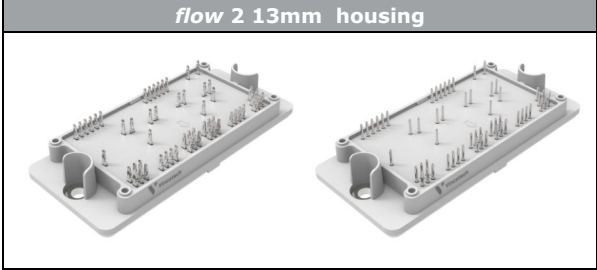
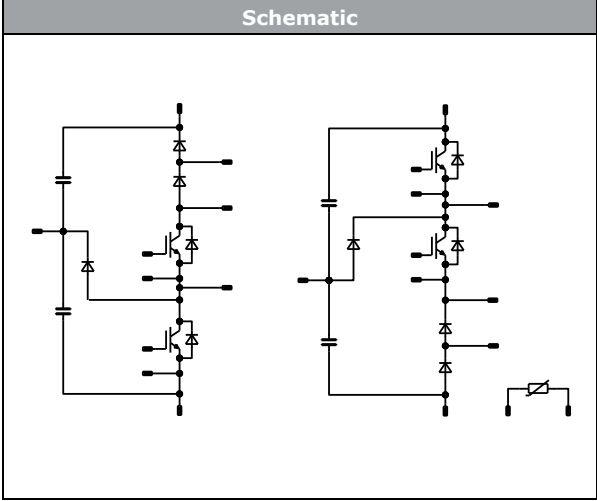




<i>flowNPC 2</i>	1200 V / 300 A
<div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Features</div> <ul style="list-style-type: none"> Enhanced efficiency Enables high switching frequencies Low inductive package Allows four quadrant operation 	<div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">flow 2 13mm housing</div> 
<div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Target applications</div> <ul style="list-style-type: none"> Industrial Drives Solar Inverters UPS 	<div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Schematic</div> 
<div style="background-color: #eee; padding: 2px; margin-bottom: 5px;">Types</div> <ul style="list-style-type: none"> 30-FT07NIB300S503-LH36F58 30-PT07NIB300S503-LH36F58Y 	

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
Buck Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	260	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	900	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	389	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C



Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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Buck Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	215	A
Repetitive peak forward current	I_{FRM}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	273	W
Maximum junction temperature	T_{jmax}		175	°C

Buck Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F		30	A
Repetitive peak forward current	I_{FRM}		60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	59	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	214	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	675	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	231	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C

Boost Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	215	A
Repetitive peak forward current	I_{FRM}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	273	W
Maximum junction temperature	T_{jmax}		175	°C



Vincotech

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
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Boost Sw.Inv.Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	215	A
Repetitive peak forward current	I_{FRM}		600	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	273	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F		30	A
Repetitive peak forward current	I_{FRM}		60	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	59	W
Maximum junction temperature	T_{jmax}		175	°C

Capacitor (DC)

Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55...+150	°C

Module Properties

Thermal Properties

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

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage* $t_p = 2\text{ s}$	4000	V
		AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			min. 12,7	mm
Clearance			min. 12,7	mm
Comparative Tracking Index	CTI		> 200	

*100 % tested in production



Vincotech

30-FT07NIB300S503-LH36F58
30-PT07NIB300S503-LH36F58Y
 datasheet

Characteristic Values

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

Buck Switch

Static

Parameter	Symbol	Conditions	V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$				0,003	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15			300	25 125 150		1,43 1,52 1,55	1,75	V
Collector-emitter cut-off current	I_{CES}		0	650			25			200	μA
Gate-emitter leakage current	I_{GES}		20	0			25			400	nA
Internal gate resistance	r_g								none		Ω
Input capacitance	C_{ies}								18000		pF
Output capacitance	C_{oes}	$f = 1$ Mhz	0	25		25			520		
Reverse transfer capacitance	C_{res}								68		
Gate charge	Q_g		15	520	300		25		656		nC

Thermal

Parameter	Symbol	Conditions	V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)							0,24		K/W

Dynamic

Parameter	Symbol	Conditions	V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Turn-on delay time	$t_{d(on)}$						25 125 150		117 116 116		ns
Rise time	t_r	$R_{gon} = 2$ Ω $R_{goff} = 2$ Ω					25 125 150		16 18 17		
Turn-off delay time	$t_{d(off)}$						25 125 150		130 148 153		
Fall time	t_f						25 125 150		14 21 24		
Turn-on energy (per pulse)	E_{on}	$Q_{t-FWD} = 7,3$ μC $Q_{t-FWD} = 14,9$ μC $Q_{t-FWD} = 17,6$ μC					25 125 150		2,72 3,17 5,61		mWs
Turn-off energy (per pulse)	E_{off}						25 125 150		1,88 3,47 4,01		



Vincotech

30-FT07NIB300S503-LH36F58
30-PT07NIB300S503-LH36F58Y
 datasheet

Characteristic Values

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

Buck Diode

Static

Parameter	Symbol	V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	Unit
Forward voltage	V_F			300	25 125 150		1,53 1,49 1,47	1,92	V
Reverse leakage current	I_R		650		25			15,2	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,35		K/W
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Dynamic

Parameter	Symbol	V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	Unit
Peak recovery current	I_{RRM}				25 125 150		211 298 328		A
Reverse recovery time	t_{rr}				25 125 150		56 77 86		ns
Recovered charge	Q_r	$di/dt = 12198$ A/μs $di/dt = 11950$ A/μs $di/dt = 11550$ A/μs	±15	350	252	25 125 150	7,34 14,87 17,59		μC
Reverse recovered energy	E_{rec}				25 125 150		1,52 3,49 3,95		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$				25 125 150		6515 6781 5496		A/μs

Buck Sw. Protection Diode

Static

Forward voltage	V_F			30	25 150		1,64 1,56	1,87	V
Reverse leakage current	I_R		650		25			0,36	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,61		K/W
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Vincotech

30-FT07NIB300S503-LH36F58
30-PT07NIB300S503-LH36F58Y
 datasheet

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		

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,003	25	4,2	5	5,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		225	25 125 150		1,10 1,08 1,09	1,45	V
Collector-emitter cut-off current	I_{CES}		0	650		25			120	μA
Gate-emitter leakage current	I_{GES}		20	0		25			300	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							34875		pF
Output capacitance	C_{oes}	$f = 1$ Mhz	0	25		25		450		
Reverse transfer capacitance	C_{res}							90		
Gate charge	Q_g		15	520	225	25		1308		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,41		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$					25 125 150		187 188 188		ns
Rise time	t_r	$R_{gon} = 2$ Ω $R_{goff} = 2$ Ω				25 125 150		17 18 18		
Turn-off delay time	$t_{d(off)}$		±15	350	252	25 125 150		225 253 261		
Fall time	t_f					25 125 150		89 210 240		
Turn-on energy (per pulse)	E_{on}	$Q_{t-FWD} = 8,1$ μC $Q_{t-FWD} = 16,2$ μC $Q_{t-FWD} = 18,9$ μC				25 125 150		1,986 2,250 2,337		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		11,100 16,009 16,789		



Vincotech

30-FT07NIB300S503-LH36F58
30-PT07NIB300S503-LH36F58Y
 datasheet

Characteristic Values

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

Boost Diode

Static

Parameter	Symbol	V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	Unit
Forward voltage	V_F			300	25 125 150		1,53 1,49 1,47	1,92	V
Reverse leakage current	I_R		650		25			15,2	μA

Thermal

Parameter	Symbol	Conditions	Value	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)	0,35	K/W

Dynamic

Parameter	Symbol	Conditions	Value	Unit			
Peak recovery current	I_{RRM}		25 125 150	170 254 273			
Reverse recovery time	t_{rr}		25 125 150	70 99 109			
Recovered charge	Q_r	$di/dt = 12261$ A/μs $di/dt = 12850$ A/μs $di/dt = 12763$ A/μs	±15 350	252	25 125 150	8,076 16,202 18,915	μC
Reverse recovered energy	E_{rec}				25 125 150	1,923 3,759 4,384	mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$				25 125 150	2039 2120 1892	A/μs

