



10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

Vincotech

flowSOL 1 BI (TL)		650 V / 30 A
Features		
• Booster with bypass diode + H6.5 Bridge • Rohm RGW IGBT Chipset for higher efficiency • Kelvin emitter for improved switching • Integrated NTC • Low inductive design		
Target applications		
• Solar Inverters		
Types		
• 10-FY07BVA030RW-LF42E28 • 10-PY07BVA030RW-LF42E28Y		
flow 1 12 mm housing		
Solder pins	Press-fit pins	
A photograph showing two rows of solder pins on a printed circuit board (PCB) for a 12 mm housing. The pins are arranged in a grid pattern, with some pins being taller than others to provide height for different components.	A photograph showing two rows of press-fit pins on a PCB for a 12 mm housing. These pins are designed to be inserted into a housing and then crimped onto a wire or terminal.	
Schematic		
A detailed circuit schematic for the flowSOL 1 BI (TL). It features an H-bridge on the left with four IGBTs and anti-parallel diodes. This is connected to a central boost converter stage. The boost converter includes a diode bridge, a resistor, and a capacitor. The output of the boost converter is connected to a full-bridge rectifier on the right, which consists of four diodes. The entire circuit is controlled by a central microcontroller or driver IC.		

Maximum Ratings

$T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Low Buck Switch / High Buck Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	35	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	63	W
Gate-emitter voltage	V_{GES}		± 30	V
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$



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Maximum Ratings

$T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Buck Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	28	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	51	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Boost Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	28	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	59	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC} V_{CC}	$T_j \leq 150^\circ\text{C}$ $V_{GE} = 15\text{ V}$	6 360	μs V
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

Low Boost Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	28	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	51	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$

High Boost Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	28	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	40	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	51	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$



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Maximum Ratings

$T_j = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
Input Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	35	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	120	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	63	W
Gate-emitter voltage	V_{GES}		± 30	V
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$
Input Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	33	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	50	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$
Input Boost Sw. Protection Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	14	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	20	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	33	W
Maximum junction temperature	T_{jmax}		175	$^\circ\text{C}$
ByPass Diode				
Peak repetitive reverse voltage	V_{RRM}		1600	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	46	A
Surge (non-repetitive) forward current	I_{FSM}	50 Hz Single Half Sine Wave $t_p = 10 \text{ ms}$	270	A
Surge current capability	I^{2t}		370	A^2s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80^\circ\text{C}$	56	W
Maximum junction temperature	T_{jmax}		150	$^\circ\text{C}$



Maximum Ratings

$T_j = 25 \text{ } ^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Condition	Value	Unit
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Module Properties

Thermal Properties

Storage temperature	T_{stg}		-40...+125	°C
Operation temperature under switching condition	T_{jop}		-40...($T_{\text{jmax}} - 25$)	°C

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage*	$t_p = 2 \text{ s}$	6000	V
		AC Voltage	$t_p = 1 \text{ min}$	2500	V
Creepage distance				min. 12,7	mm
Clearance		Press-fit pins / Solder pins		7,93 / 8,16	mm
Comparative Tracking Index	CTI			> 200	

*100 % tested in production



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V] V_{GS} [V]	V_{CE} [V] V_{DS} [V] V_F [V]	I_c [A] I_D [A] I_F [A]	T_j [°C]	Min	Typ	Max		

Low Buck Switch / High Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = 5$ V			0,02	25	5	6	7	V
Collector-emitter saturation voltage	V_{CESat}		15		30	25 125 150		1,44 1,60 1,63	1,9	V
Collector-emitter cut-off current	I_{CES}		0	650		25			10	µA
Gate-emitter leakage current	I_{GES}		30	0		25			200	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	$f = 1$ Mhz	0	30	25	2530	65	46		pF
Output capacitance	C_{oes}									
Reverse transfer capacitance	C_{res}									
Gate charge	Q_g		15	400	30	25		84		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,50		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	± 15	350	30	25		42		
Rise time	t_r					125		43		
						150		43		
Turn-off delay time	$t_{d(off)}$					25		7		
Fall time	t_f					125		7		
						150		7		
Turn-on energy (per pulse)	E_{on}	$Q_{fwd} = 2 \mu C$ $Q_{fwd} = 2,7 \mu C$ $Q_{fwd} = 3 \mu C$				25		59		
						125		67		
						150		68		
Turn-off energy (per pulse)	E_{off}					25		22		
						125		37		
						150		52		
						25		0,374		
						125		0,471		
						150		0,495		
						25		0,256		
						125		0,387		
						150		0,441		



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	I_D [A]	T_j [°C]	Min	Typ	Max	
			V_{GS} [V]	V_{DS} [V]	I_F [A]	I_F [A]					

Buck Diode

Static

Forward voltage	V_F				20	25 125 150		1,56 1,51 1,51	1,92		V
Reverse leakage current	I_R			650		25			1,28		μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,88			K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt = 6385 \text{ A}/\mu\text{s}$ $di/dt = 6312 \text{ A}/\mu\text{s}$ $di/dt = 6023 \text{ A}/\mu\text{s}$	± 15	350	30	25		70			A
Reverse recovery time	t_{rr}					125		76			
						150		78			
						25		51			
						125		91			
						150		94			ns
Recovered charge	Q_r					25		2,03			
						125		2,74			μC
						150		2,99			
Reverse recovered energy	E_{rec}					25		0,532			
						125		0,690			
						150		0,751			mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25		5003			
						125		5228			
						150		5263			$A/\mu\text{s}$



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	I_D [A]	T_j [°C]	Min	Typ	Max	
			V_{GS} [V]	V_{DS} [V]	I_F [A]	I_F [A]					

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00029	25	5,1	5,8	6,4	V
Collector-emitter saturation voltage	V_{CESat}		15		20	25 125 150	1,03	1,49 1,67 1,71	1,87	V
Collector-emitter cut-off current	I_{CES}		0	650		25			1	µA
Gate-emitter leakage current	I_{GES}		20	0		25			150	nA
Input capacitance	C_{ies}	$f = 1 \text{ MHz}$	0	25	25			1100		pF
Reverse transfer capacitance	C_{res}							32		
Gate charge	Q_g		15	480	20	25		120		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,60		K/W
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Dynamic (T21 - D12)

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 16 \Omega$ $R_{goff} = 16 \Omega$	± 15	350	20	25		63		ns
Rise time	t_r					125		61		
						150		60		
Turn-off delay time	$t_{d(off)}$					25		20		
Fall time	t_f					125		20		
Turn-on energy (per pulse)	E_{on}					150		20		
Turn-off energy (per pulse)	E_{off}	$Q_{fFWD} = 0,6 \mu\text{C}$ $Q_{fFWD} = 1,2 \mu\text{C}$ $Q_{fFWD} = 1,4 \mu\text{C}$	± 15	350	20	25		132		mWs
						125		149		
						150		153		
						25		80		
						125		122		
						150		131		
						25		0,534		
						125		0,692		
						150		0,762		
						25		0,439		
						125		0,611		
						150		0,643		



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	T_j [°C]	Min	Typ	Max		
			V_{GS} [V]	V_{DS} [V]	I_D [A]						

Low Boost Diode

Static

Forward voltage	V_F				20	25 125 150		1,56 1,51 1,51	1,92	V
Reverse leakage current	I_R			650		25			1,28	µA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,88		K/W
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Dynamic (T21 - D12)

Peak recovery current	I_{RRM}	$di/dt = 1250 \text{ A/}\mu\text{s}$ $di/dt = 996 \text{ A/}\mu\text{s}$ $di/dt = 1075 \text{ A/}\mu\text{s}$	± 15	350	20	25		12		A
Reverse recovery time	t_{rr}					125		16		
						150		17		
Recovered charge	Q_r					25		93		ns
						125		122		
						150		134		
Reverse recovered energy	E_{rec}					25		0,633		µC
						125		1,19		
						150		1,37		
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25		0,100		mWs
						125		0,190		
						150		0,227		
						25		78		
						125		223		
						150		177		A/µs



10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	I_D [A]	T_j [°C]	Min	Typ	Max	
			V_{GS} [V]	V_{DS} [V]	I_F [A]	I_F [A]					

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00029	25	5,1	5,8	6,4	V
Collector-emitter saturation voltage	V_{CESat}		15		20	25 125 150	1,03	1,49 1,67 1,71	1,87	V
Collector-emitter cut-off current	I_{CES}		0	650		25			1	μA
Gate-emitter leakage current	I_{GES}		20	0		25			150	nA
Input capacitance	C_{ies}	$f = 1 \text{ MHz}$	0	25	25			1100		pF
Reverse transfer capacitance	C_{res}							32		
Gate charge	Q_g		15	480	20	25		120		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,60		K/W
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Dynamic (T21 - D20)

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 16 \Omega$ $R_{goff} = 16 \Omega$	± 15	350	20	25		62		ns
Rise time	t_r					125		61		
						150		61		
Turn-off delay time	$t_{d(off)}$					25		22		
						125		21		
Fall time	t_f					150		20		
Turn-on energy (per pulse)	E_{on}	$Q_{fFWD} = 0,6 \mu\text{C}$ $Q_{fFWD} = 1,2 \mu\text{C}$ $Q_{fFWD} = 1,4 \mu\text{C}$				25		131		mWs
						125		150		
Turn-off energy (per pulse)	E_{off}					150		154		
						25		72		
						125		105		
						150		115		
						25		0,524		
						125		0,705		
						150		0,765		
						25		0,431		
						125		0,607		
						150		0,643		



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	T_j [°C]	Min	Typ	Max		
			V_{GS} [V]	V_{DS} [V]	I_D [A]						

High Boost Diode

Static

Forward voltage	V_F				20	25 125 150		1,56 1,51 1,51	1,92	V
Reverse leakage current	I_R			650		25			1,28	µA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,88		K/W
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Dynamic (T21 - D20)

Peak recovery current	I_{RRM}	$di/dt = 1272 \text{ A/}\mu\text{s}$ $di/dt = 868 \text{ A/}\mu\text{s}$ $di/dt = 1011 \text{ A/}\mu\text{s}$	± 15	350	20	25		13		A
Reverse recovery time	t_{rr}					125		17		
						150		18		
Recovered charge	Q_r					25		72		
Recovered charge	Q_r					125		114		ns
Recovered charge	Q_r					150		127		
Reverse recovered energy	E_{rec}					25		0,614		
Reverse recovered energy	E_{rec}					125		1,20		µC
Reverse recovered energy	E_{rec}					150		1,38		
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25		0,093		
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					125		0,197		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					150		0,234		
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25		221		
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					125		184		A/µs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					150		147		



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	I_D [A]	T_j [°C]	Min	Typ	Max	
			V_{GS} [V]	V_{DS} [V]	I_F [A]	I_F [A]					

Input Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = 5$ V			0,02	25	5	6	7	V
Collector-emitter saturation voltage	V_{CESat}		15		30	25 125 150		1,44 1,60 1,63	1,9	V
Collector-emitter cut-off current	I_{CES}		0	650		25			10	µA
Gate-emitter leakage current	I_{GES}		30	0		25			200	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}	$f = 1$ Mhz	0	30	25	2530	65	46		pF
Output capacitance	C_{oes}									
Reverse transfer capacitance	C_{res}									
Gate charge	Q_g		15	400	30	25		84		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,50		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	15/0	400	30	25		21		
Rise time	t_r					125		19		
						150		19		
Turn-off delay time	$t_{d(off)}$					25		8		
Fall time	t_f					125		8		
						150		8		
Turn-on energy (per pulse)	E_{on}	$Q_{rFWD} = 1,1 \mu C$ $Q_{rFWD} = 2 \mu C$ $Q_{rFWD} = 2,3 \mu C$				25		93		
						125		106		
						150		109		
Turn-off energy (per pulse)	E_{off}					25		18		
						125		30		
						150		34		
						25		0,501		
						125		0,658		
						150		0,679		
						25		0,296		
						125		0,450		
						150		0,486		



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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	I_D [A]	T_j [°C]	Min	Typ	Max	
			V_{GS} [V]	V_{DS} [V]	I_F [A]	I_F [A]					

Input Boost Diode

Static

Forward voltage	V_F				30	25 125 150		1,52 1,46 1,44	1,92		V
Reverse leakage current	I_R			650		25			1,6		µA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,92		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt = 5993 \text{ A/}\mu\text{s}$ $di/dt = 5650 \text{ A/}\mu\text{s}$ $di/dt = 5315 \text{ A/}\mu\text{s}$	15/0	400	30	25 125 150		50 63 68		A
Reverse recovery time	t_{rr}					25 125 150		42 65 73		ns
Recovered charge	Q_r					25 125 150		1,07 1,96 2,28		µC
Reverse recovered energy	E_{rec}					25 125 150		0,292 0,553 0,654		mWs
Peak rate of fall of recovery current	$(di_{rf}/dt)_{max}$					25 125 150		2522 1944 2299		A/µs

Input Boost Sw. Protection Diode

Static

Forward voltage	V_F				10	25 125		1,67 1,56	1,87		V
Reverse leakage current	I_R			650		25			0,14		µA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						2,87		K/W
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ByPass Diode

Static

Forward voltage	V_F				35	25 125		1,17 1,13		V	
Reverse leakage current	I_R			1600		25			50		µA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,25		K/W
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Characteristic Values

Parameter	Symbol	Conditions						Value			Unit
			V_{GE} [V]	V_{CE} [V]	I_c [A]	T_j [°C]	Min	Typ	Max		
			V_{GS} [V]	V_{DS} [V]	I_D [A]	I_F [A]					

Thermistor

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta R/R$	$R_{100} = 1484 \Omega$				100	-5	5		%
Power dissipation	P					25		5		mW
Power dissipation constant						25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. ±1 %				25		3962		K
B-value	$B_{(25/100)}$	Tol. ±1 %				25		4000		K
Vincotech NTC Reference									I	



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Low Buck Switch / High Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

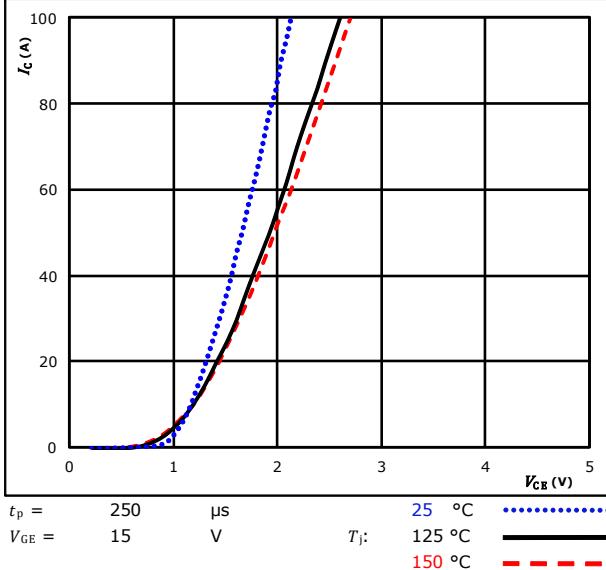


figure 2. IGBT

Typical output characteristics

$$I_C = f(V_{CE})$$

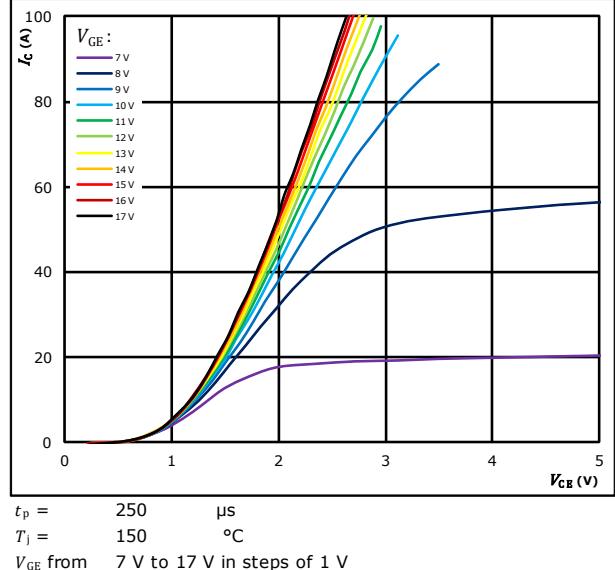


figure 3. IGBT

Typical transfer characteristics

$$I_C = f(V_{GE})$$

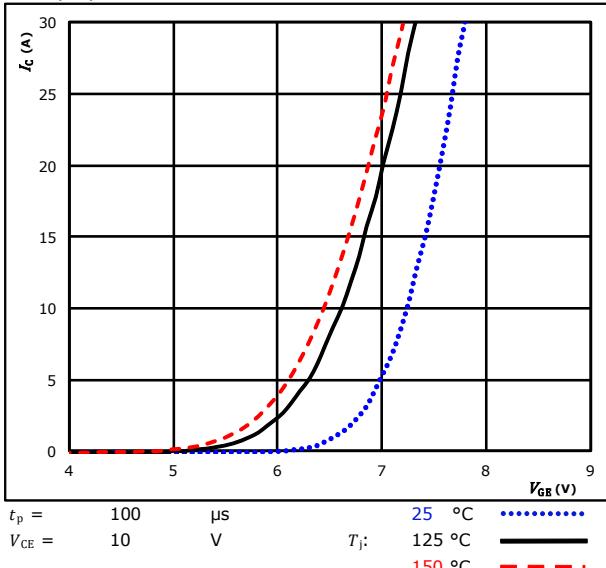
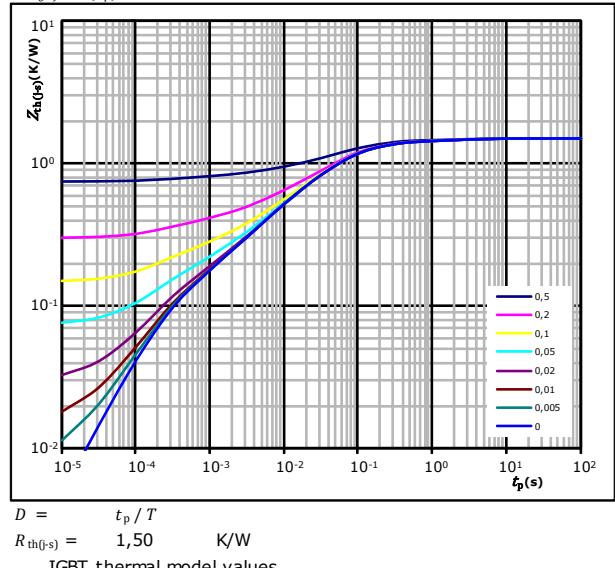


figure 4. IGBT

Transient thermal impedance as function of pulse duration

$$Z_{th(j-s)} = f(t_p)$$

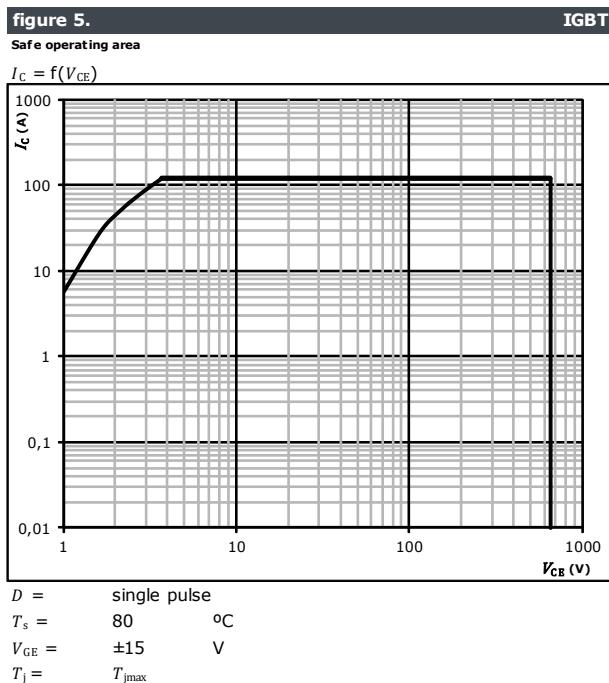




10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

Vincotech

Low Buck Switch / High Buck Switch Characteristics

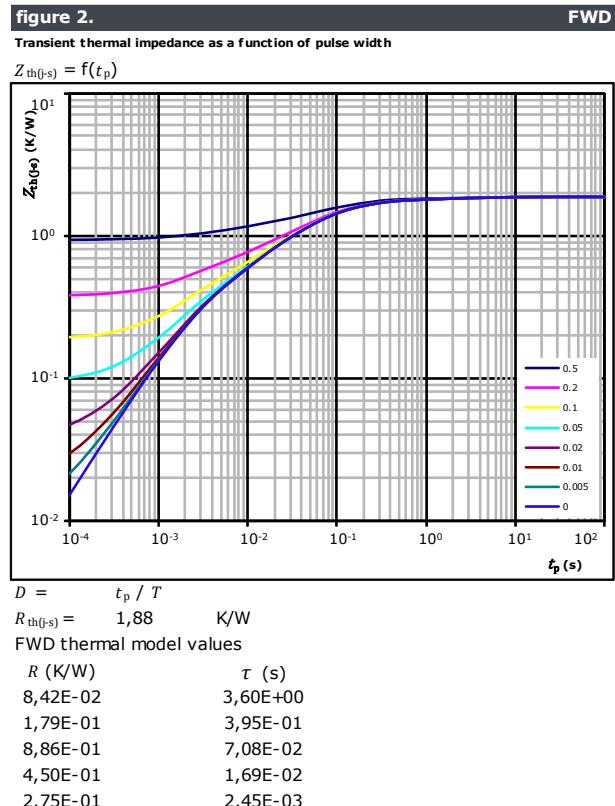
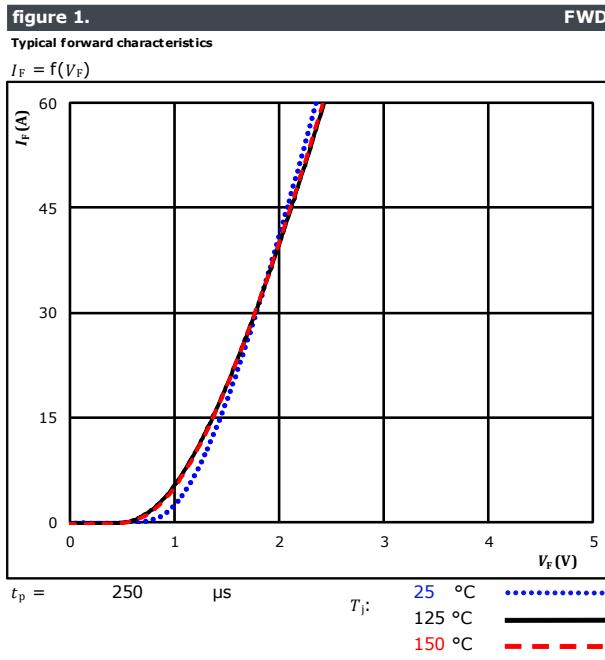