Boost Sw.Inv.Diode

Static

Parameter	Symbol	V_{GE} [V]	V_{CE} [V]	I_C [A]	T_j [°C]	Min	Typ	Max	Unit
Forward voltage	V_F			300	25 125 150		1,53 1,49 1,47	1,92	V
Reverse leakage current	I_R		650		25			15,2	μA

Thermal

Parameter	Symbol	Conditions	Value	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)	0,35	K/W



Characteristic Values

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

Boost Sw. Protection Diode

Static

Parameter	Symbol	V_{GS} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Forward voltage	V_F			30	25 150		1,64 1,56	1,87	V
Reverse leakage current	I_R		650		25			0,36	μA

Thermal

Parameter	Symbol	Conditions	Value	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)	1,61	K/W

Capacitor (DC)

Parameter	Symbol	Value	Unit
Capacitance	C	33	nF
Tolerance		-5	+5 %

Thermistor

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

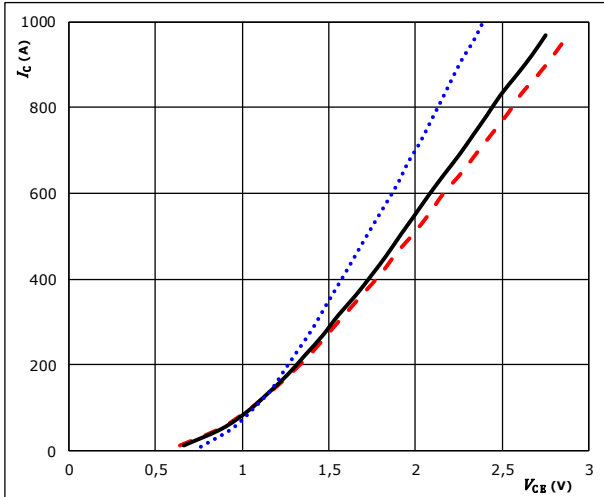


Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

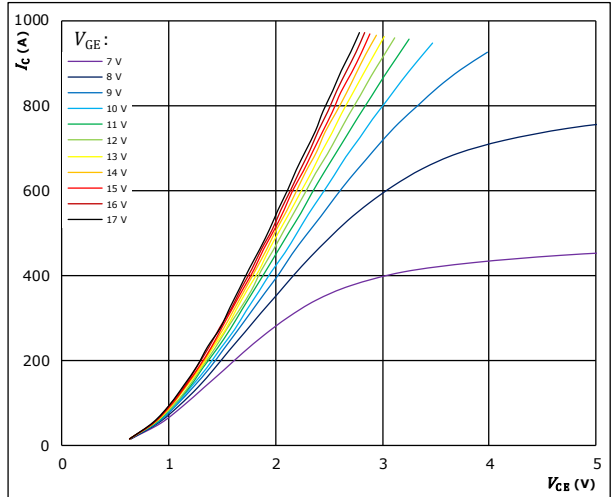


$t_p = 250 \mu s$ $T_j: 25 \text{ }^\circ\text{C}$ (dotted blue)
 $V_{GE} = 15 \text{ V}$ $T_j: 125 \text{ }^\circ\text{C}$ (solid black)
 $T_j: 150 \text{ }^\circ\text{C}$ (dashed red)

figure 2. IGBT

Typical output characteristics

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

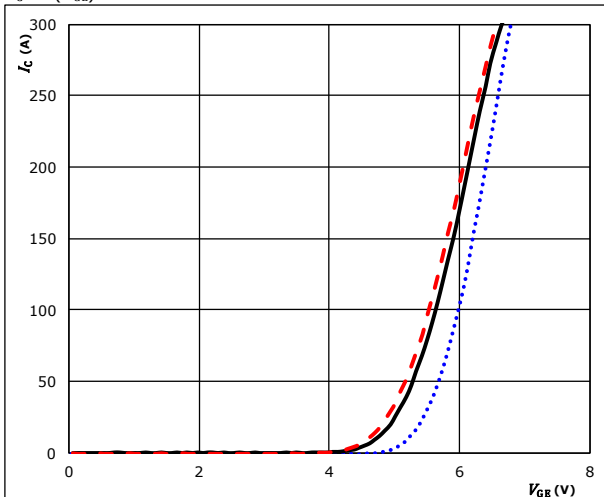


$t_p = 250 \mu s$
 $T_j = 150 \text{ }^\circ\text{C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

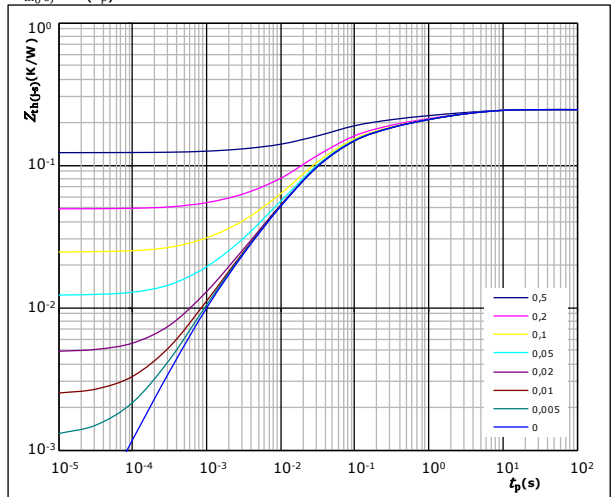


$t_p = 100 \mu s$ $T_j: 25 \text{ }^\circ\text{C}$ (dotted blue)
 $V_{CE} = 10 \text{ V}$ $T_j: 125 \text{ }^\circ\text{C}$ (solid black)
 $T_j: 150 \text{ }^\circ\text{C}$ (dashed red)

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(j-s)} = 0,24 \text{ K/W}$

IGBT thermal model values

R (K/W)	τ (s)
3,19E-02	4,04E+00
3,56E-02	8,39E-01
5,47E-02	1,56E-01
9,39E-02	3,22E-02
2,10E-02	7,54E-03
7,41E-03	1,20E-03

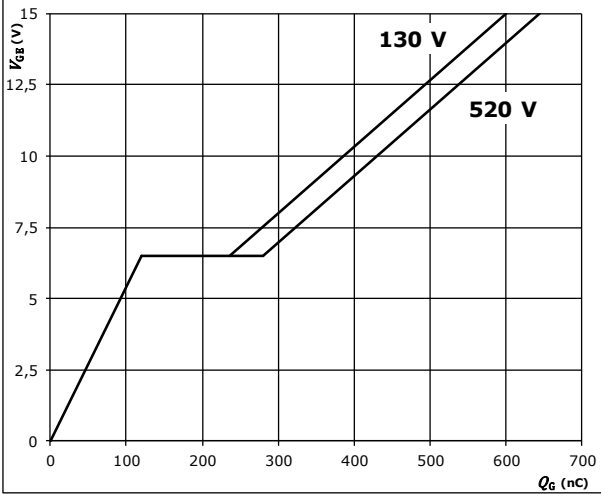


Buck Switch Characteristics

figure 5. IGBT

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

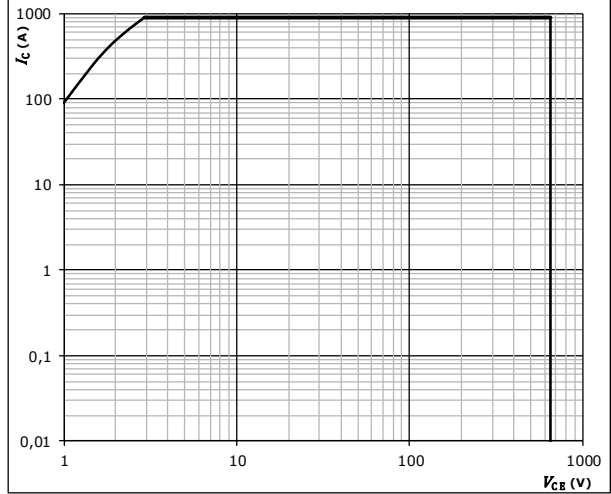


$I_C = 300$ A

figure 6. IGBT

Safe operating area

$I_C = f(V_{CE})$



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

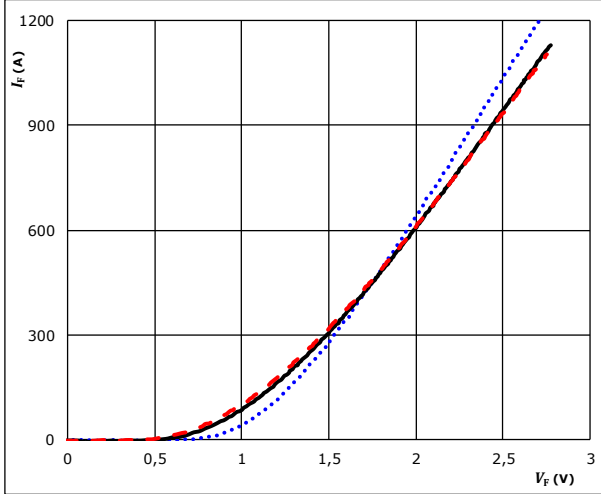


Buck Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$$I_F = f(V_F)$$



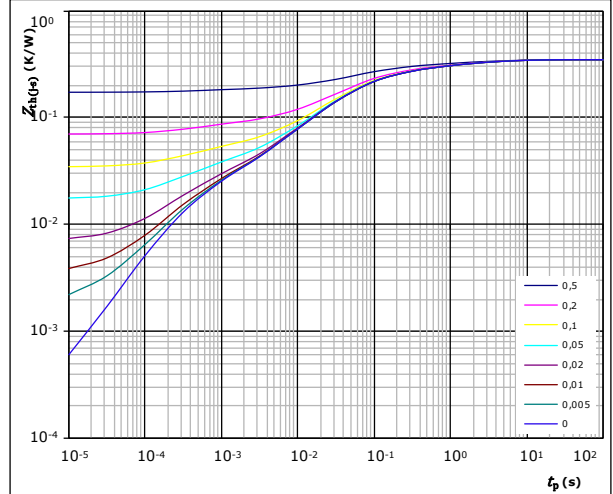
$t_p = 250 \mu s$

T_j : 25 °C
 125 °C ———
 150 °C - - - -

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,35 \text{ K/W}$

FWD thermal model values

R (K/W)	τ (s)
2,86E-02	5,43E+00
5,04E-02	9,81E-01
7,36E-02	1,80E-01
1,26E-01	4,67E-02
4,07E-02	1,41E-02
1,25E-02	2,87E-03
1,67E-02	3,56E-04

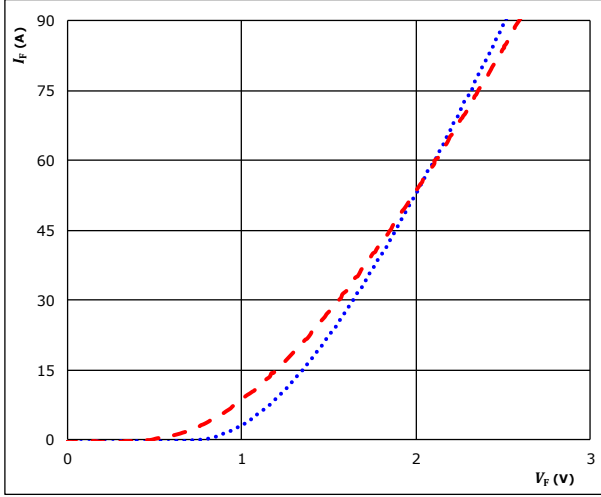


Buck Sw. Protection Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

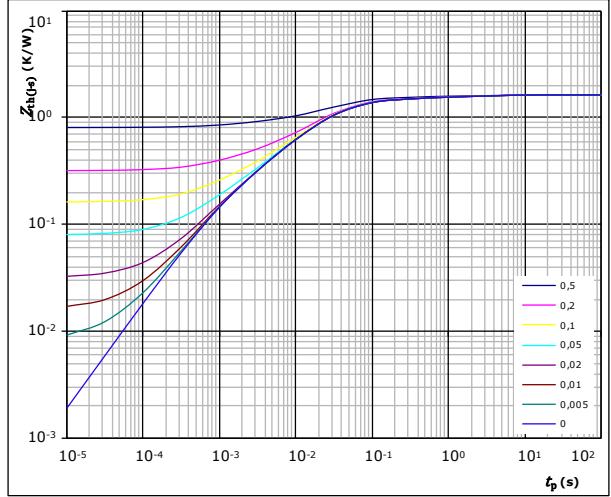


$t_p = 250 \mu\text{s}$
 $T_j:$ 25 °C
 150 °C - - - - -

figure 2. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,61 \text{ K/W}$
 FWD thermal model values

R (K/W)	τ (s)
1,05E-01	3,05E+00
1,86E-01	2,04E-01
8,60E-01	3,00E-02
3,40E-01	8,15E-03
1,24E-01	1,07E-03

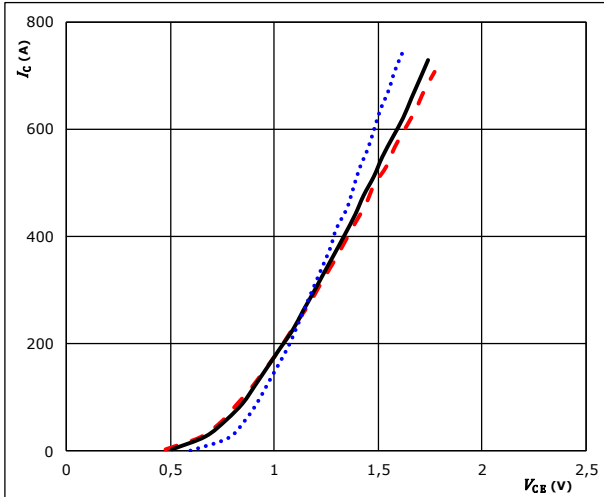


Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

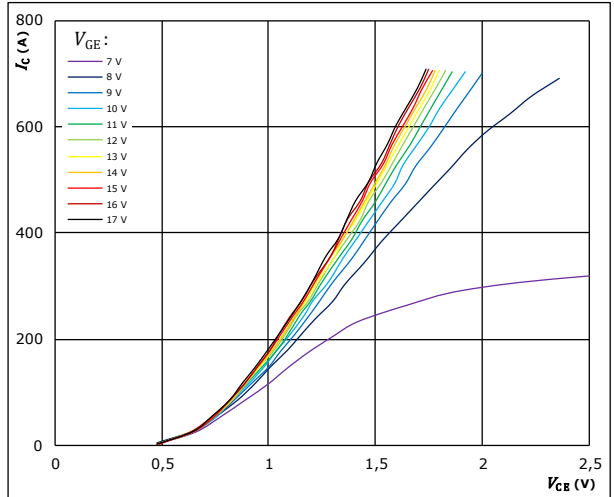


$t_p = 250 \mu\text{s}$ $T_j: 25 \text{ }^\circ\text{C}$
 $V_{GE} = 15 \text{ V}$ $T_j: 125 \text{ }^\circ\text{C}$ ———
 $T_j: 150 \text{ }^\circ\text{C}$ - - - -

figure 2. IGBT

Typical output characteristics

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

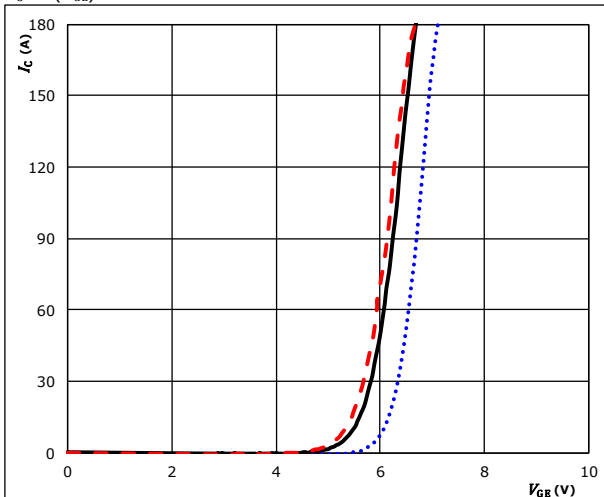


$t_p = 250 \mu\text{s}$
 $T_j = 150 \text{ }^\circ\text{C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