**10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y**
datasheet

Vincotech

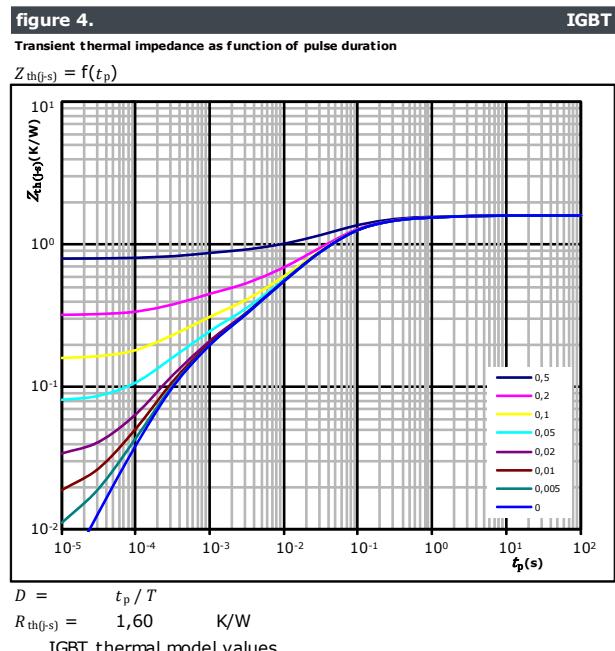
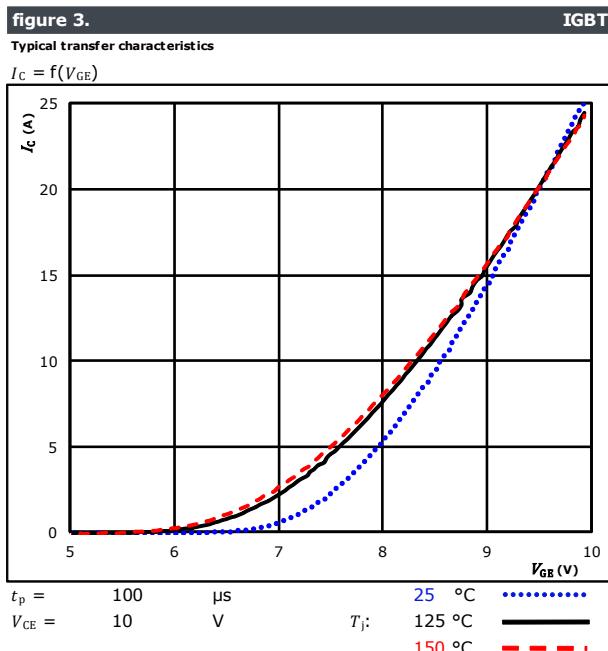
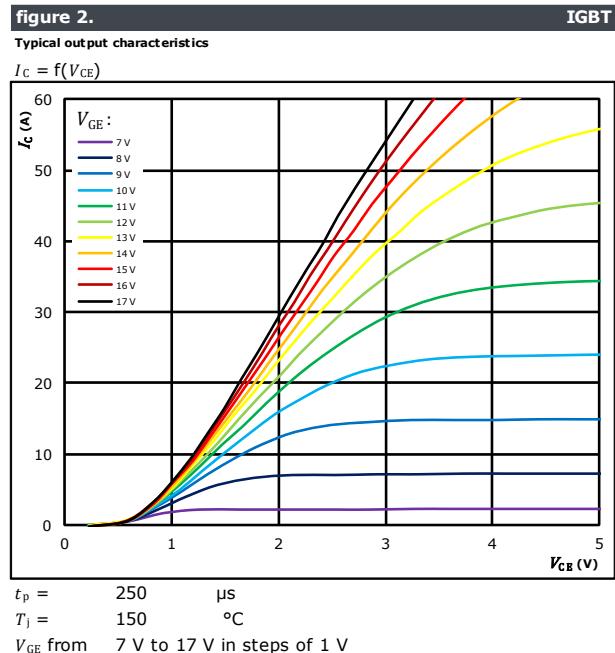
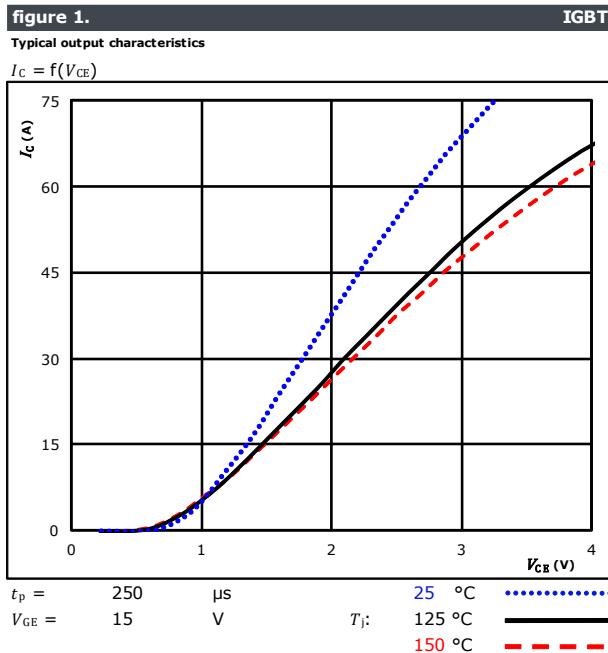
Buck Diode Characteristics





Vincotech

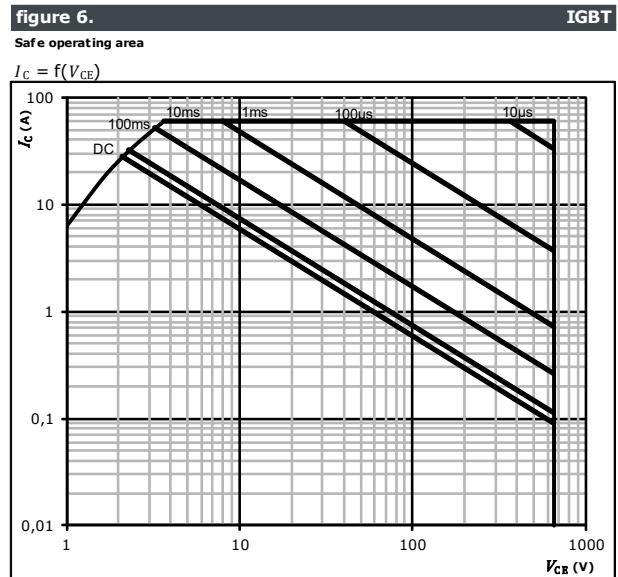
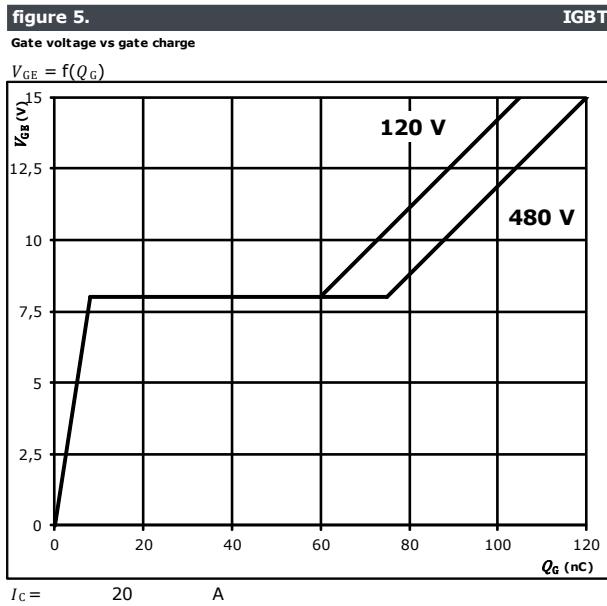
Boost Switch Characteristics



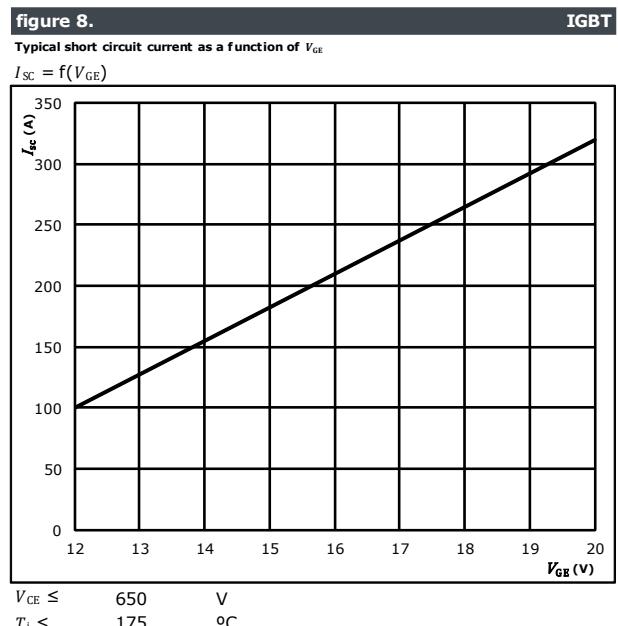
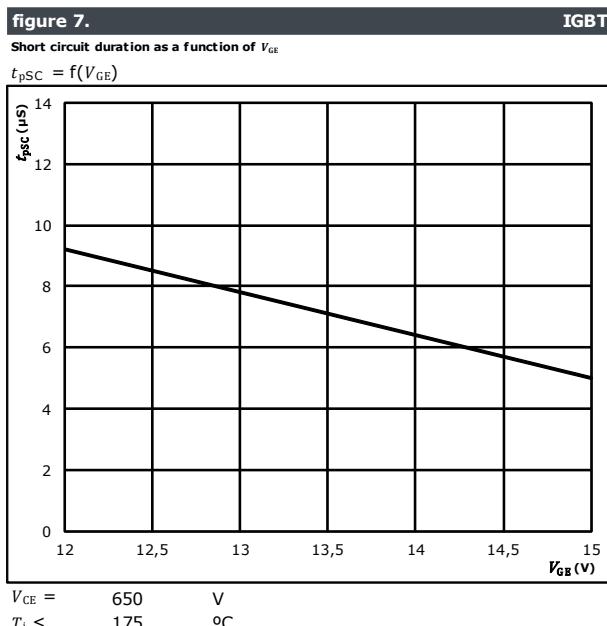


Vincotech

Boost Switch Characteristics

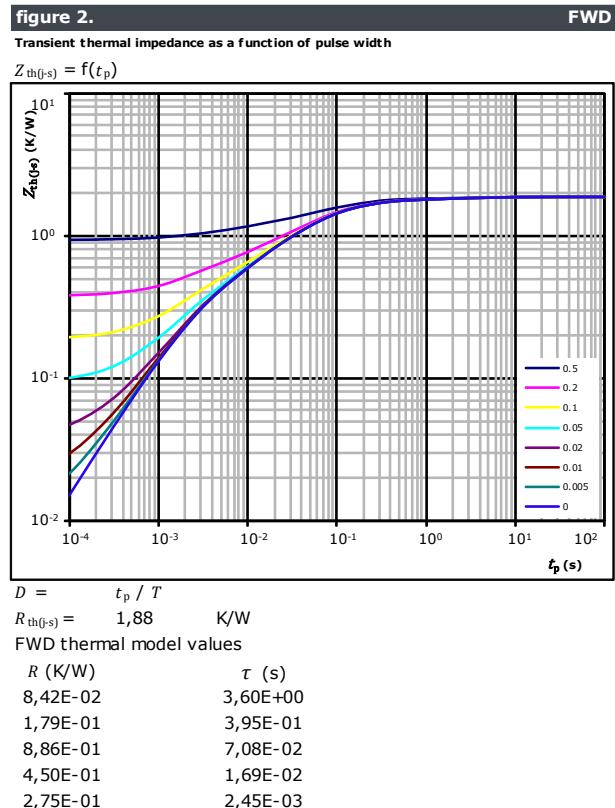
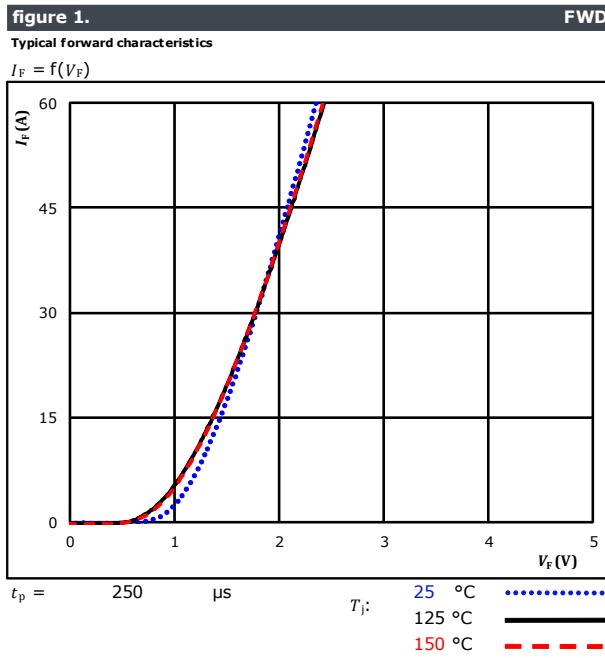


D = single pulse
 T_s = 80 °C
 V_{GE} = ±15 V
 T_j = T_{jmax}





Low Boost Diode Characteristics

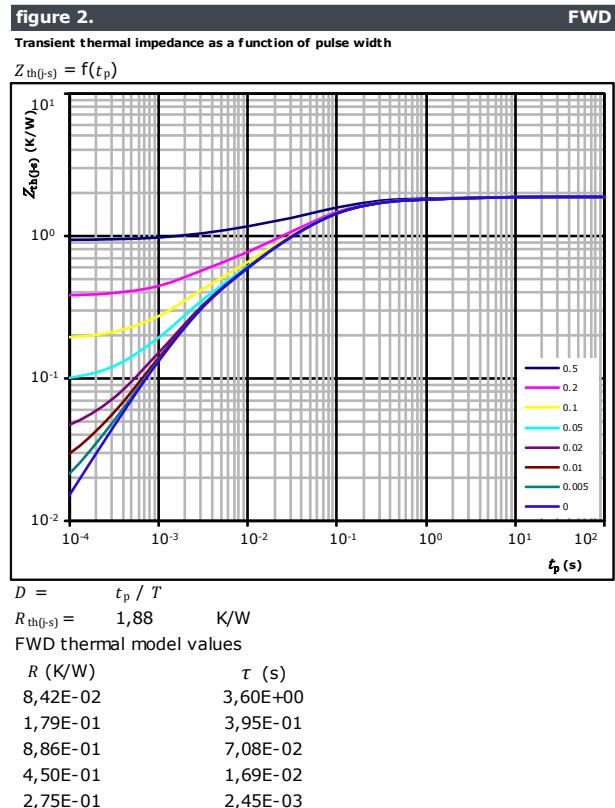
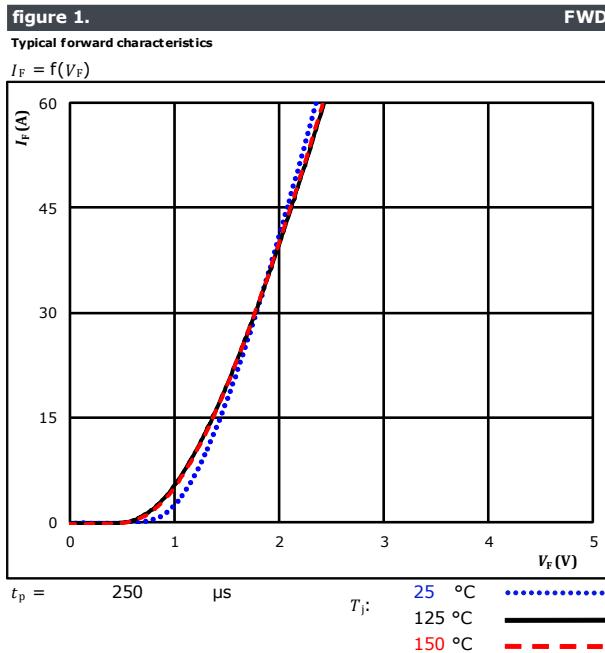