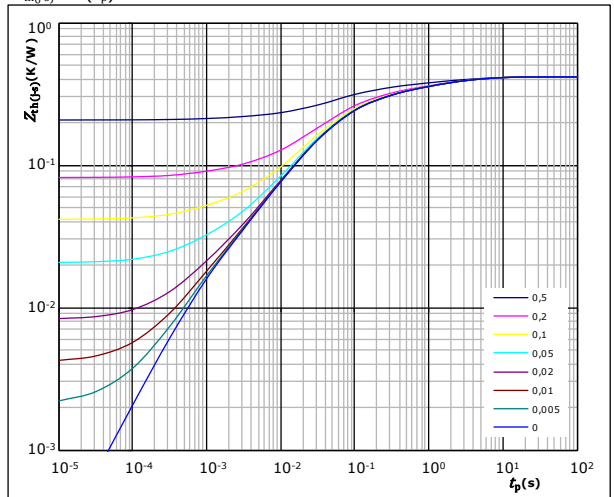


$t_p = 100 \mu\text{s}$ $T_j: 25 \text{ }^\circ\text{C}$
 $V_{CE} = 10 \text{ V}$ $T_j: 125 \text{ }^\circ\text{C}$ ———
 $T_j: 150 \text{ }^\circ\text{C}$ - - - -

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(j-s)} = 0,41 \text{ K/W}$
 IGBT thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
4,53E-02	4,06E+00
6,68E-02	9,20E-01
1,07E-01	1,59E-01
1,53E-01	3,65E-02
2,93E-02	7,79E-03
1,11E-02	8,69E-04

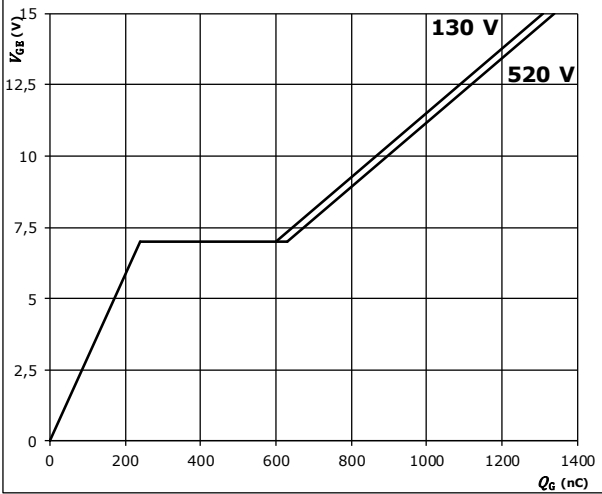


Boost Switch Characteristics

figure 5. IGBT

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

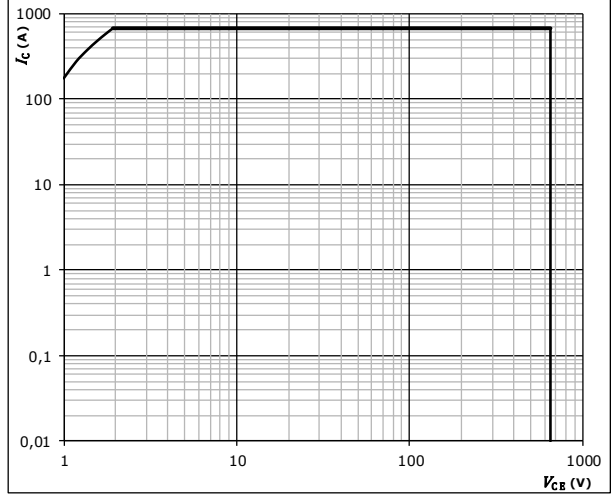


$I_C = 225$ A

figure 6. IGBT

Safe operating area

$I_C = f(V_{CE})$



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

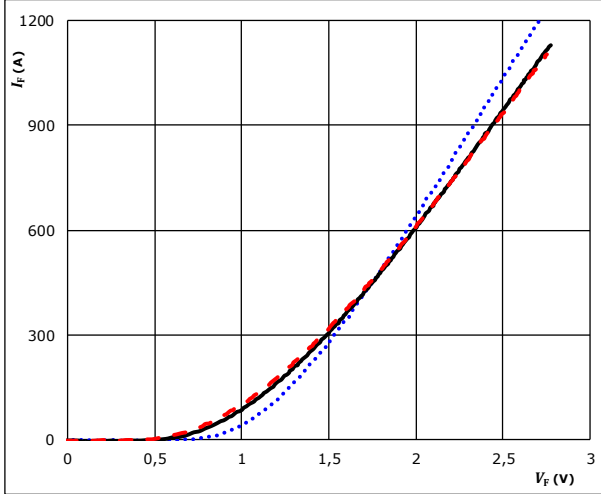


Boost Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$$I_F = f(V_F)$$

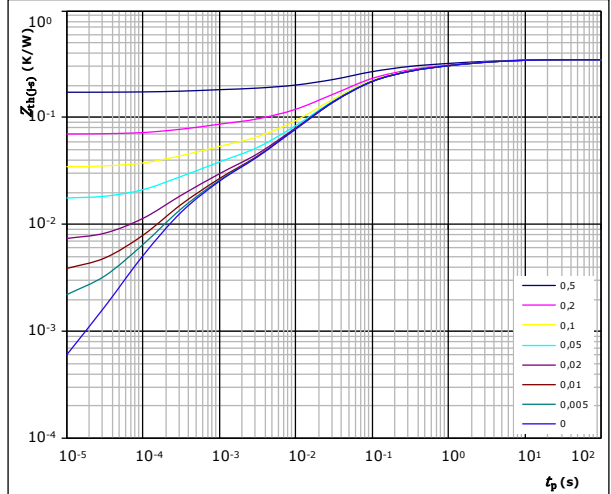


$t_p =$ 250 μ s
 T_j : 25 °C
 125 °C ———
 150 °C - - - -

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,35$ K/W

FWD thermal model values

R (K/W)	τ (s)
2,86E-02	5,43E+00
5,04E-02	9,81E-01
7,36E-02	1,80E-01
1,26E-01	4,67E-02
4,07E-02	1,41E-02
1,25E-02	2,87E-03
1,67E-02	3,56E-04

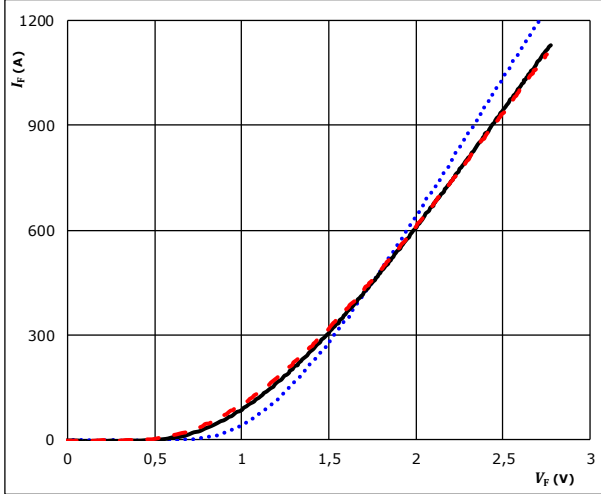


Boost Sw.Inv.Diode Characteristics

figure 1. **FWD**

Typical forward characteristics

$$I_F = f(V_F)$$



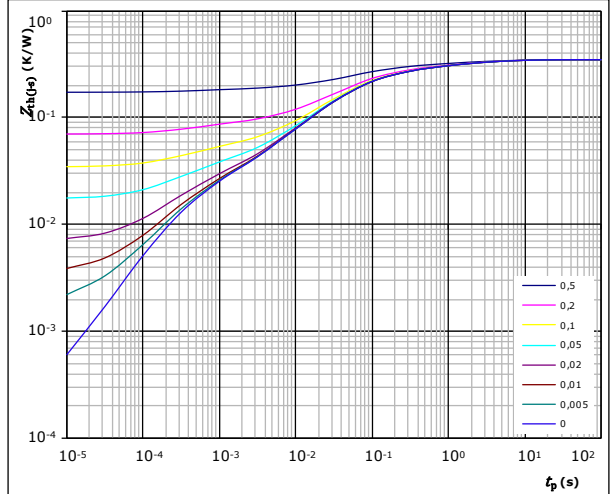
$t_p = 250 \mu s$

T_j : 25 °C
 125 °C ———
 150 °C - - - -

figure 2. **FWD**

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,35 \text{ K/W}$

FWD thermal model values

R (K/W)	τ (s)
2,86E-02	5,43E+00
5,04E-02	9,81E-01
7,36E-02	1,80E-01
1,26E-01	4,67E-02
4,07E-02	1,41E-02
1,25E-02	2,87E-03
1,67E-02	3,56E-04