**10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y**
datasheet

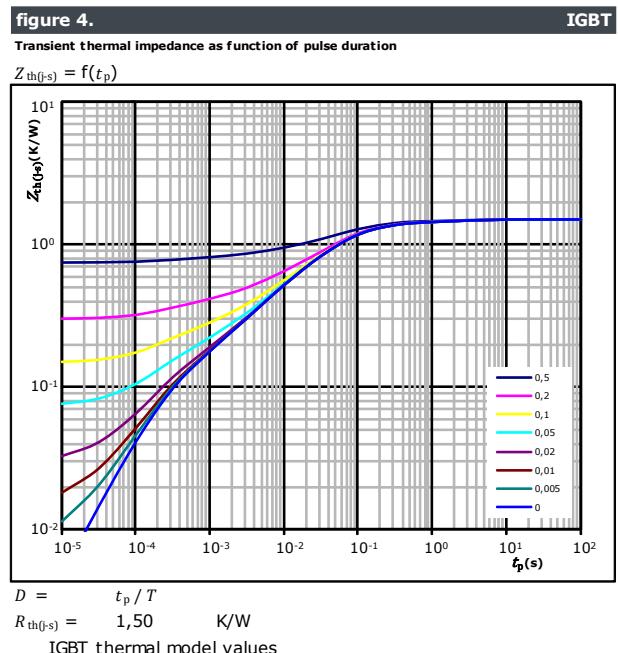
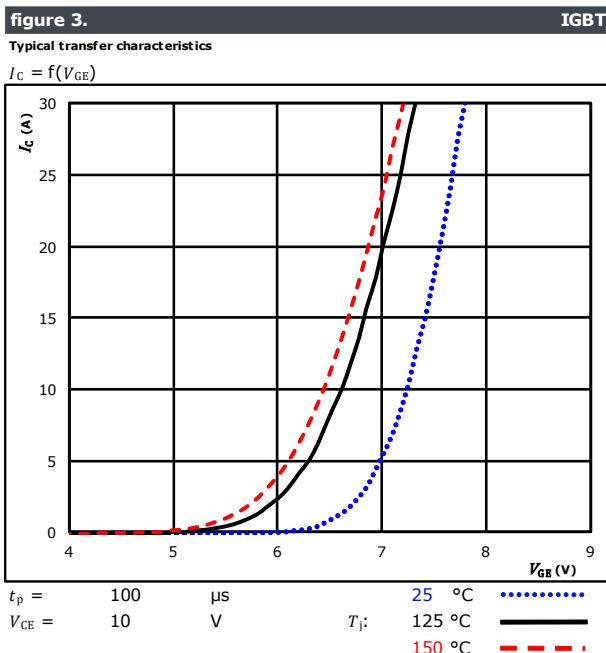
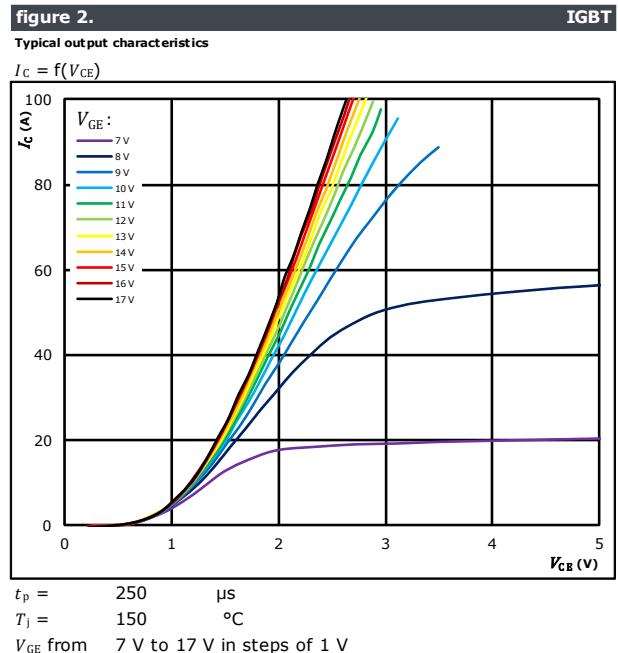
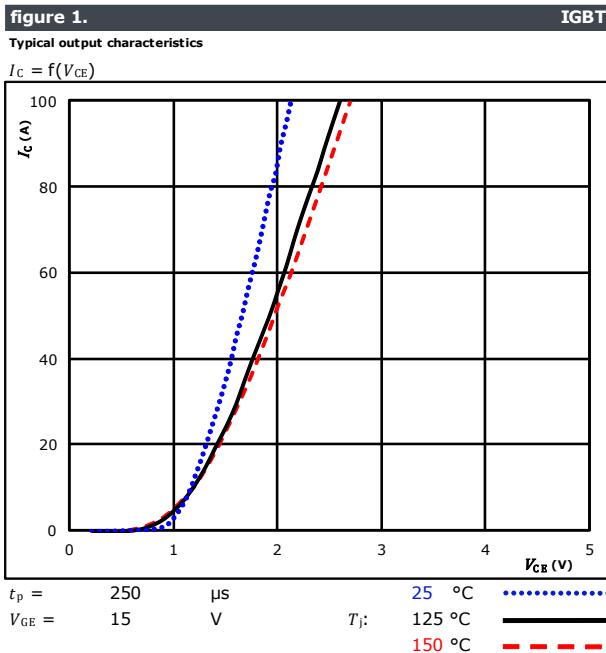
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High Boost Diode Characteristics





Input Boost Switch Characteristics

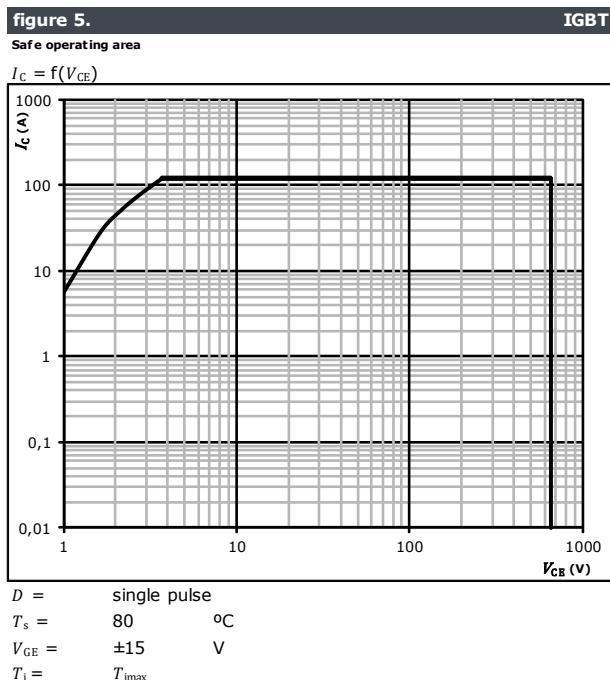




10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

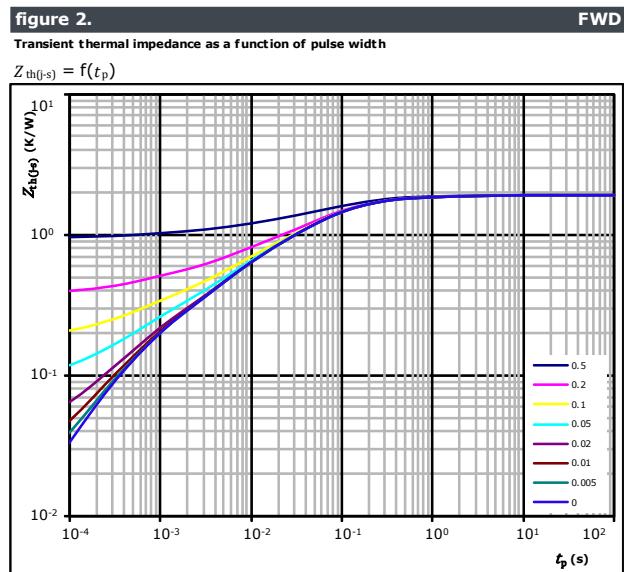
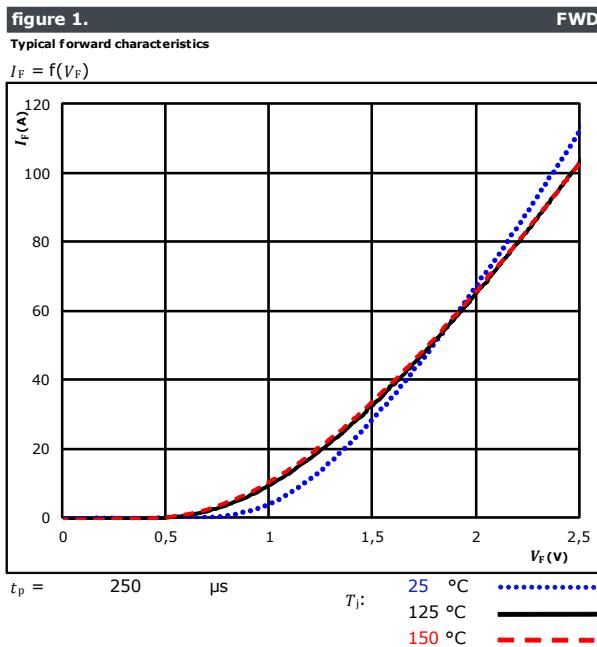
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Input Boost Switch Characteristics





Input Boost Diode Characteristics

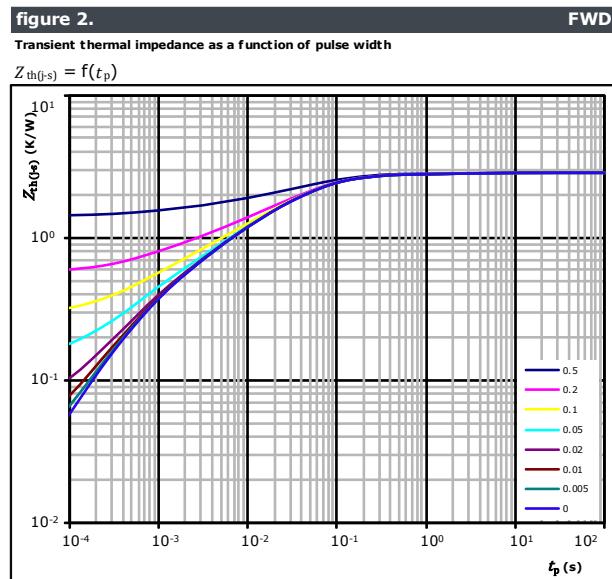
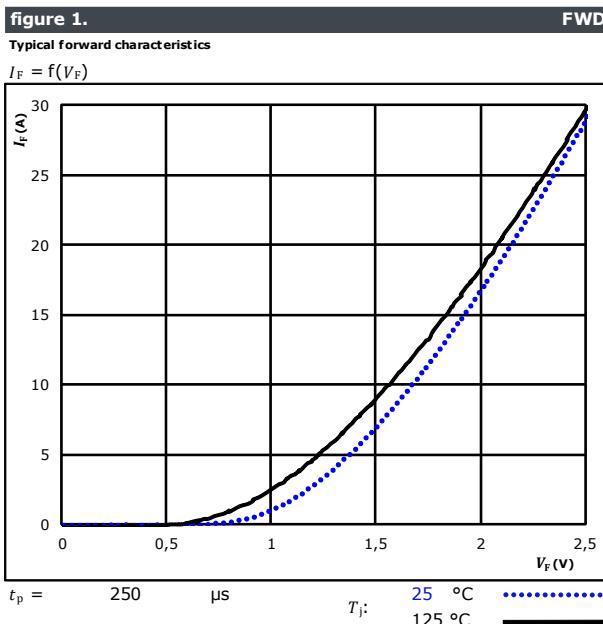




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**10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y**
datasheet

Input Boost Sw. Protection Diode Characteristics



FWD thermal model values

R (K/W)	τ (s)
6,53E-02	3,94E+00
1,48E-01	4,48E-01
1,31E+00	5,96E-02
7,32E-01	1,36E-02
4,04E-01	2,79E-03
2,11E-01	5,37E-04



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10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

ByPass Diode Characteristics

figure 1.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

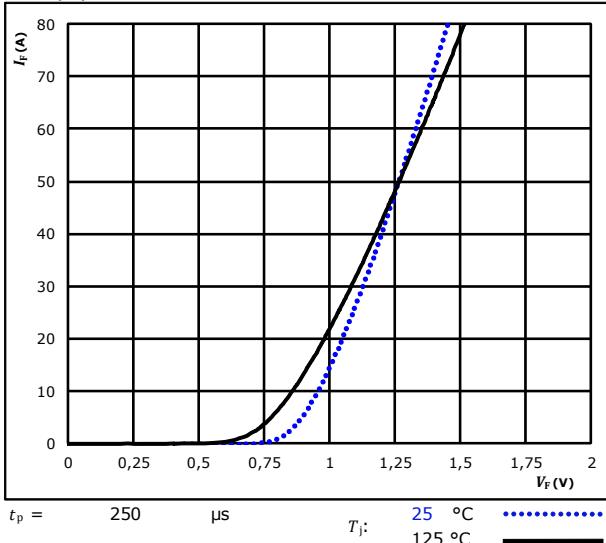
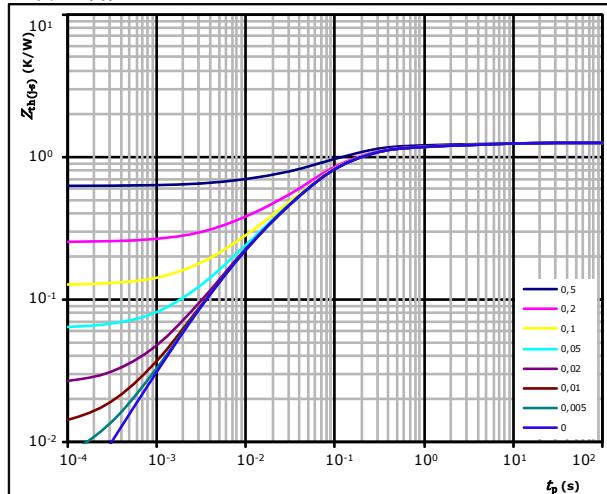


figure 2.

FWD

Transient thermal impedance as a function of pulse width

$$Z_{th(f-s)} = f(t_p)$$



$$D = t_p / T$$

$$R_{th(f-s)} = 1,25 \text{ K/W}$$

FWD thermal model values

R (K/W)	τ (s)
8,00E-02	5,22E+00
1,56E-01	4,18E-01
6,95E-01	8,82E-02
2,23E-01	3,07E-02
9,97E-02	5,99E-03

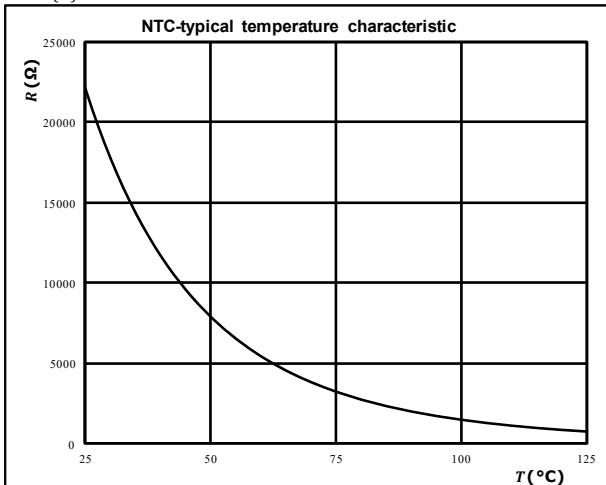
Thermistor Characteristics

figure 1.

Thermistor

Typical NTC characteristic as a function of temperature

$$R = f(T)$$





Vincotech

Low Buck / High Buck Switching Characteristics

figure 1.

Typical switching energy losses as a function of collector current

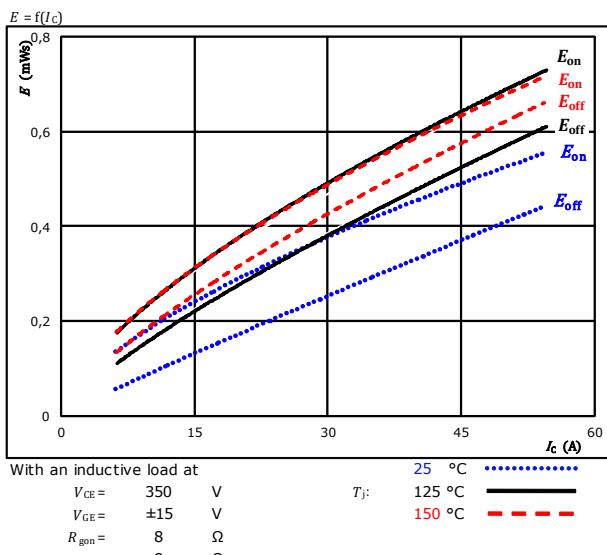


figure 2.

Typical switching energy losses as a function of gate resistor

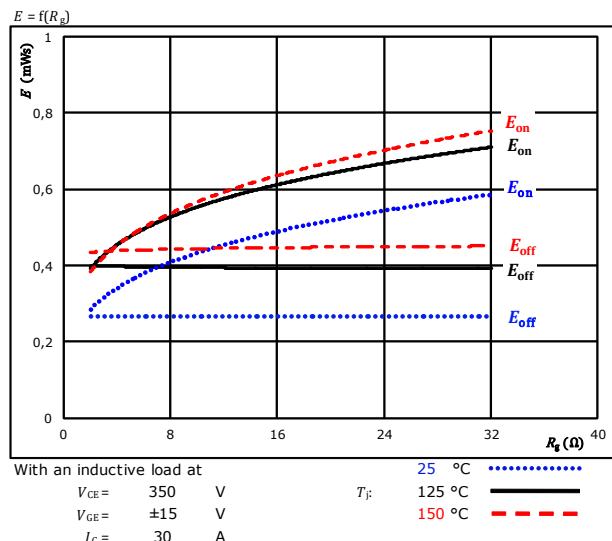


figure 3.

Typical reverse recovered energy loss as a function of collector current

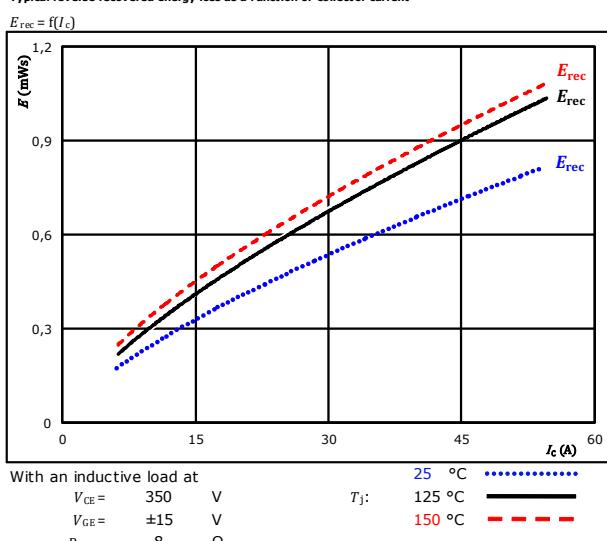
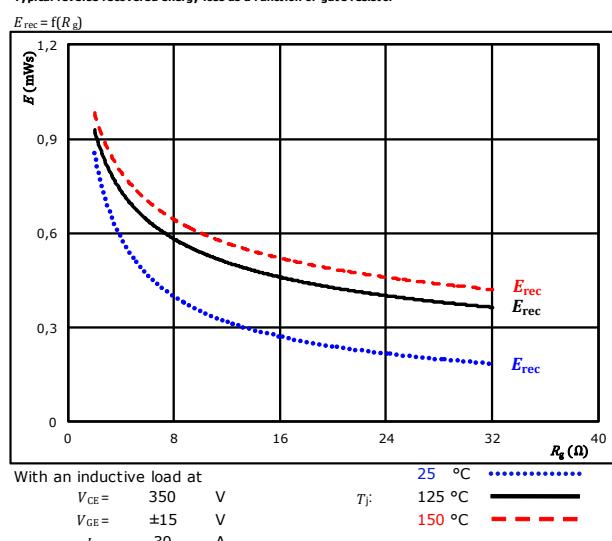


figure 4.