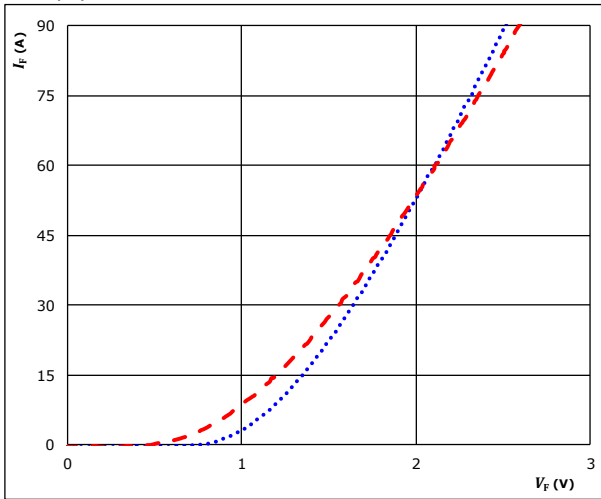


Boost Sw. Protection Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

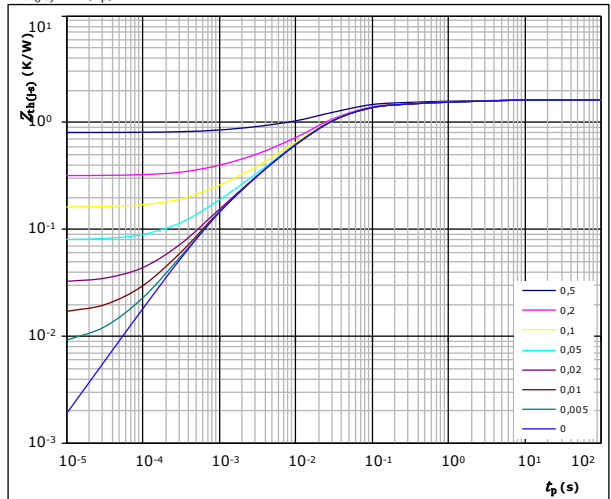


$t_p = 250\ \mu\text{s}$ $T_j:$ 25 °C
- - - - 150 °C

figure 2. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,61\ \text{K/W}$
 FWD thermal model values

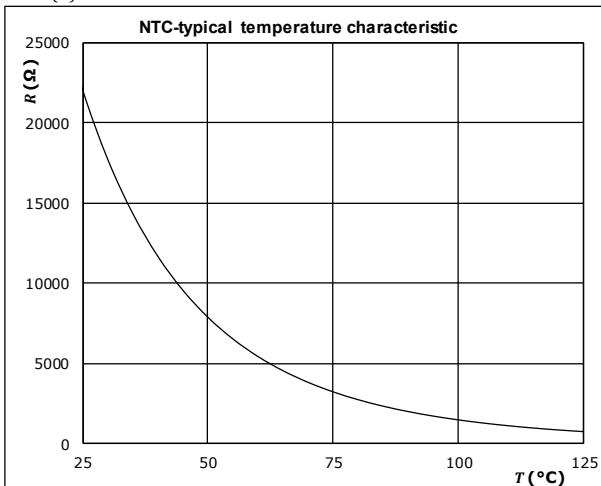
R (K/W)	τ (s)
1,05E-01	3,05E+00
1,86E-01	2,04E-01
8,60E-01	3,00E-02
3,40E-01	8,15E-03
1,24E-01	1,07E-03

Thermistor Characteristics

figure 1. Thermistor

Typical NTC characteristic as a function of temperature

$$R = f(T)$$



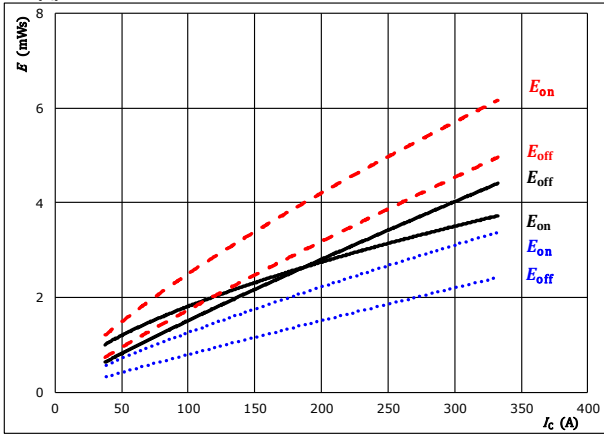


Buck Switching Characteristics

figure 1. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$

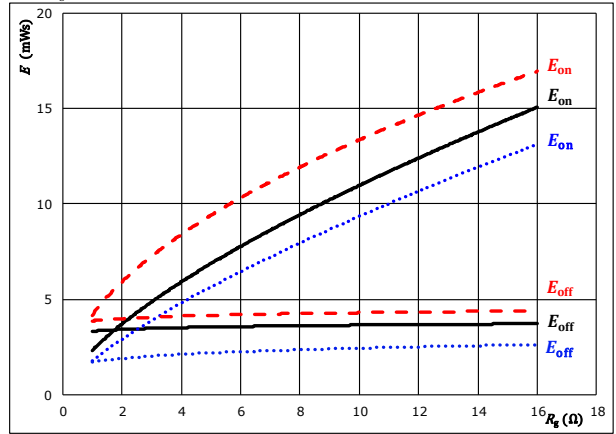


With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{g(on)} = 2$ Ω
 $R_{g(off)} = 2$ Ω
 $T_j: 25$ °C
 125 °C
 150 °C

figure 2. IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$

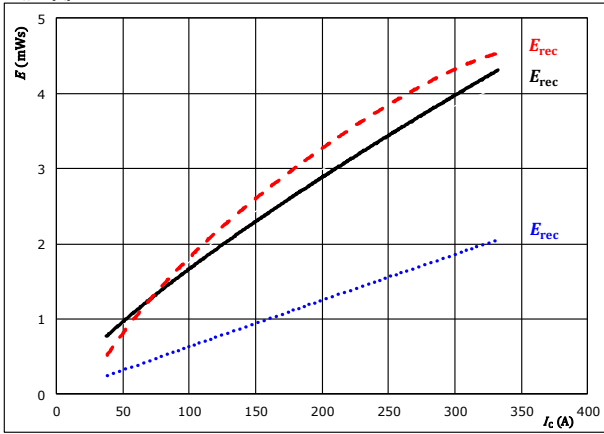


With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 252$ A
 $T_j: 25$ °C
 125 °C
 150 °C

figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_C)$$

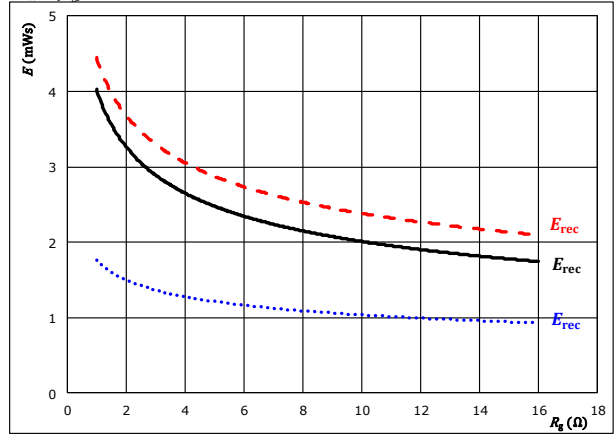


With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{g(on)} = 2$ Ω
 $T_j: 25$ °C
 125 °C
 150 °C

figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor

$$E_{rec} = f(R_g)$$



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 252$ A
 $T_j: 25$ °C
 125 °C
 150 °C