Typical reverse recovered energy loss as a function of gate resistor



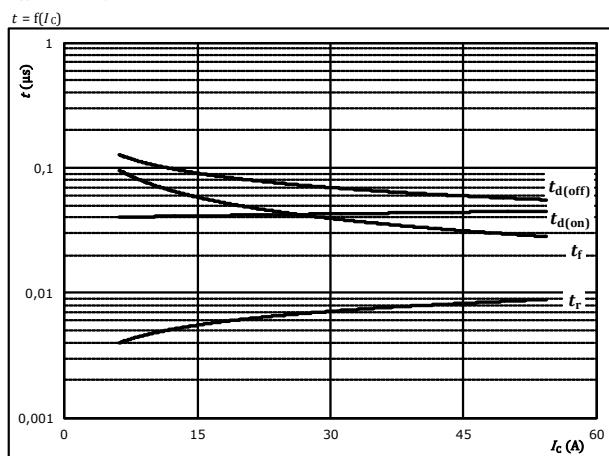


Vincotech

Low Buck / High Buck Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

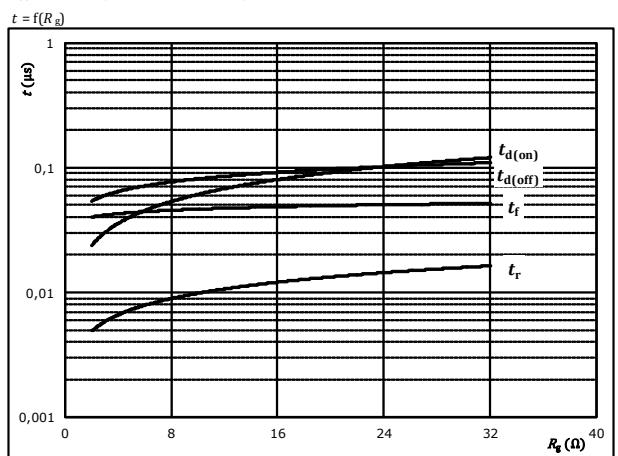


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

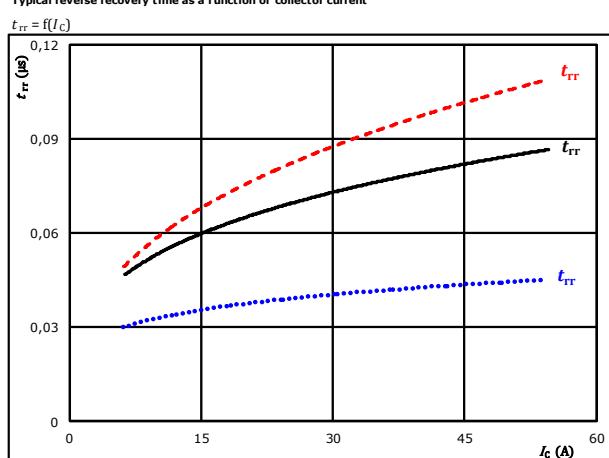


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	30	A

figure 7. FWD

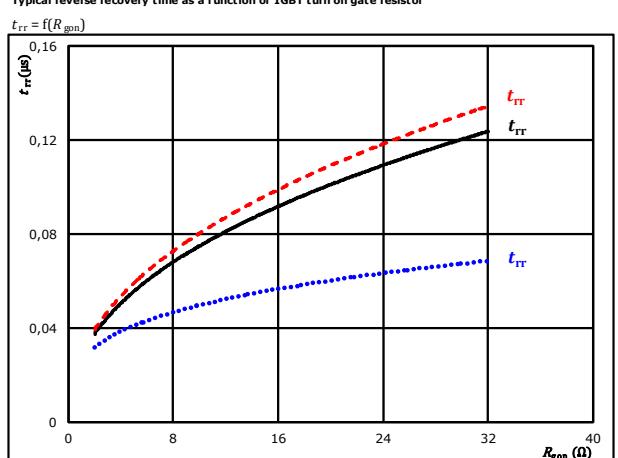
Typical reverse recovery time as a function of collector current



At	$V_{CE} =$	350	V	25 °C
	$V_{GE} =$	±15	V	$T_J =$	125 °C ———
	$R_{gon} =$	8	Ω		150 °C - - -

figure 8. FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor

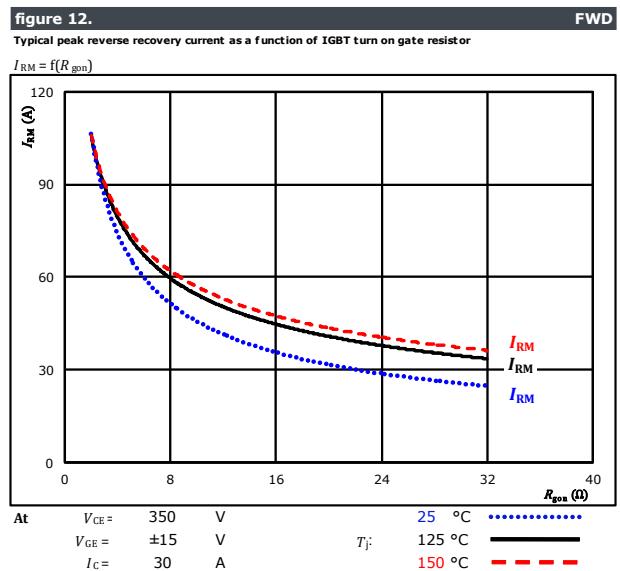
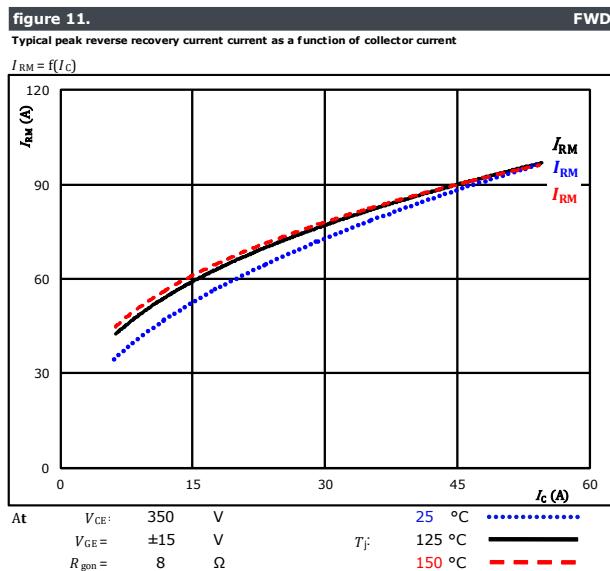
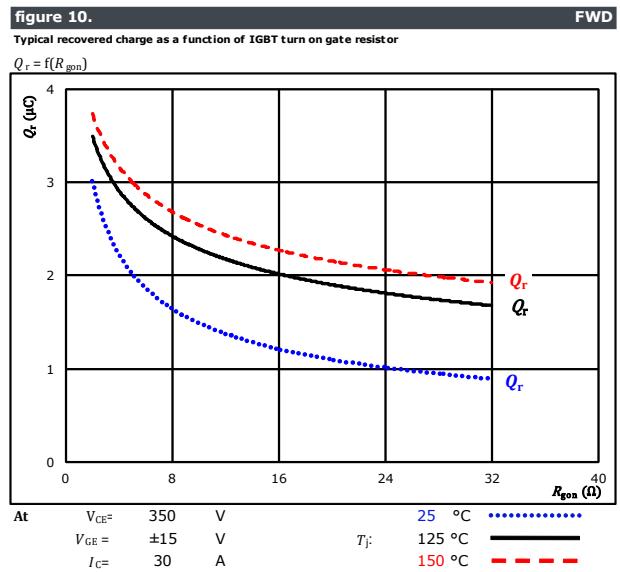
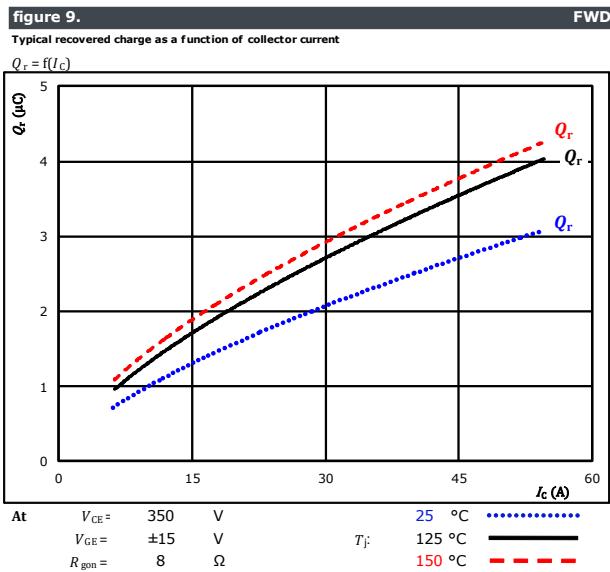


At	$V_{CE} =$	350	V	25 °C
	$V_{GE} =$	±15	V	$T_J =$	125 °C ———
	$I_C =$	30	A		150 °C - - -



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Low Buck / High Buck Switching Characteristics





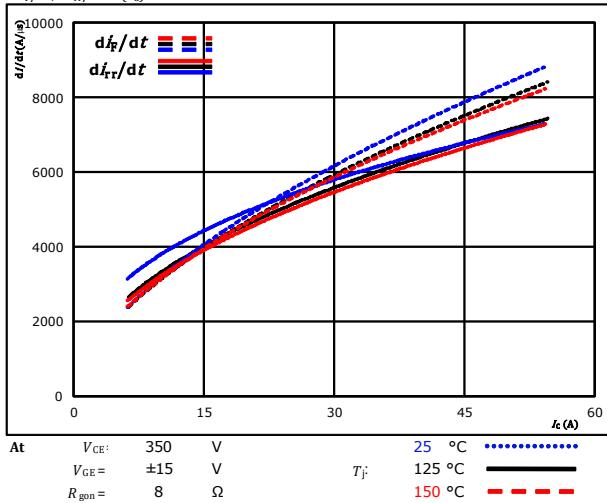
Vincotech

Low Buck / High Buck Switching Characteristics

figure 13.

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

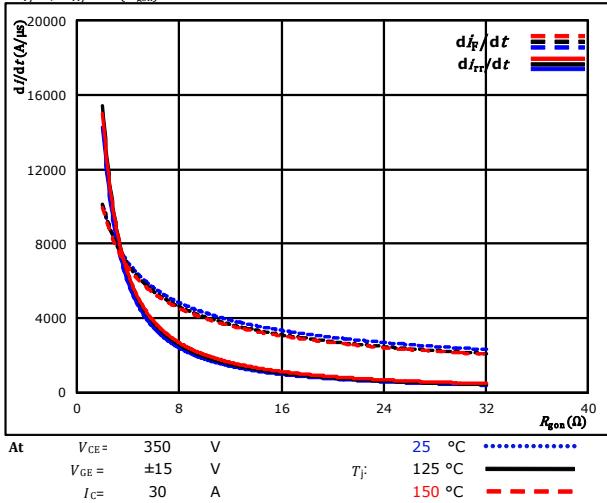


FWD

figure 14.

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$di_F/dt, di_{rr}/dt = f(R_{gon})$



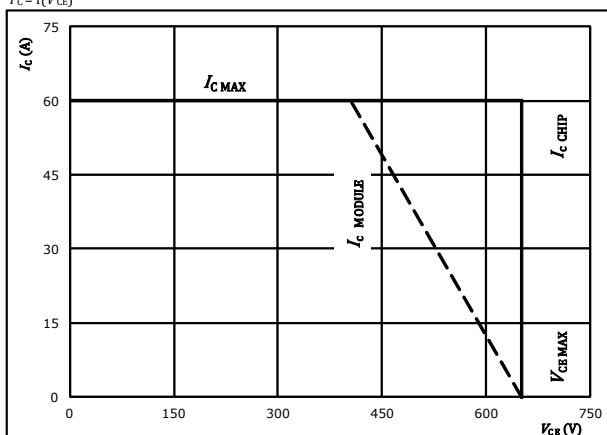
FWD

figure 15.

IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$





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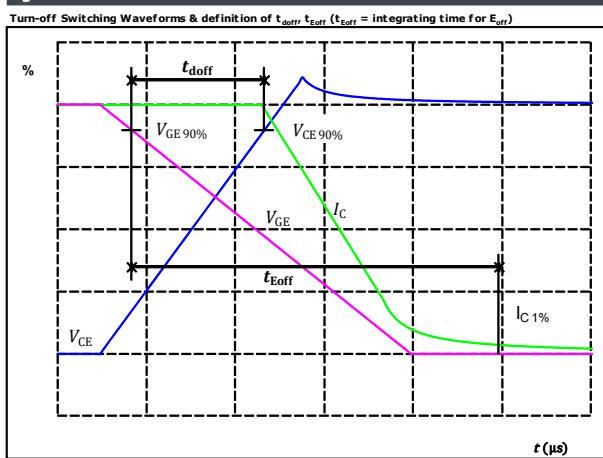
Low Buck / High Buck Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

figure 1.

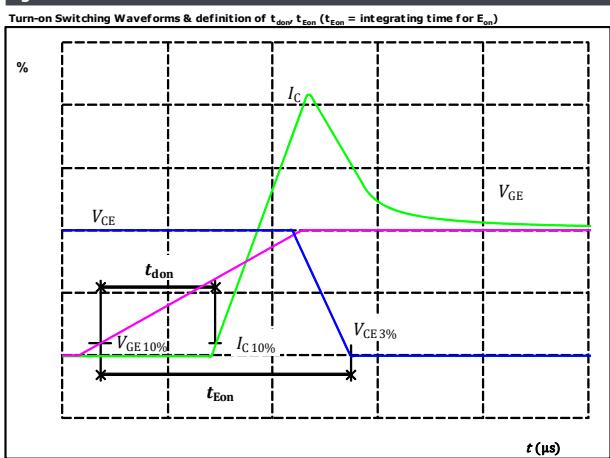
IGBT



$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	30	A
$t_{doff} =$	67	ns

figure 2.

IGBT

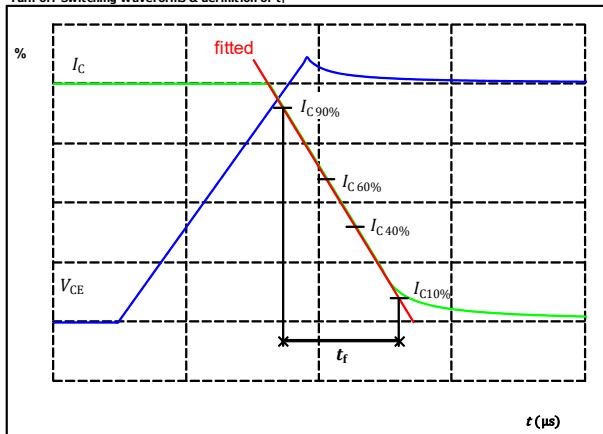


$V_{GE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	30	A
$t_{don} =$	43	ns

figure 3.

IGBT

Turn-off Switching Waveforms & definition of t_f

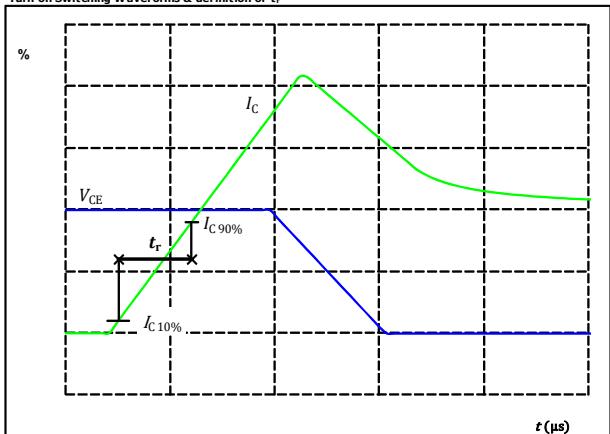


$V_C(100\%) =$	350	V
$I_C(100\%) =$	30	A
$t_f =$	37	ns

figure 4.

IGBT

Turn-on Switching Waveforms & definition of t_r

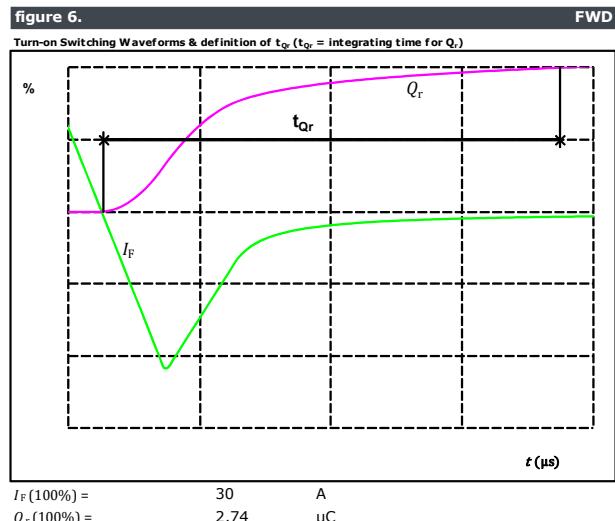
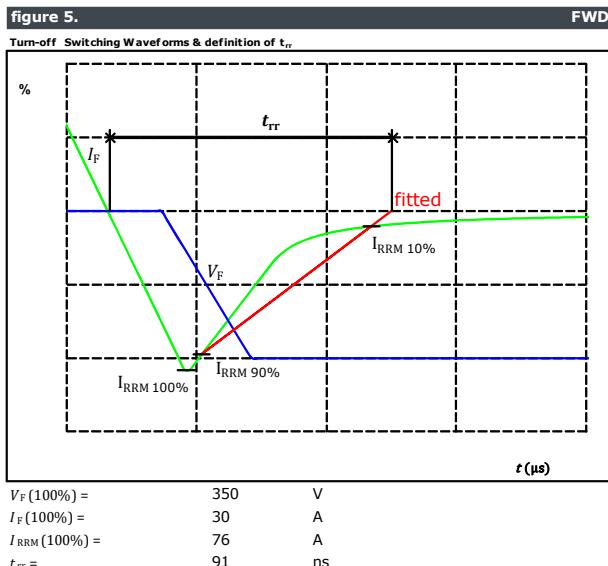


$V_C(100\%) =$	350	V
$I_C(100\%) =$	30	A
$t_r =$	7	ns



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Low Buck / High Buck Switching Characteristics

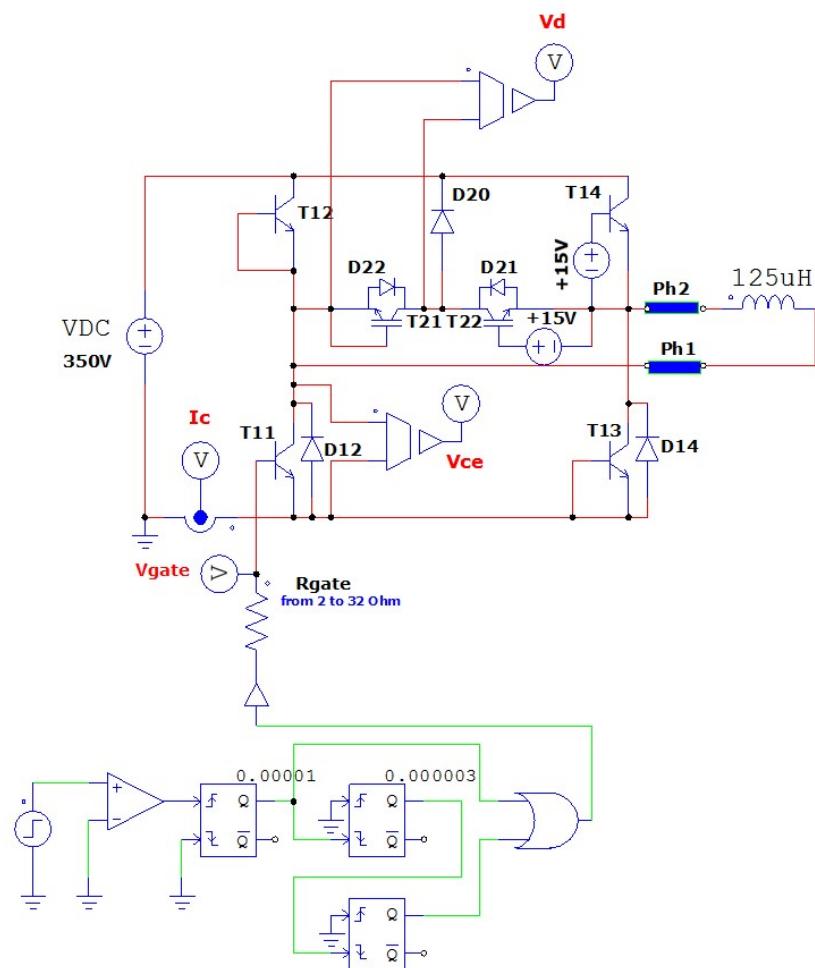




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Low Buck / High Buck Switching Measurement circuit

figure 1.





Low Boost Switching Characteristics

figure 1.

Typical switching energy losses as a function of collector current

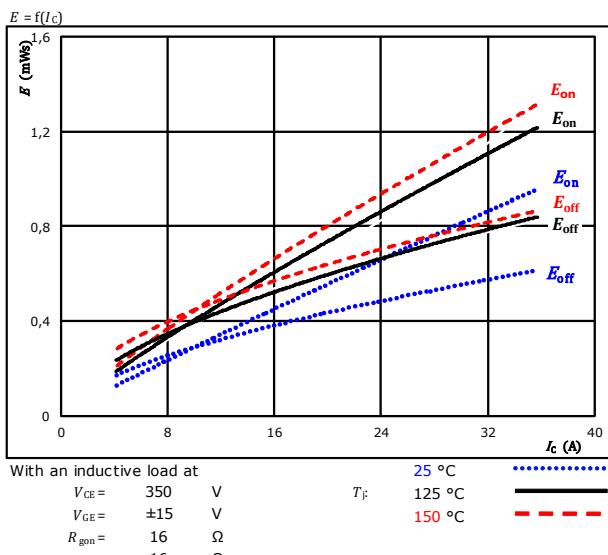


figure 2.

Typical switching energy losses as a function of gate resistor

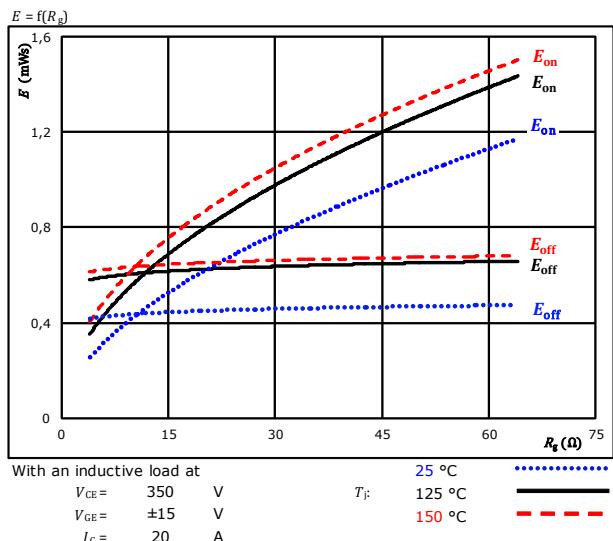


figure 3.

Typical reverse recovered energy loss as a function of collector current

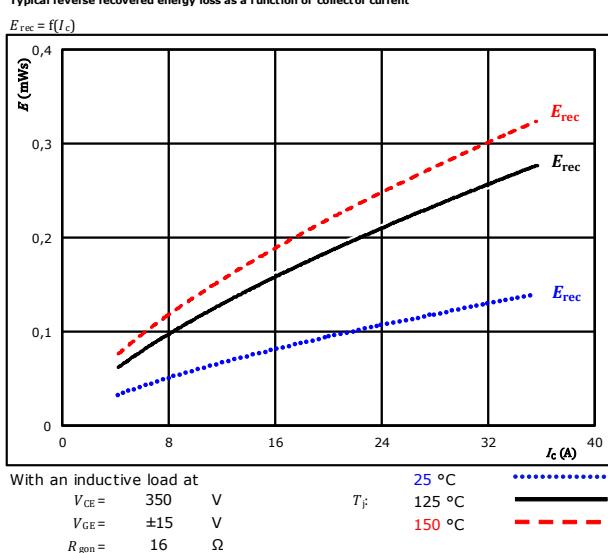
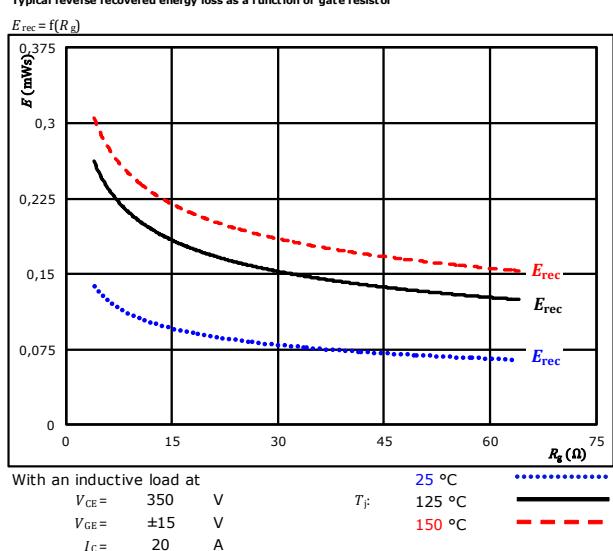


figure 4.

Typical reverse recovered energy loss as a function of gate resistor



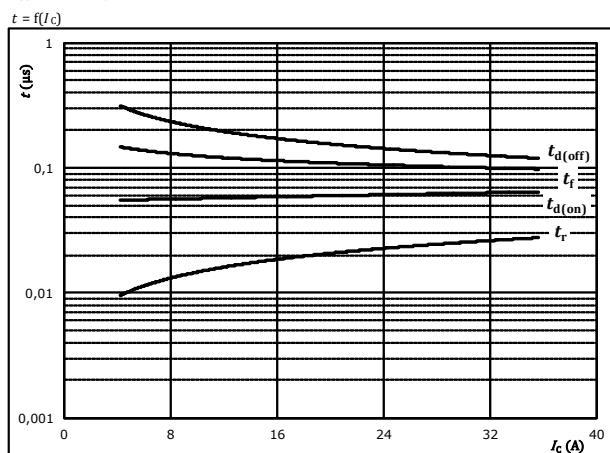


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Low Boost Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

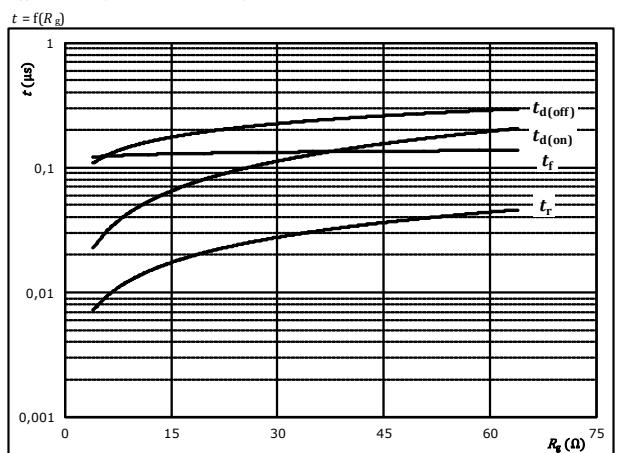


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	16	Ω
$R_{goff} =$	16	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

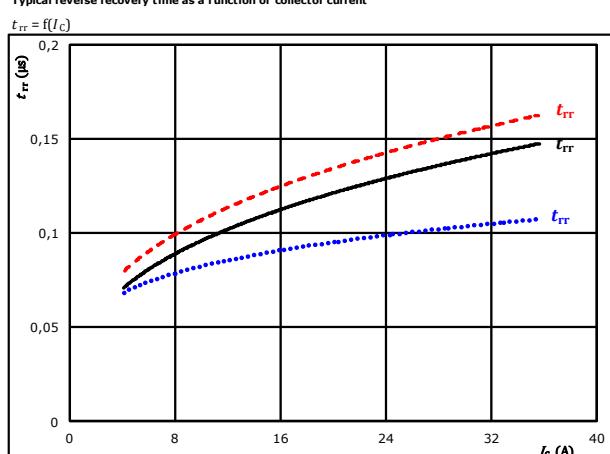


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	20	A

figure 7. FWD

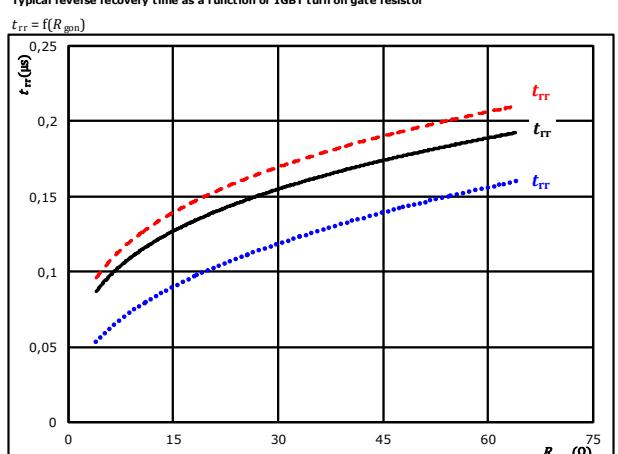
Typical reverse recovery time as a function of collector current



At $V_{CE} = 350$ V $T_J = 25$ °C $t_{rr} = 0.06$ μ s
 $V_{GE} = \pm 15$ V $I_C = 20$ A $t_{rr} = 0.06$ μ s
 $R_{gon} = 16$ Ω $T_J = 125$ °C $t_{rr} = 0.18$ μ s
 $R_{goff} = 16$ Ω $T_J = 150$ °C $t_{rr} = 0.18$ μ s

figure 8. FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor



At $V_{CE} = 350$ V $T_J = 25$ °C $t_{rr} = 0.08$ μ s
 $V_{GE} = \pm 15$ V $I_C = 20$ A $t_{rr} = 0.08$ μ s
 $R_{gon} = 16$ Ω $T_J = 125$ °C $t_{rr} = 0.22$ μ s
 $R_{goff} = 16$ Ω $T_J = 150$ °C $t_{rr} = 0.22$ μ s



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Low Boost Switching Characteristics

figure 9.

Typical recovered charge as a function of collector current

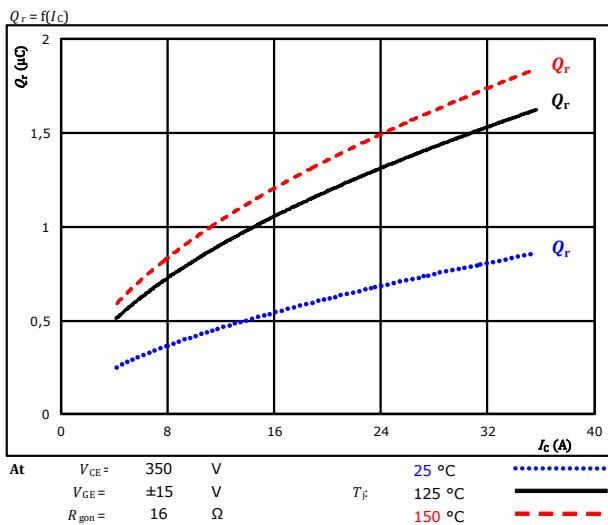


figure 10.

Typical recovered charge as a function of IGBT turn on gate resistor

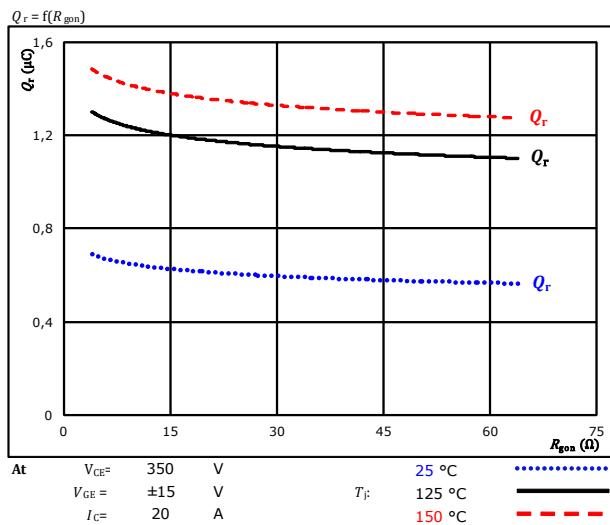


figure 11.

Typical peak reverse recovery current as a function of collector current

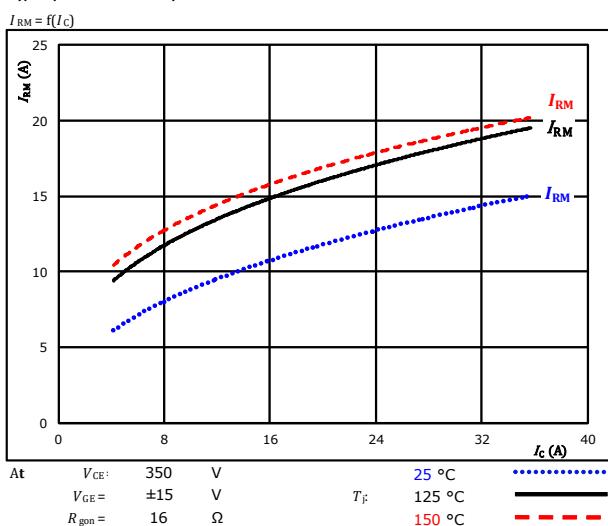
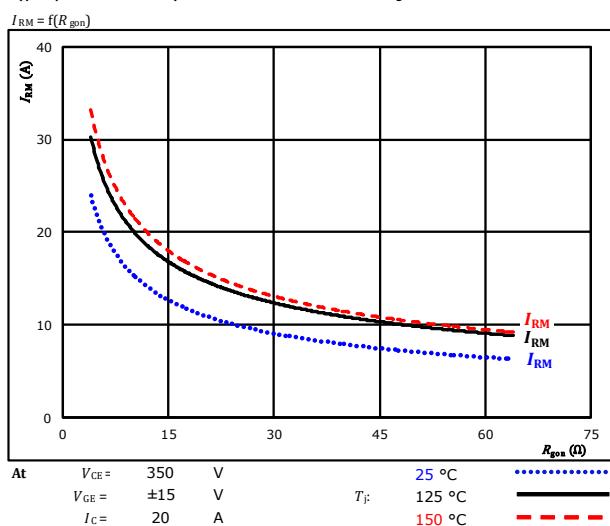


figure 12.

Typical peak reverse recovery current as a function of IGBT turn on gate resistor





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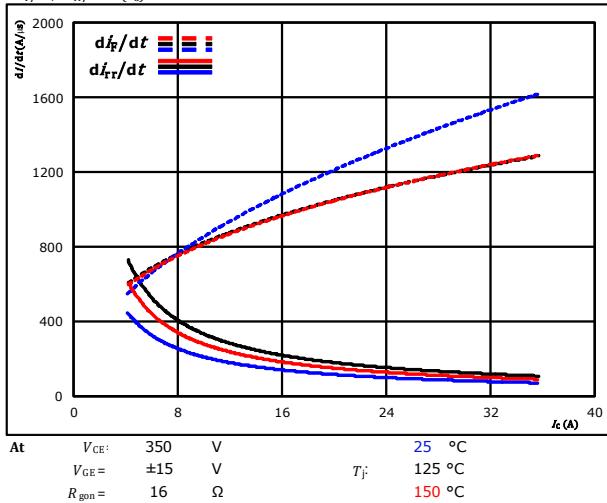
**10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y**
datasheet

Low Boost Switching Characteristics

figure 13.

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

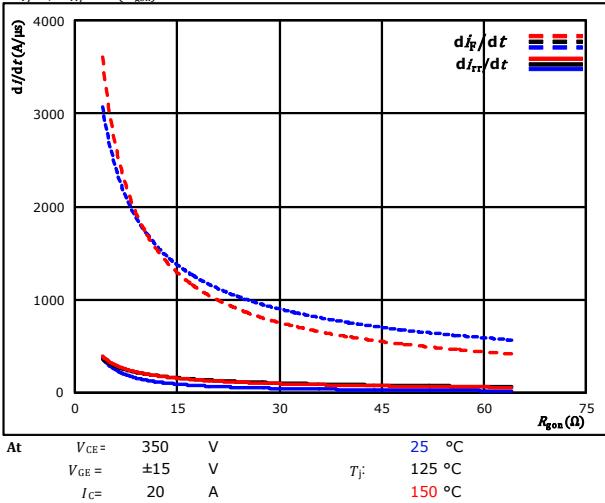


FWD

figure 14.

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$di_F/dt, di_{rr}/dt = f(R_{gon})$



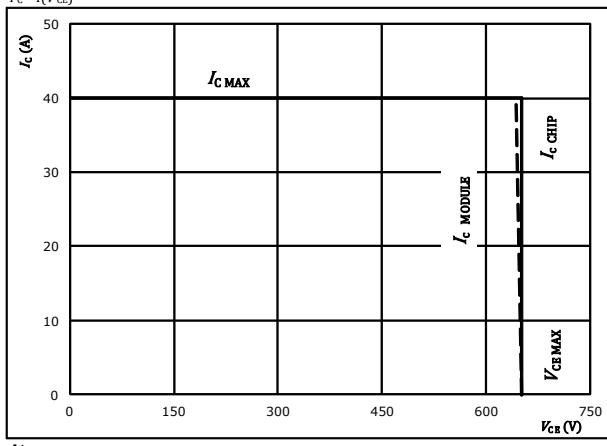
FWD

figure 15.

IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$





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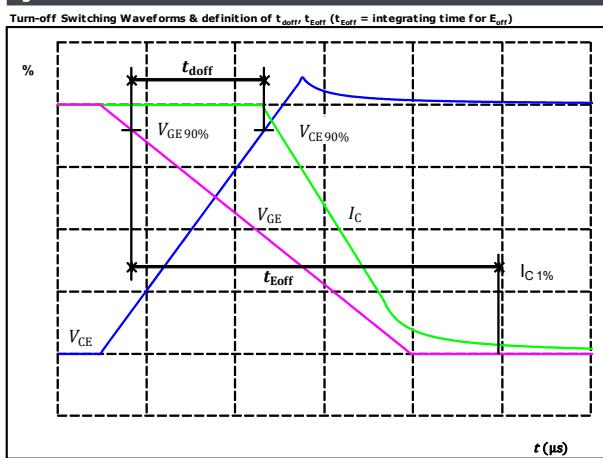
Low Boost Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	16 Ω
R_{goff}	=	16 Ω

figure 1.

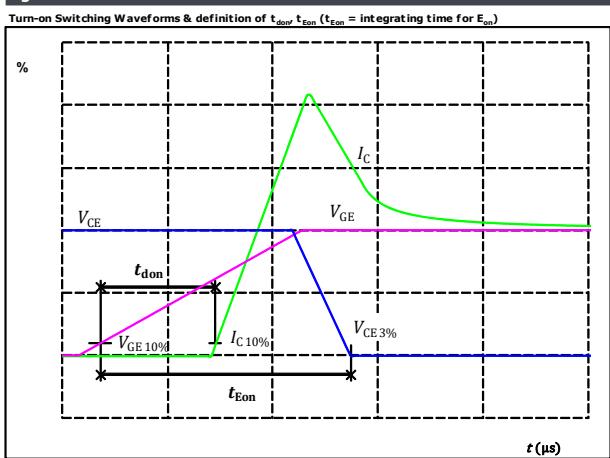
IGBT



$V_{GE}(0\%) =$	15	V
$V_{GE}(100\%) =$	-15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_{doff} =$	149	ns

figure 2.

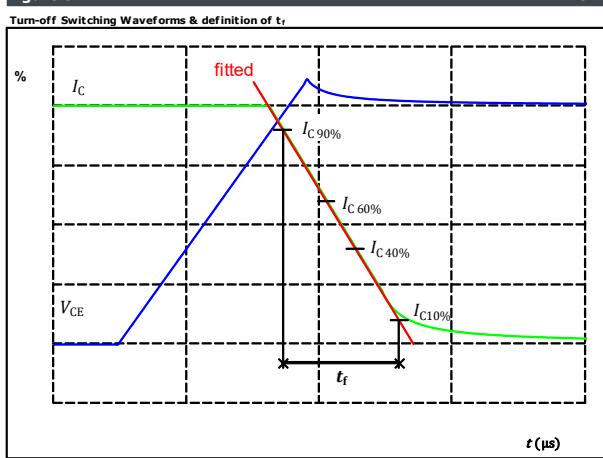
IGBT



$V_{GE}(0\%) =$	15	V
$V_{GE}(100\%) =$	-15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_{don} =$	61	ns

figure 3.

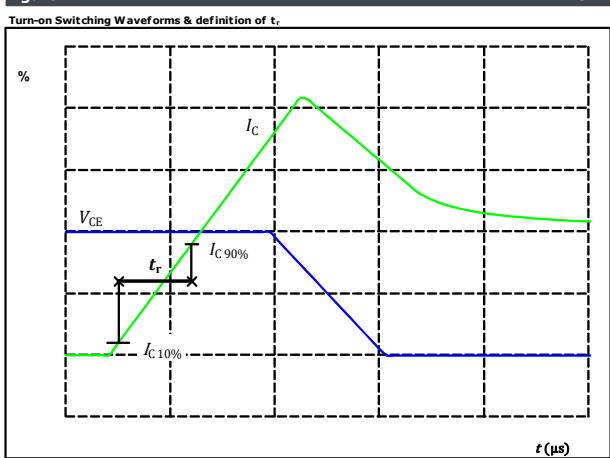
IGBT



$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_f =$	122	ns

figure 4.

IGBT



$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_r =$	20	ns



10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

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Low Boost Switching Characteristics

figure 5.

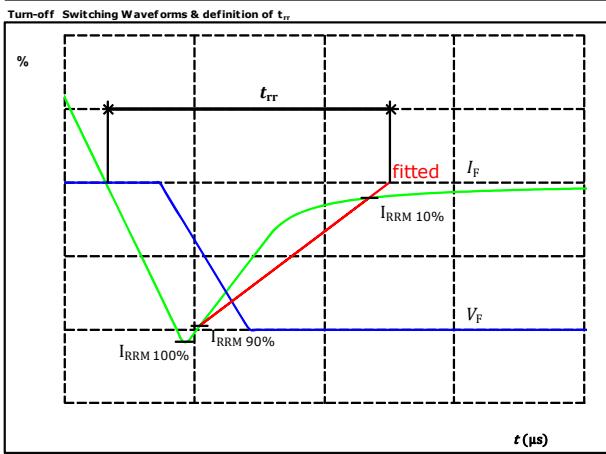
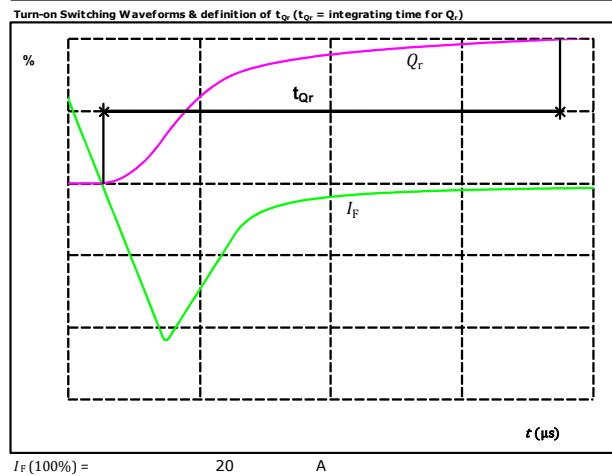


figure 6.