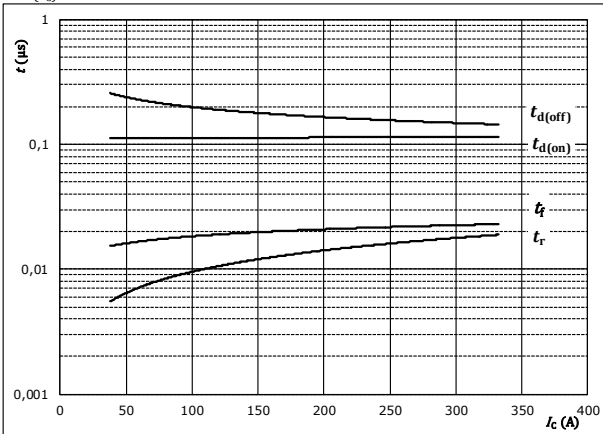


Buck Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



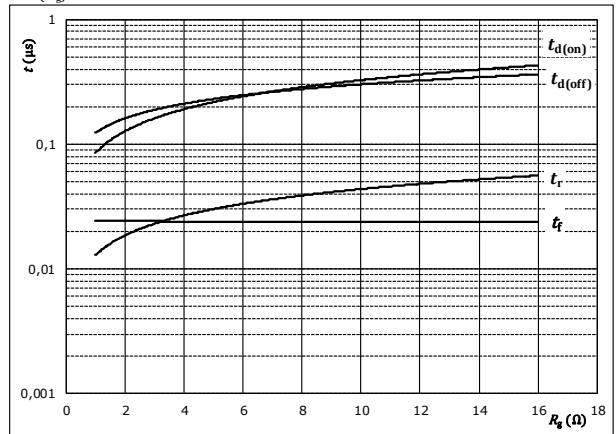
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	2	Ω
$R_{goff} =$	2	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



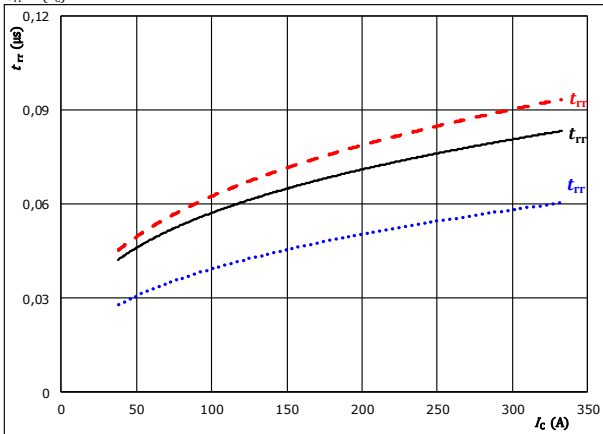
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	252	A

figure 7. FWD

Typical reverse recovery time as a function of collector current

$$t_{rr} = f(I_C)$$

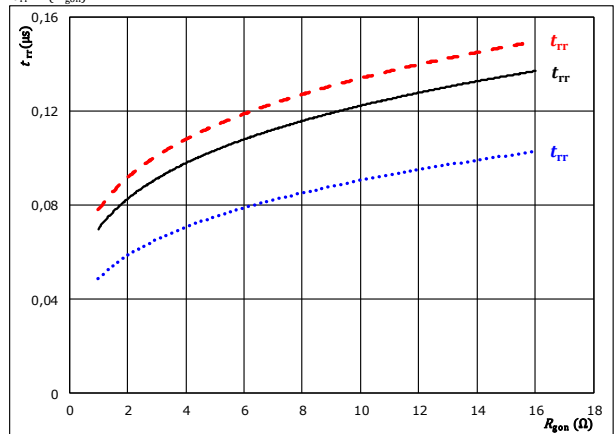


At	$V_{CE} =$	350	V	$T_j:$	25 °C
	$V_{GE} =$	±15	V		125 °C	————
	$R_{gon} =$	2	Ω		150 °C	- - - -

figure 8. FWD

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

$$t_{rr} = f(R_{gon})$$



At	$V_{CE} =$	350	V	$T_j:$	25 °C
	$V_{GE} =$	±15	V		125 °C	————
	$I_C =$	252	A		150 °C	- - - -

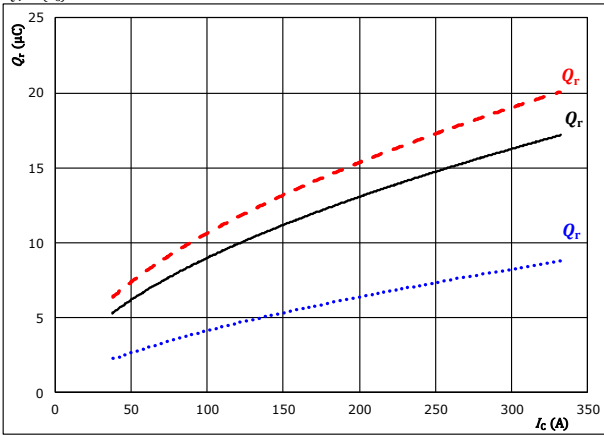


Buck Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$

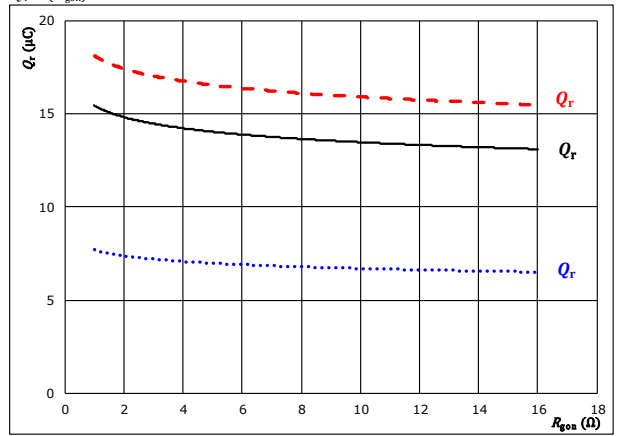


At $V_{CE} = 350$ V $T_j = 25$ °C $\dots\dots\dots$
 $V_{GE} = \pm 15$ V $T_j = 125$ °C ---
 $R_{gon} = 2$ Ω $T_j = 150$ °C ---

figure 10. FWD

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

$$Q_r = f(R_{gon})$$

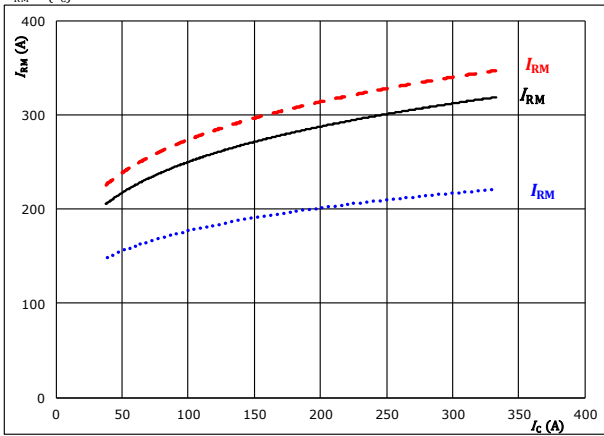


At $V_{CE} = 350$ V $T_j = 25$ °C $\dots\dots\dots$
 $V_{GE} = \pm 15$ V $T_j = 125$ °C ---
 $I_c = 252$ A $T_j = 150$ °C ---