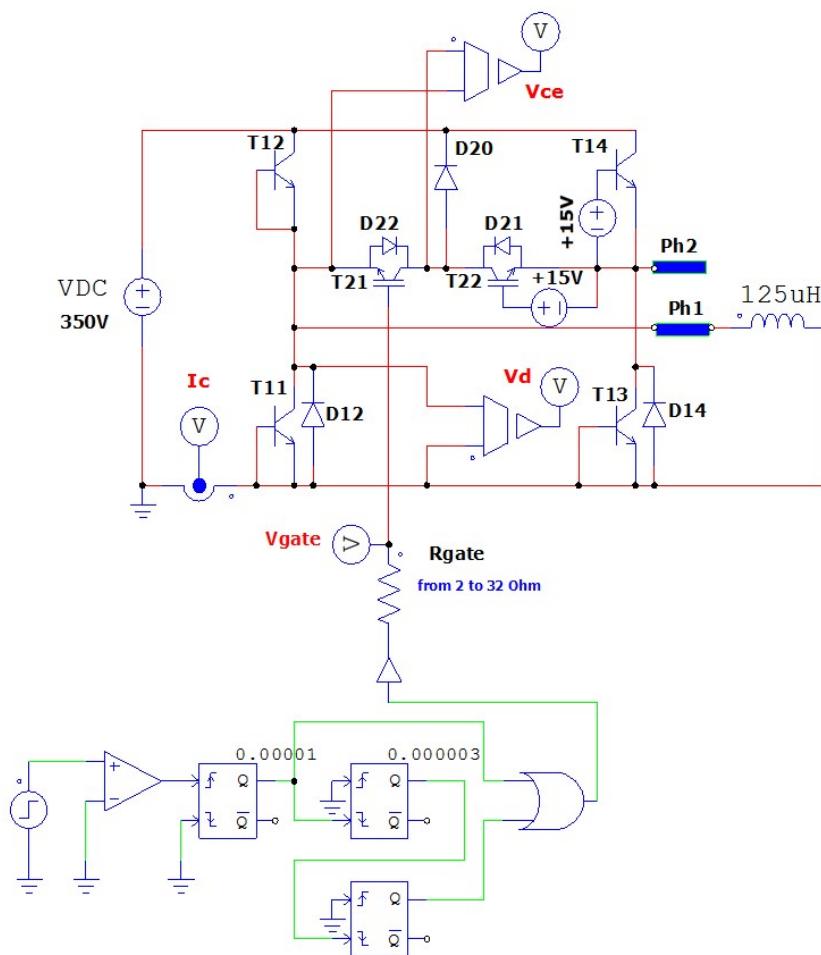


10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

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Low Boost Switching Measurement Circuit

figure 1.





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High Boost Switching Characteristics

figure 1.

Typical switching energy losses as a function of collector current

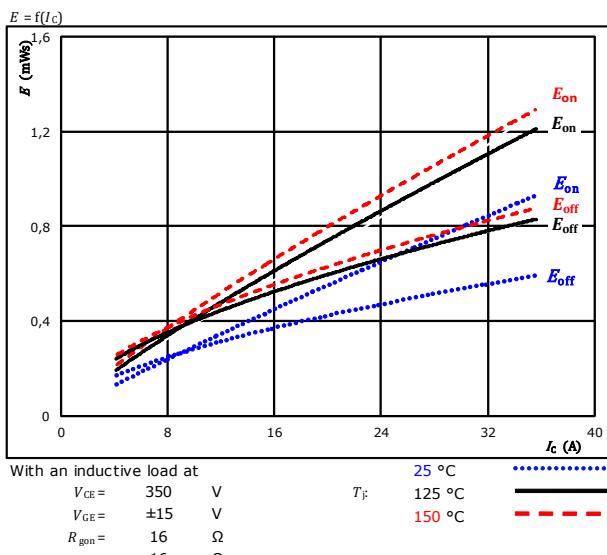


figure 2.

Typical switching energy losses as a function of gate resistor

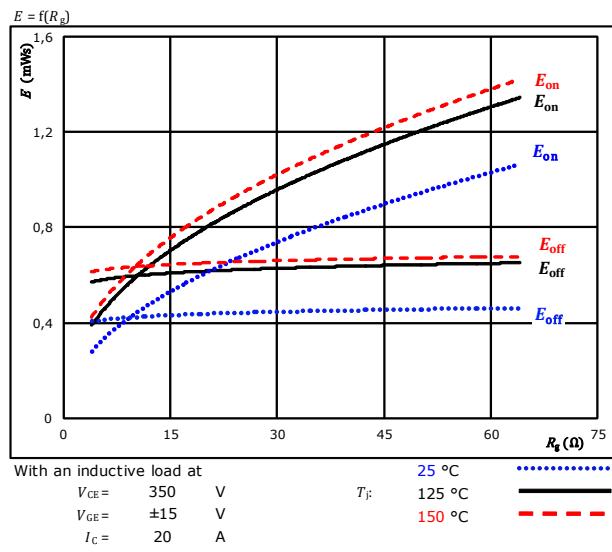


figure 3.

Typical reverse recovered energy loss as a function of collector current

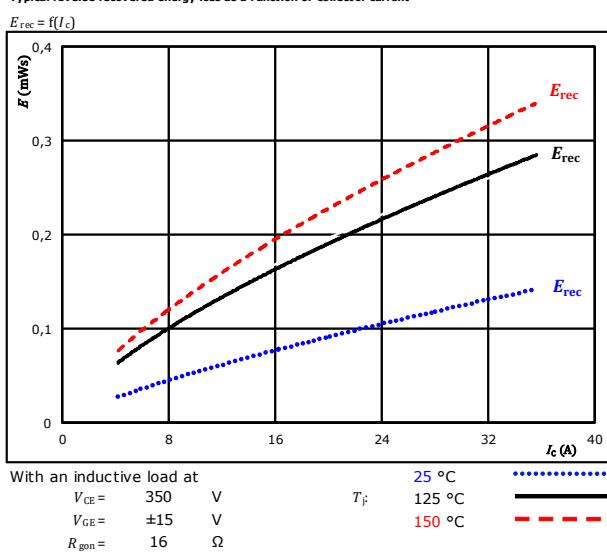
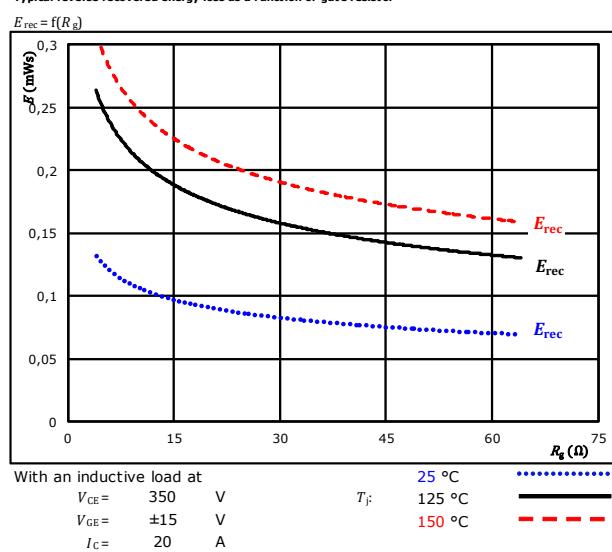


figure 4.

Typical reverse recovered energy loss as a function of gate resistor



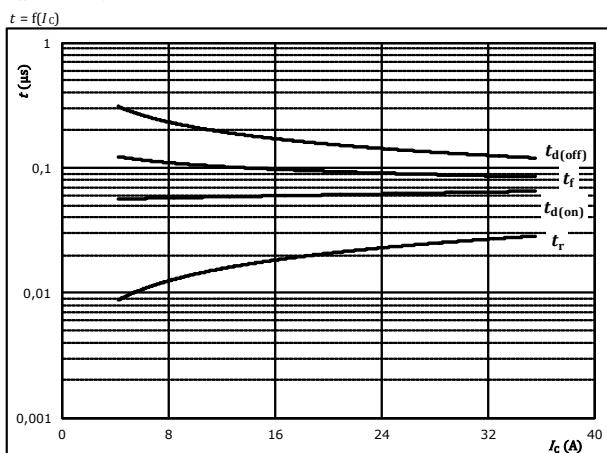


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High Boost Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

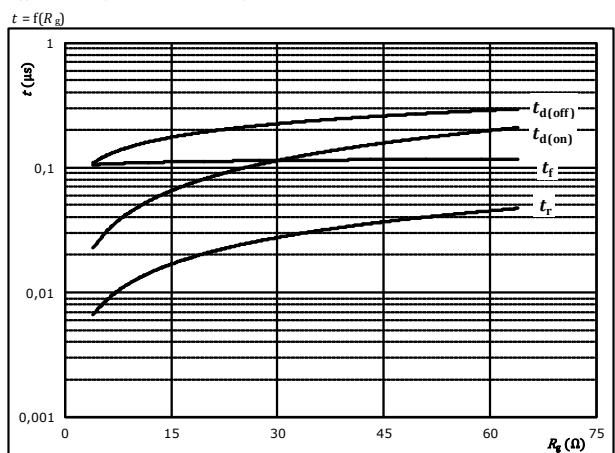


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	16	Ω
$R_{goff} =$	16	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

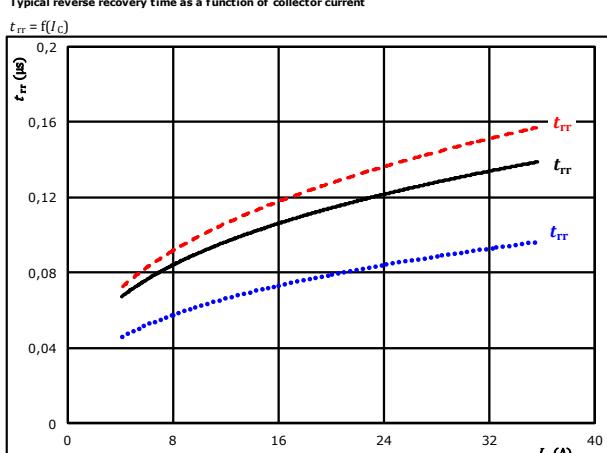


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	20	A

figure 7. FWD

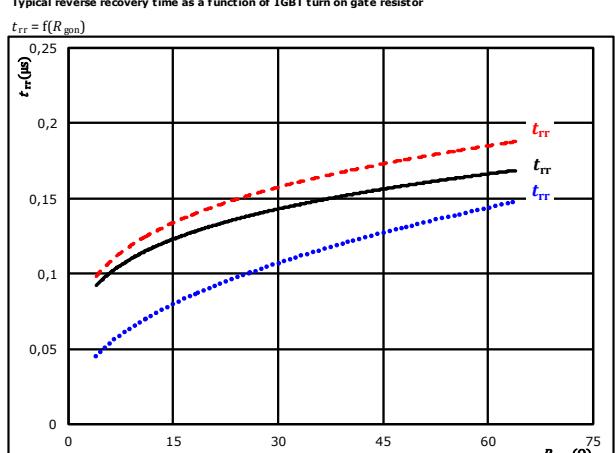
Typical reverse recovery time as a function of collector current



At	$V_{CE} =$	350	V	$T_J =$	25 °C	$\cdots\cdots\cdots$
	$V_{GE} =$	±15	V		125 °C	—
	$R_{gon} =$	16	Ω		150 °C	- - -

figure 8. FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor

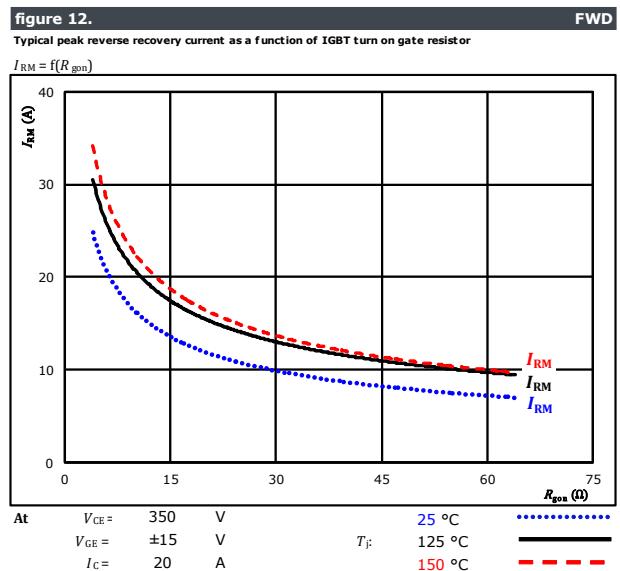
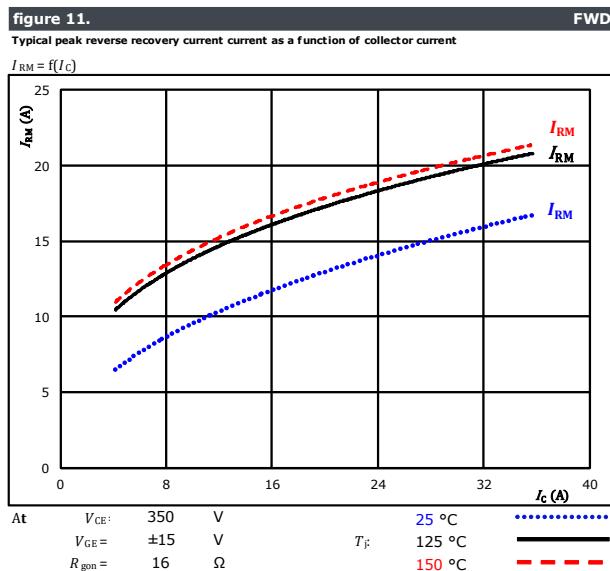
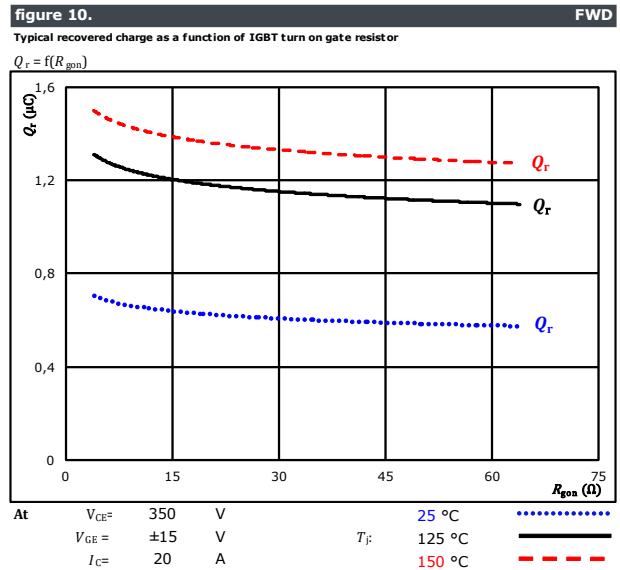
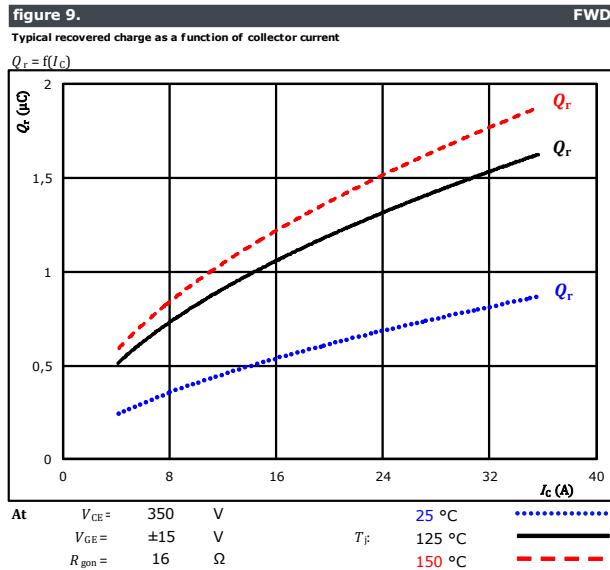


At	$V_{CE} =$	350	V	$T_J =$	25 °C	$\cdots\cdots\cdots$
	$V_{GE} =$	±15	V		125 °C	—
	$I_C =$	20	A		150 °C	- - -



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High Boost Switching Characteristics





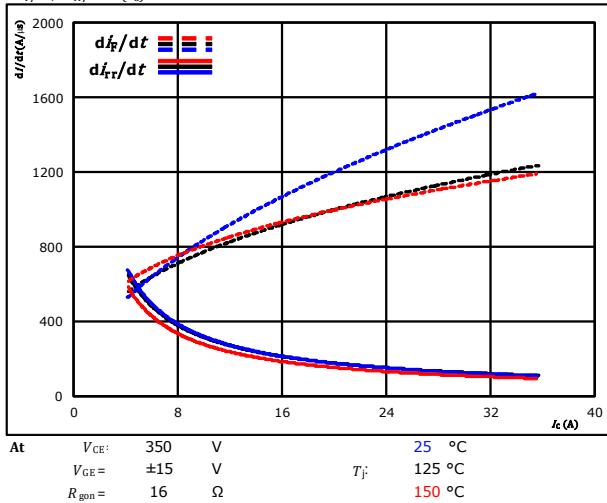
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High Boost Switching Characteristics

figure 13.

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_C)$

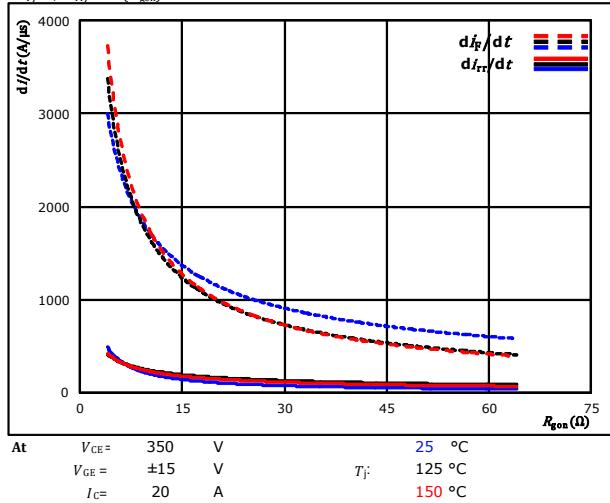


FWD

figure 14.

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$di_F/dt, di_{rr}/dt = f(R_{gon})$



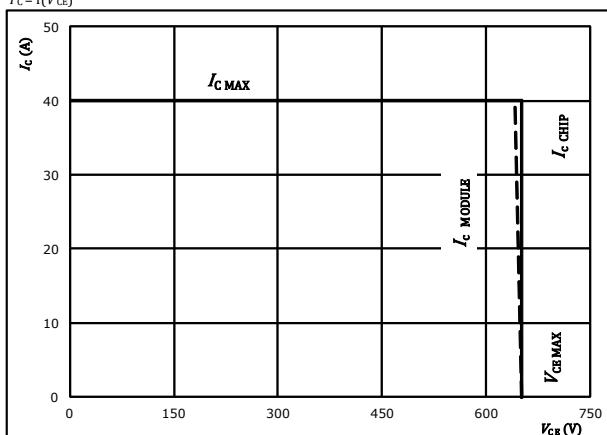
FWD

figure 15.

IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$





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High Boost Switching Definitions

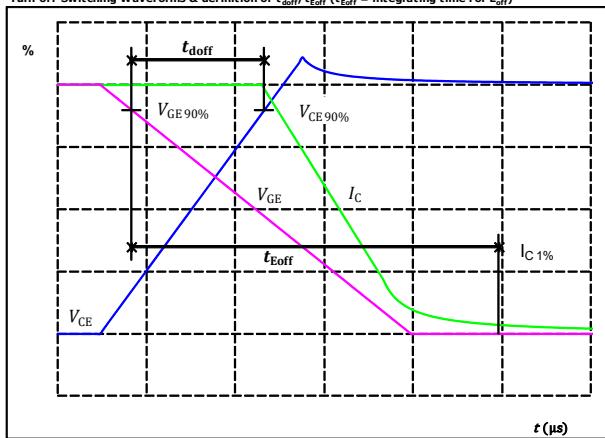
General conditions

T_j	=	125 °C
R_{gon}	=	16 Ω
R_{goff}	=	16 Ω

figure 1.

IGBT

Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})

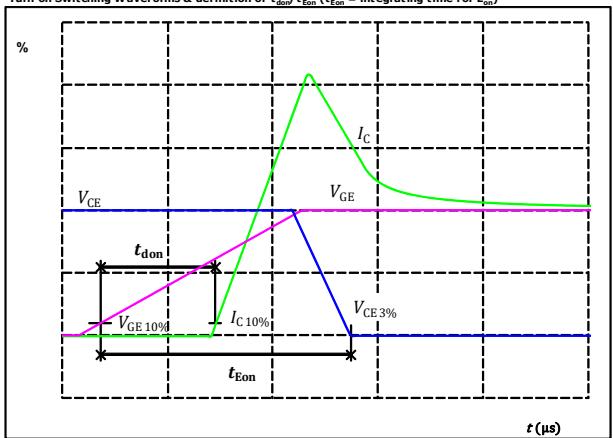


$V_{GE}(0\%) =$	15	V
$V_{GE}(100\%) =$	-15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_{doff} =$	150	ns

figure 2.

IGBT

Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})

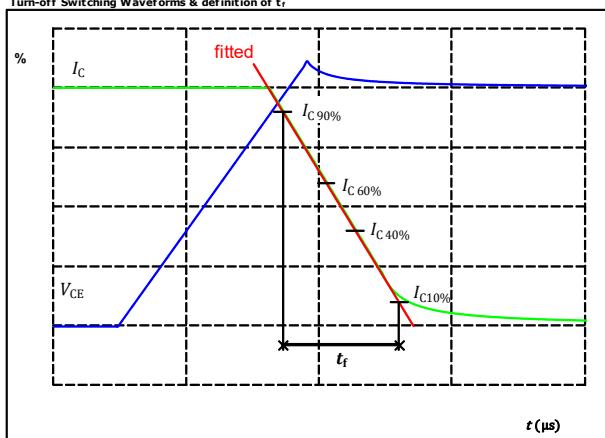


$V_{GE}(0\%) =$	15	V
$V_{GE}(100\%) =$	-15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_{don} =$	61	ns

figure 3.

IGBT

Turn-off Switching Waveforms & definition of t_f

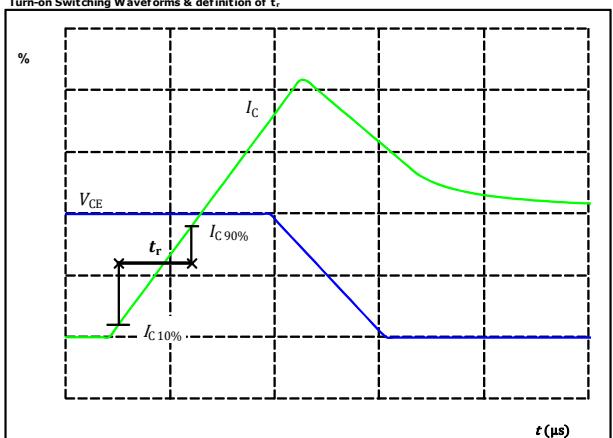


$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_f =$	105	ns

figure 4.

IGBT

Turn-on Switching Waveforms & definition of t_r



$V_C(100\%) =$	350	V
$I_C(100\%) =$	20	A
$t_r =$	21	ns



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datasheet

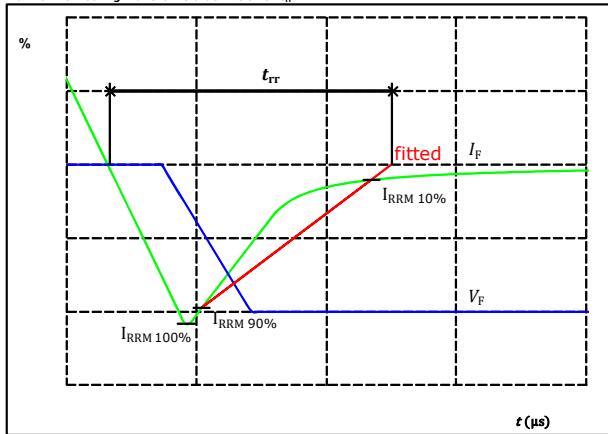
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High Boost Switching Characteristics

figure 5.

FWD

Turn-off Switching Waveforms & definition of t_{rr}

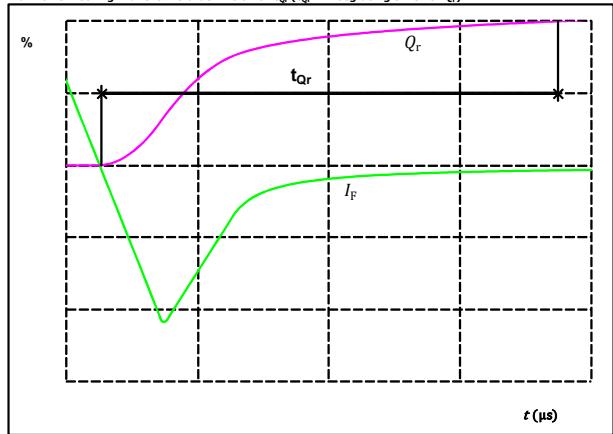


$I_F(100\%) = 350 \text{ A}$
 $I_F(100\%) = 20 \text{ A}$
 $I_{RRM}(100\%) = 17 \text{ A}$
 $t_{rr} = 114 \text{ ns}$

figure 6.

FWD

Turn-on Switching Waveforms & definition of t_{qr} (t_{qr} = integrating time for Q_r)

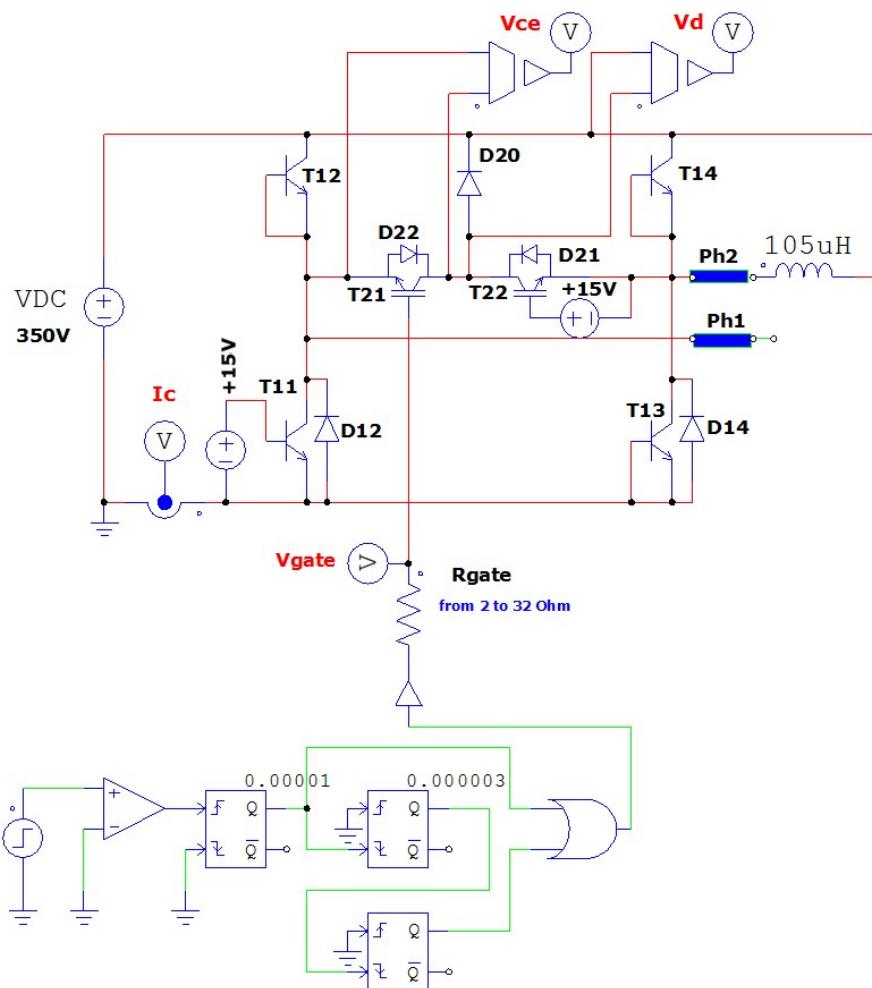


$I_F(100\%) = 1,200 \mu\text{C}$
 $Q_r(100\%) = 1,200 \mu\text{C}$



High Boost Switching Measurement Circuit

figure 1.





Input Boost Switching Characteristics

figure 1.

Typical switching energy losses as a function of collector current

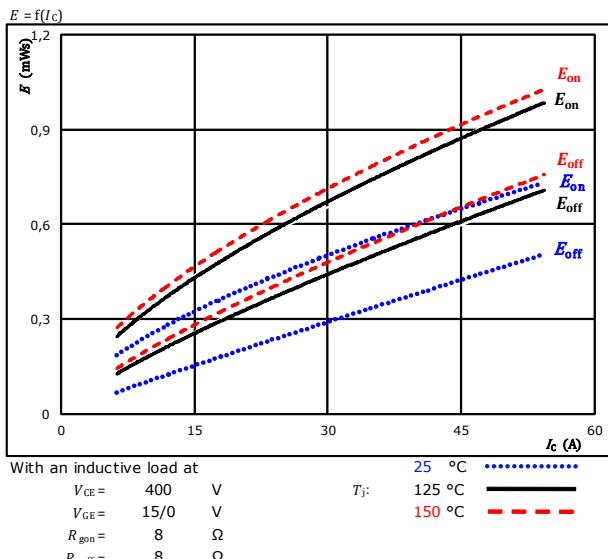


figure 2.

Typical switching energy losses as a function of gate resistor

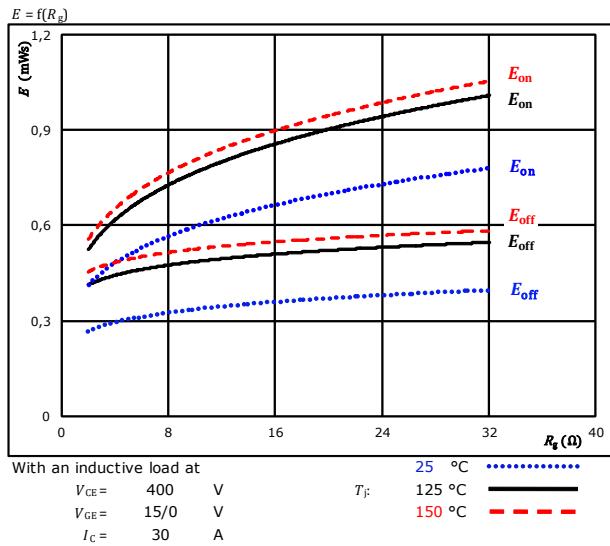


figure 3.

Typical reverse recovered energy loss as a function of collector current

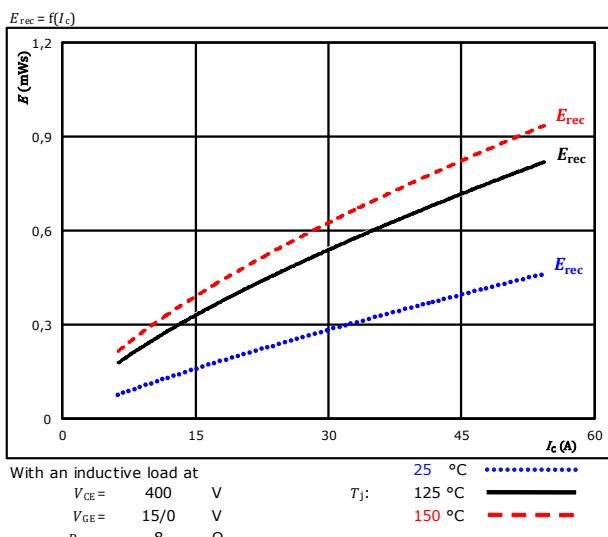
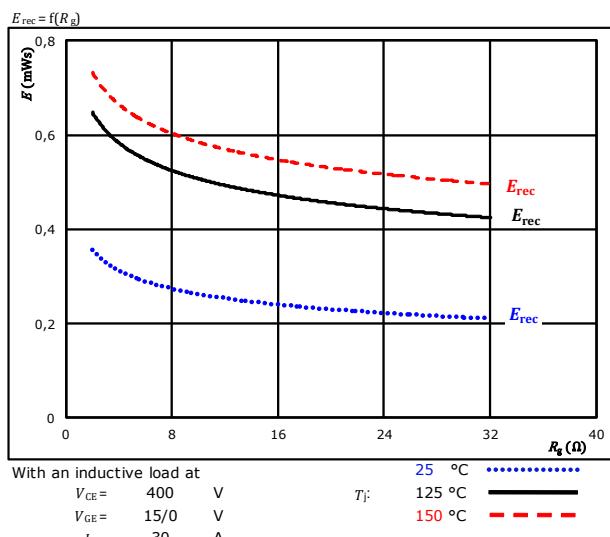


figure 4.

Typical reverse recovered energy loss as a function of gate resistor



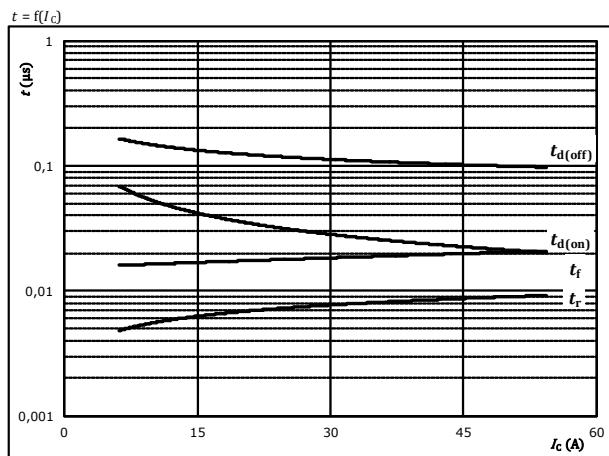


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Input Boost Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

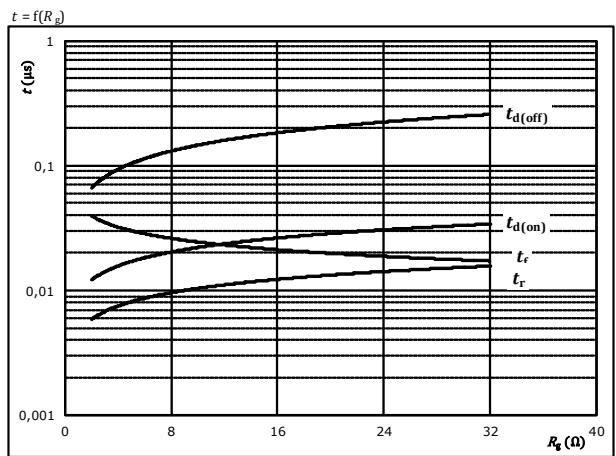


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	400	V
$V_{GE} =$	15/0	V
$R_{gon} =$	8	Ω
$R_{goff} =$	8	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

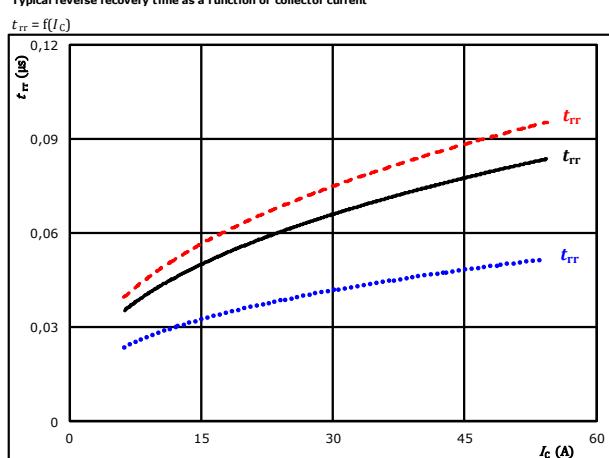


With an inductive load at

$T_J =$	150	°C
$V_{CE} =$	400	V
$V_{GE} =$	15/0	V
$I_C =$	30	A

figure 7. FWD

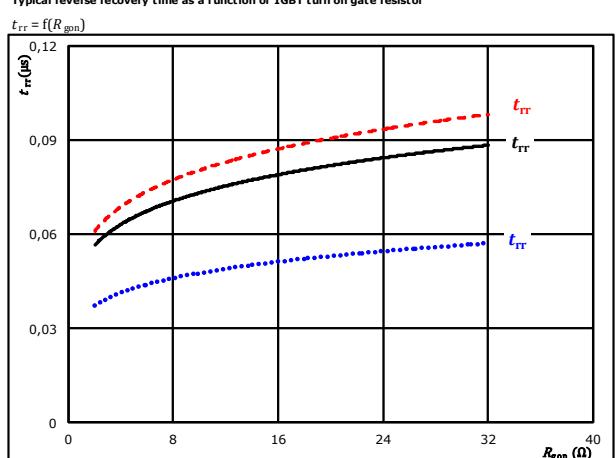
Typical reverse recovery time as a function of collector current



At	$V_{CE} =$	400	V	25	°C
	$V_{GE} =$	15/0	V	$T_J =$	125 °C	—
	$R_{gon} =$	8	Ω		150 °C	- - -

figure 8. FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor

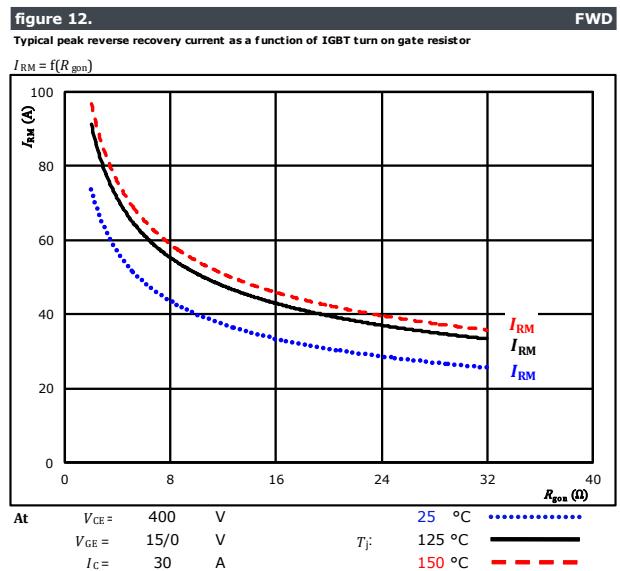
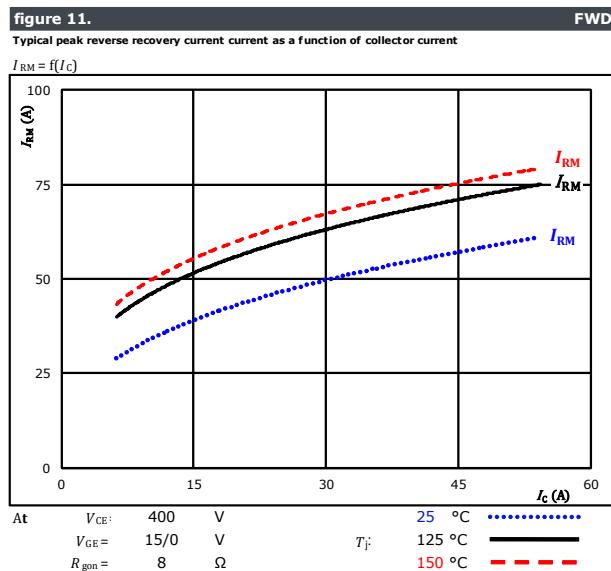
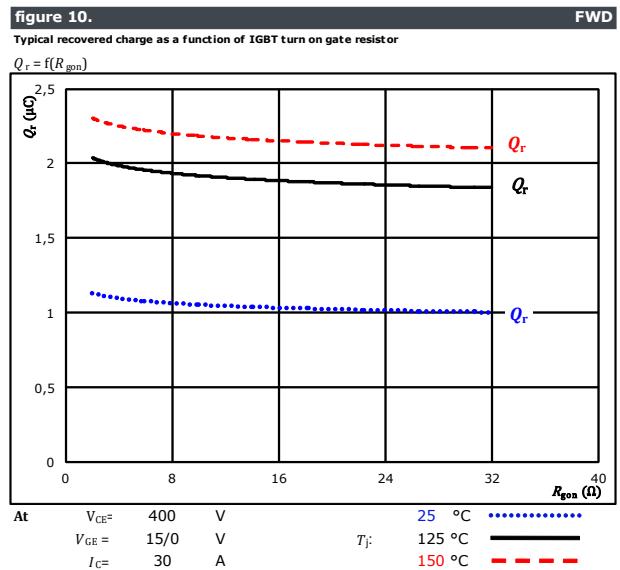
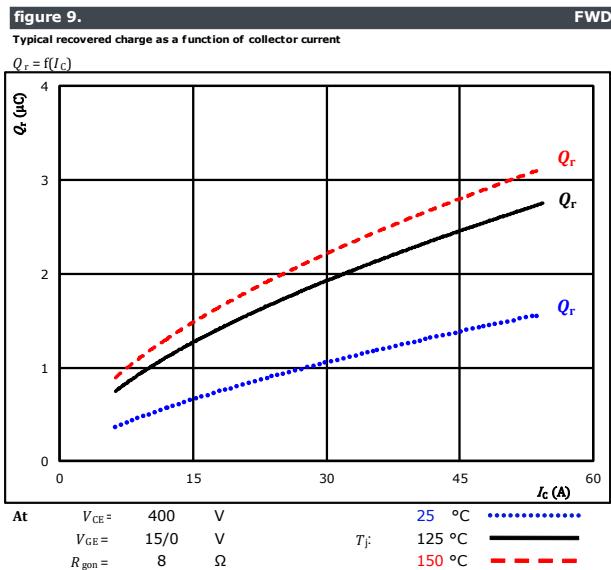


At	$V_{CE} =$	400	V	25	°C
	$V_{GE} =$	15/0	V	$T_J =$	125 °C	—
	$I_C =$	30	A		150 °C	- - -



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Input Boost Switching Characteristics





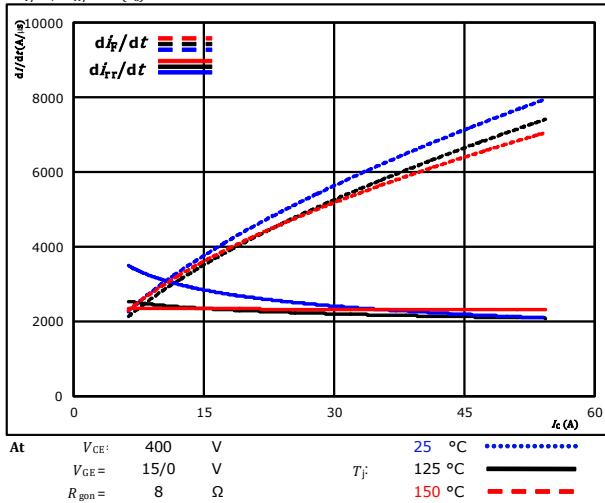
Vincotech

Input Boost Switching Characteristics

figure 13.

Typical rate of fall of forward and reverse recovery current as a function of collector current

$di_F/dt, di_{rr}/dt = f(I_c)$

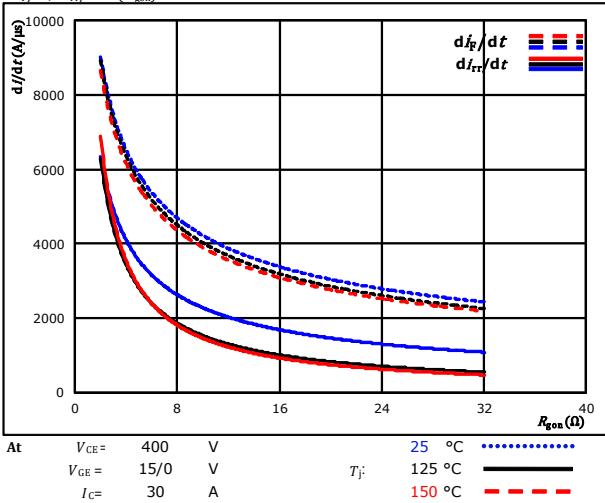


FWD

figure 14.

Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor

$di_F/dt, di_{rr}/dt = f(R_{gon})$



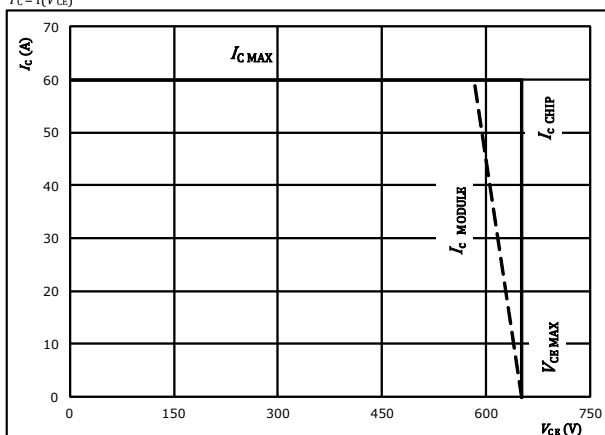
FWD

figure 15.

IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$





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Input Boost Switching Definitions

General conditions

T_j	=	125 °C
R_{gon}	=	8 Ω
R_{goff}	=	8 Ω

figure 1.

IGBT

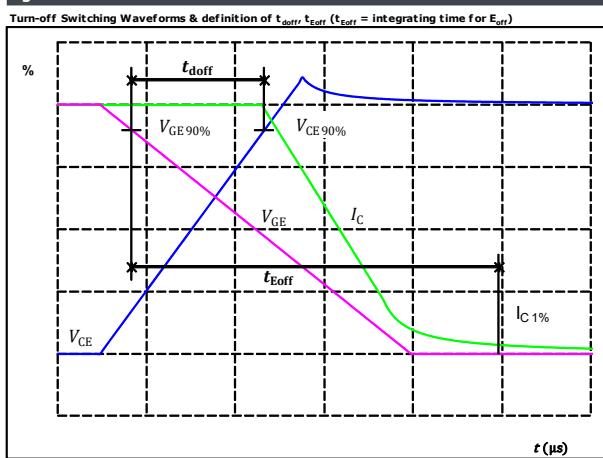


figure 2.

IGBT

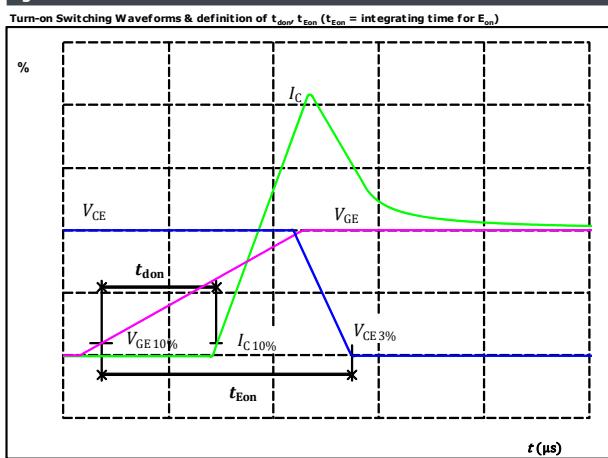


figure 3.

IGBT

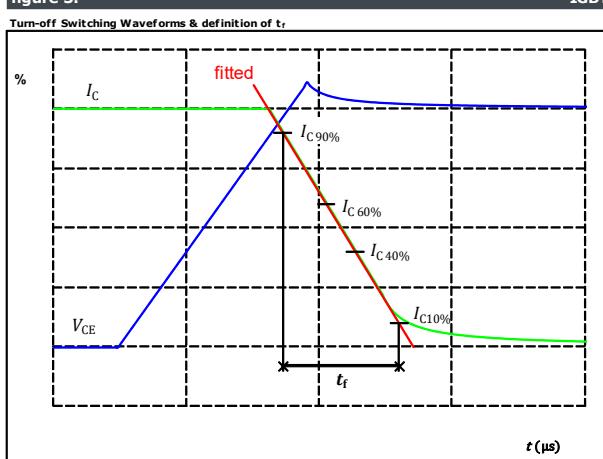
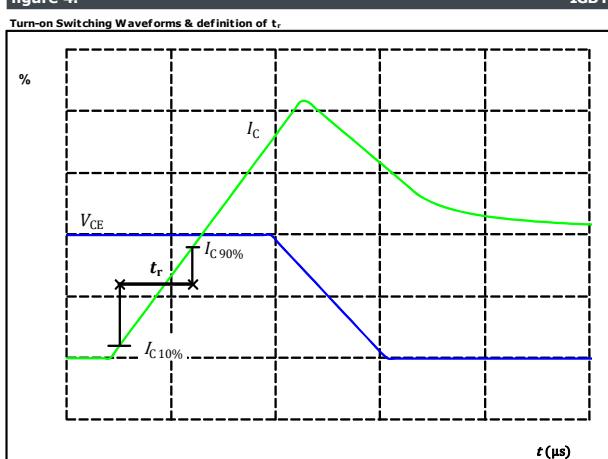


figure 4.

IGBT

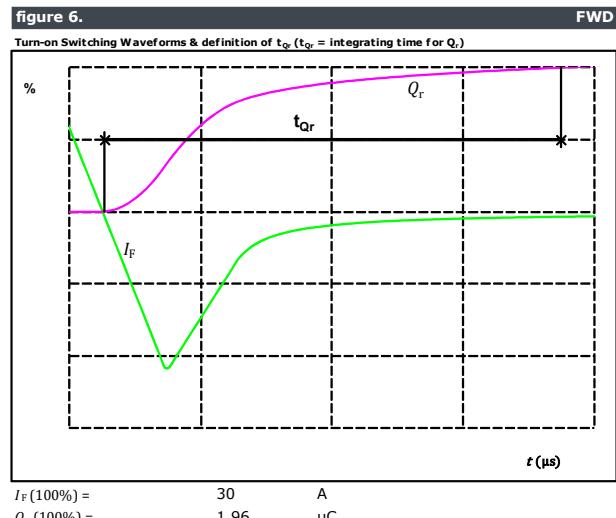
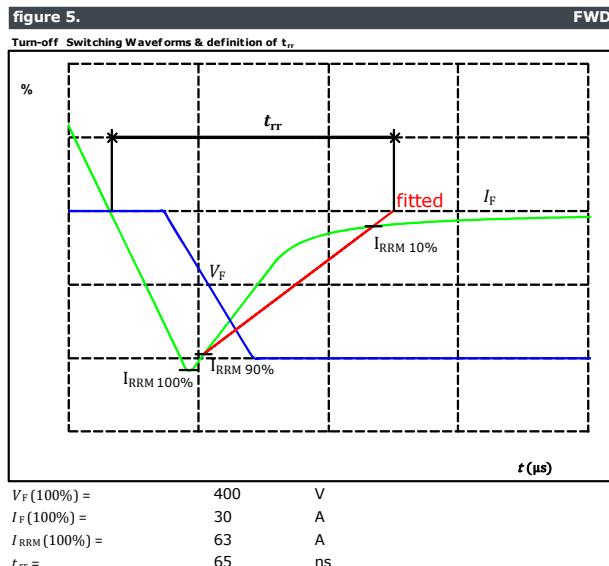




10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

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Input Boost Switching Characteristics

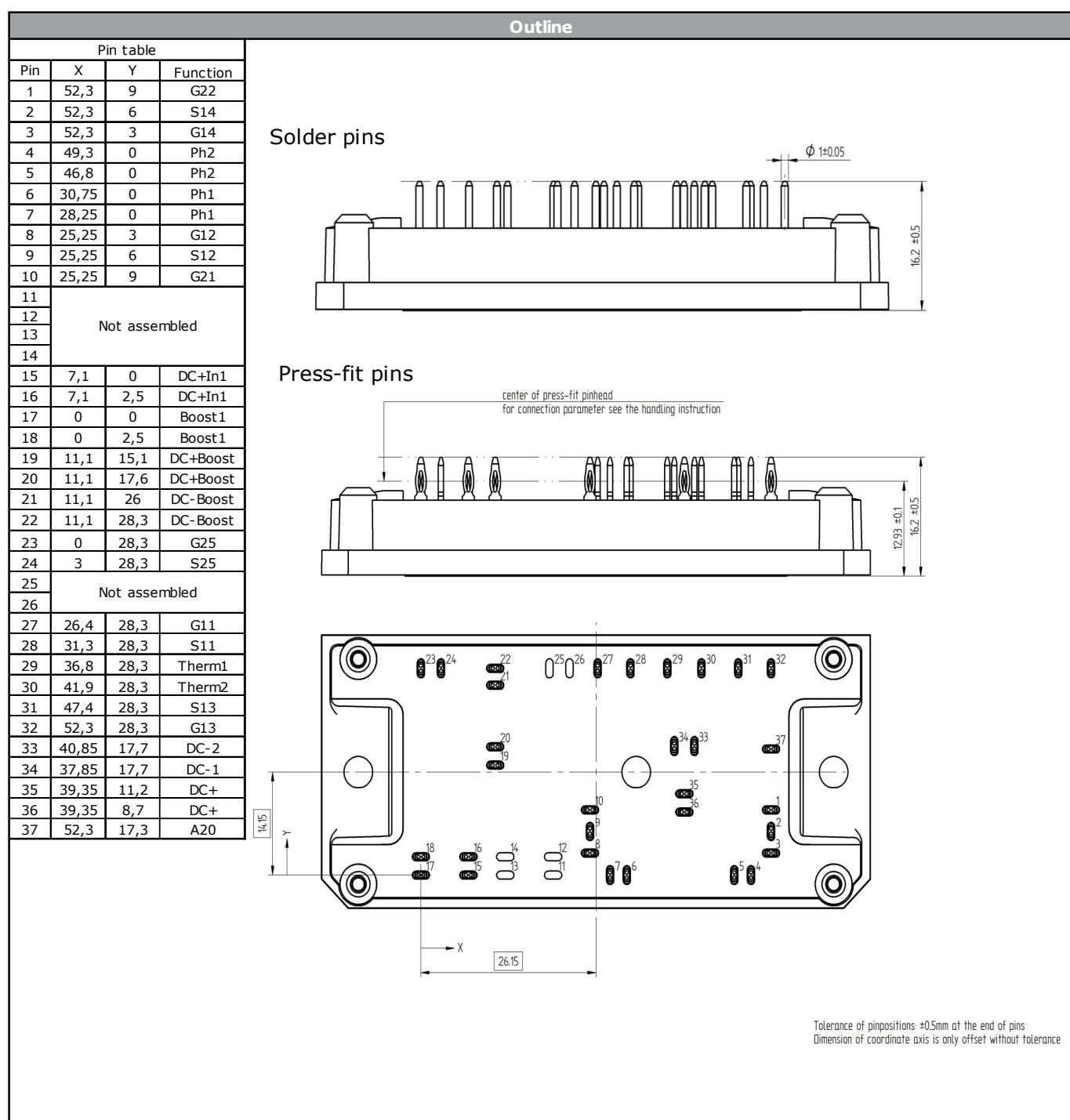




**10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y**
datasheet

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Ordering Code & Marking					
Version			Ordering Code		
without thermal paste 12 mm housing with solder pins			10-FY07BVA030RW-LF42E28		
with thermal paste 12 mm housing with solder pins			10-FY07BVA030RW-LF42E28-/3/		
without thermal paste 12 mm housing with press-fit pins			10-PY07BVA030RW-LF42E28Y		
with thermal paste 12 mm housing with press-fit pins			10-PY07BVA030RW-LF42E28Y-/3/		
NN-NNNNNNNNNNNNNN TTTTTTVV WWYY UL VIN LLLL SSSS			Text	Name	Date code
			NN-NNNNNNNNNNNNNN-TTTTTVV	WWYY	UL VIN
			Datamatrix	Type&Ver	Lot number
			TTTTTTVV	LLLLL	SSSS
					WWYY

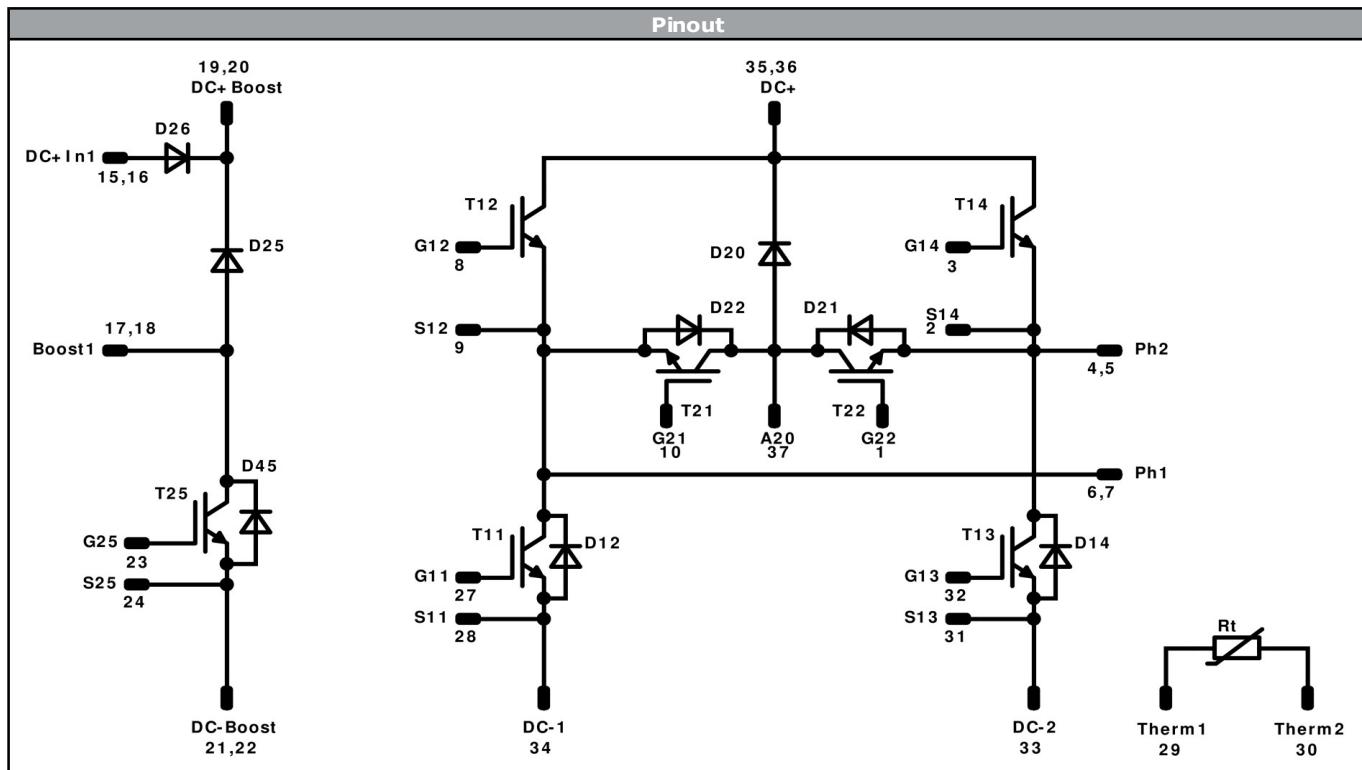


Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

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Identification

ID	Component	Voltage	Current	Function	Comment
T11, T12, T13, T14	IGBT	650 V	30 A	Low Buck / High Buck Switch	
D21, D22	FWD	650 V	20 A	Buck Diode	
T21	IGBT	650 V	20 A	Boost Switch	
D12, D14	FWD	650 V	20 A	Low Boost Diode	
D20	FWD	650 V	20 A	High Boost Diode	
T25	IGBT	650 V	30 A	Input Boost Switch	
D25	FWD	650 V	30 A	Input Boost Diode	
D45	FWD	650 V	10 A	Input Boost Sw. Protection Diode	
D26	FWD	1600 V	35 A	ByPass Diode	
Rt	NTC			Thermistor	



10-FY07BVA030RW-LF42E28
10-PY07BVA030RW-LF42E28Y
datasheet

Vincotech

Packaging instruction			
Standard packaging quantity (SPQ) 100	>SPQ	Standard	<SPQ Sample

Handling instruction			
Handling instructions for flow 1 packages see vincotech.com website.			

Package data			
Package data for flow 1 packages see vincotech.com website.			

UL recognition and file number			
This device is certified according to UL 1557 standard, UL file number E192116. For more information see vincotech.com website.			

Document No.:	Date:	Modification:	Pages
10-XY07BVA030RW-LF42E28x-D2-14	13 Mar. 2019	Correction of I_c/I_f values	1,2,3

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As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in labelling can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.