figure 11. FWD

Typical peak reverse recovery current current as a function of collector current

$$I_{RM} = f(I_c)$$

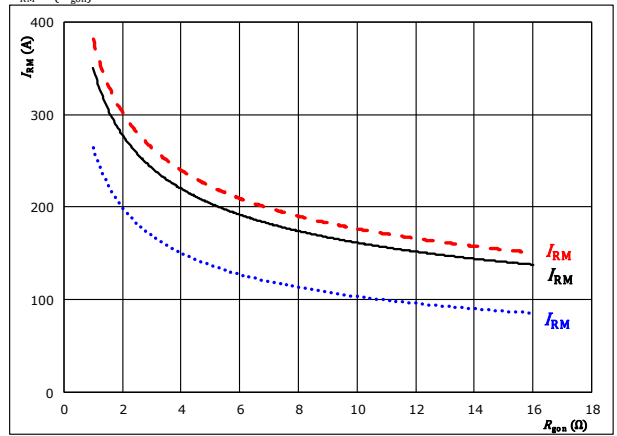


At $V_{CE} = 350$ V $T_j = 25$ °C $\dots\dots\dots$
 $V_{GE} = \pm 15$ V $T_j = 125$ °C ---
 $R_{gon} = 2$ Ω $T_j = 150$ °C ---

figure 12. FWD

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

$$I_{RM} = f(R_{gon})$$



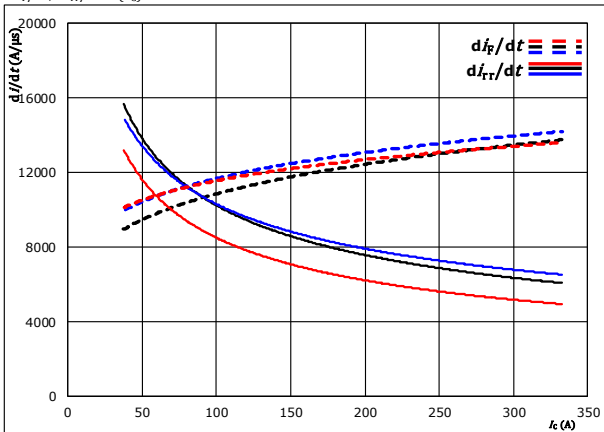
At $V_{CE} = 350$ V $T_j = 25$ °C $\dots\dots\dots$
 $V_{GE} = \pm 15$ V $T_j = 125$ °C ---
 $I_c = 252$ A $T_j = 150$ °C ---



Buck Switching Characteristics

figure 13. FWD

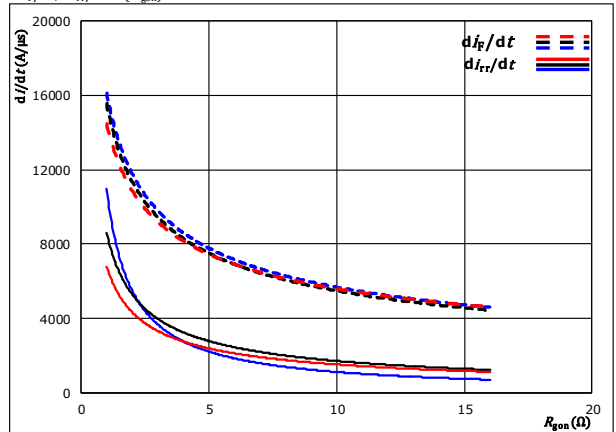
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_{rr}/dt = f(I_c)$



At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = \pm 15$ V $T_j = 125$ °C
 $R_{gpn} = 2$ Ω $T_j = 150$ °C

figure 14. FWD

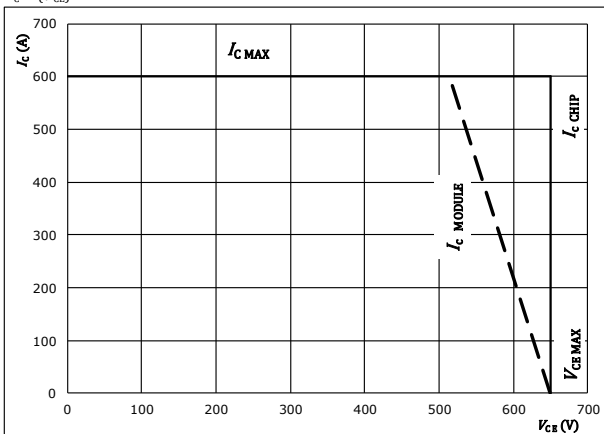
Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor
 $di_f/dt, di_{rr}/dt = f(R_{gpn})$



At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = \pm 15$ V $T_j = 125$ °C
 $I_c = 252$ A $T_j = 150$ °C

figure 15. IGBT

Reverse bias safe operating area
 $I_c = f(V_{CE})$



At $T_j = 125$ °C
 $R_{gpn} = 2$ Ω
 $R_{goff} = 2$ Ω

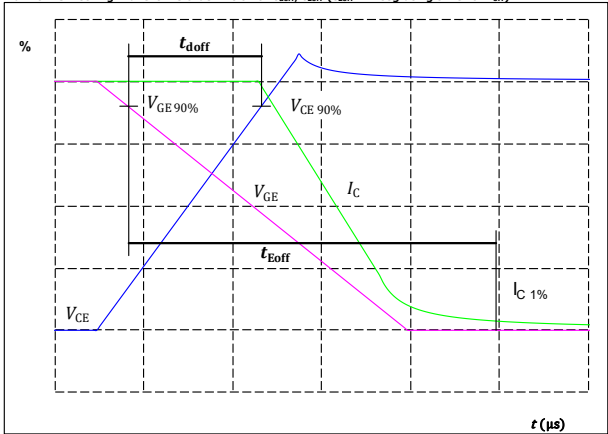


Buck Switching Definitions

General conditions		
T_j	=	125 °C
R_{gon}	=	2 Ω
R_{goff}	=	2 Ω

figure 1. IGBT

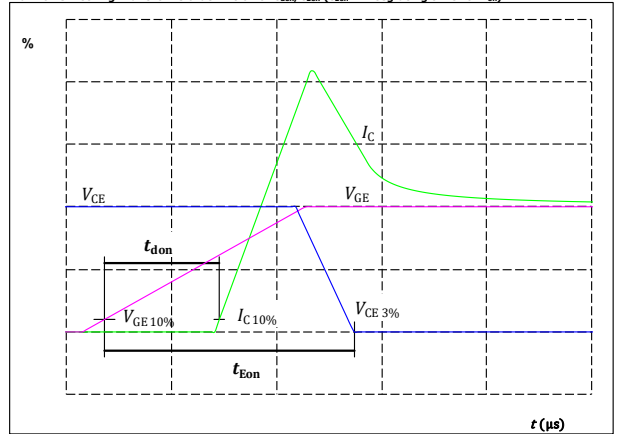
Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{CE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_{doff} =$	148	ns

figure 2. IGBT

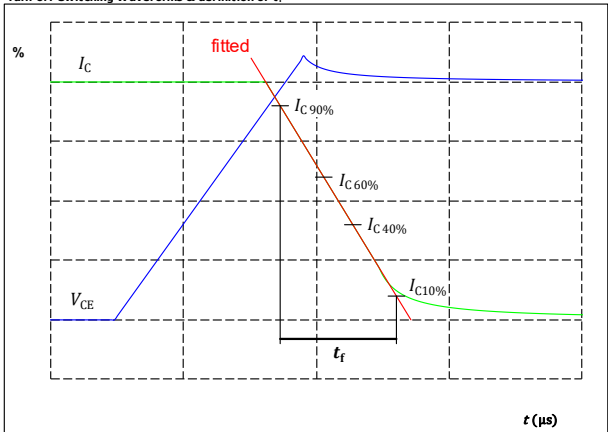
Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{CE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_{don} =$	116	ns

figure 3. IGBT

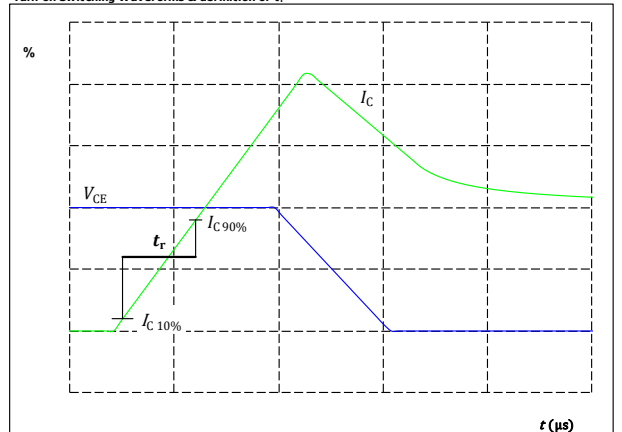
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_f =$	21	ns

figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r



$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_r =$	18	ns



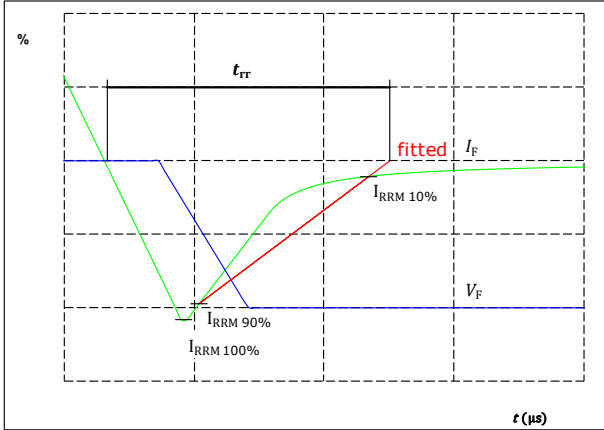
Vincotech

30-FT07NIB300S503-LH36F58
30-PT07NIB300S503-LH36F58Y
 datasheet

Buck Switching Characteristics

figure 5. FWD

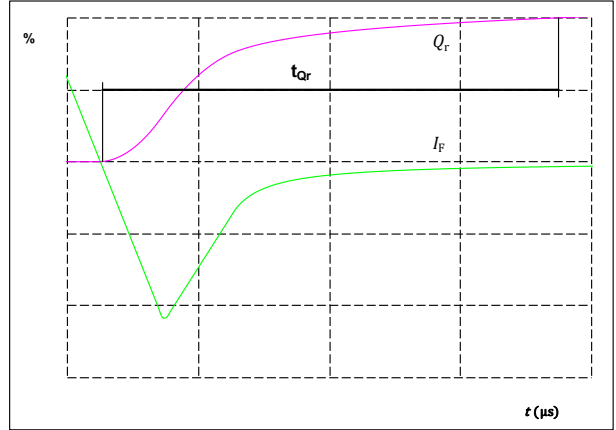
Turn-off Switching Waveforms & definition of t_{rr}



$V_F(100\%) =$	350	V
$I_F(100\%) =$	252	A
$I_{RRM}(100\%) =$	298	A
$t_{rr} =$	77	ns

figure 6. FWD

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



$I_F(100\%) =$	252	A
$Q_r(100\%) =$	14,87	μC

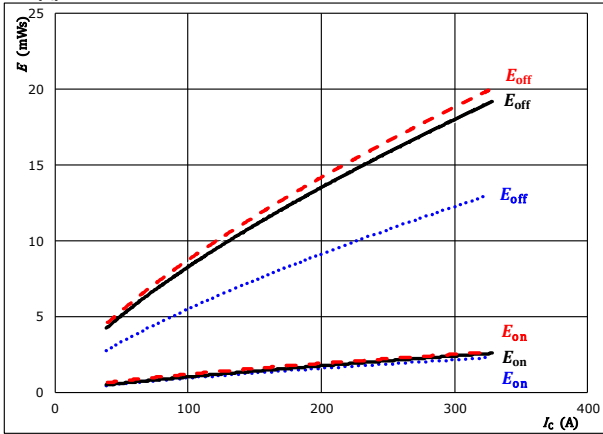


Boost Switching Characteristics

figure 1. IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_c)$$



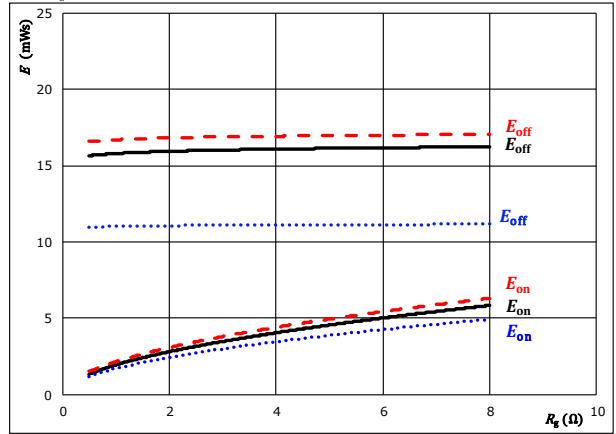
With an inductive load at

$V_{CE} =$	350 V	$T_j:$	25 °C
$V_{GE} =$	±15 V		125 °C	————
$R_{g\text{on}} =$	2 Ω		150 °C	-----
$R_{g\text{off}} =$	2 Ω			

figure 2. IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



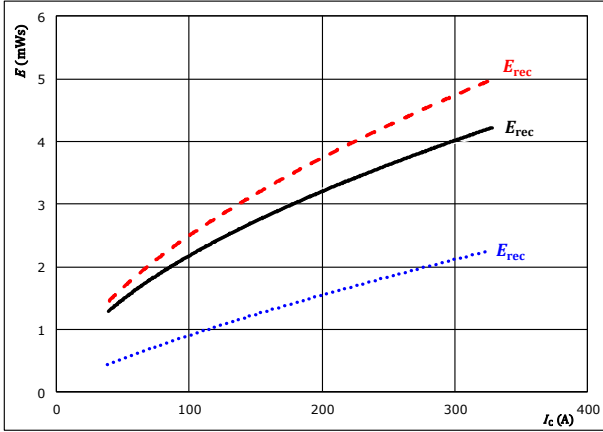
With an inductive load at

$V_{CE} =$	350 V	$T_j:$	25 °C
$V_{GE} =$	±15 V		125 °C	————
$I_c =$	252 A		150 °C	-----

figure 3. FWD

Typical reverse recovered energy loss as a function of collector current

$$E_{rec} = f(I_c)$$



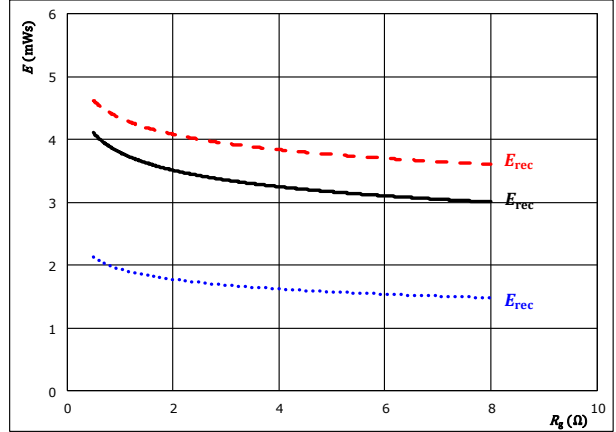
With an inductive load at

$V_{CE} =$	350 V	$T_j:$	25 °C
$V_{GE} =$	±15 V		125 °C	————
$R_{g\text{on}} =$	2 Ω		150 °C	-----

figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor

$$E_{rec} = f(R_g)$$



With an inductive load at

$V_{CE} =$	350 V	$T_j:$	25 °C
$V_{GE} =$	±15 V		125 °C	————
$I_c =$	252 A		150 °C	-----

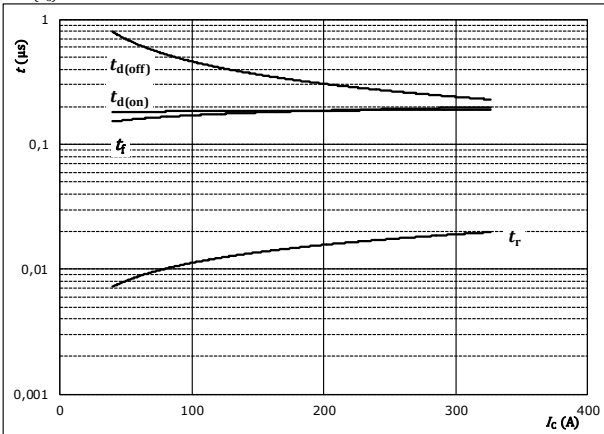


Boost Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



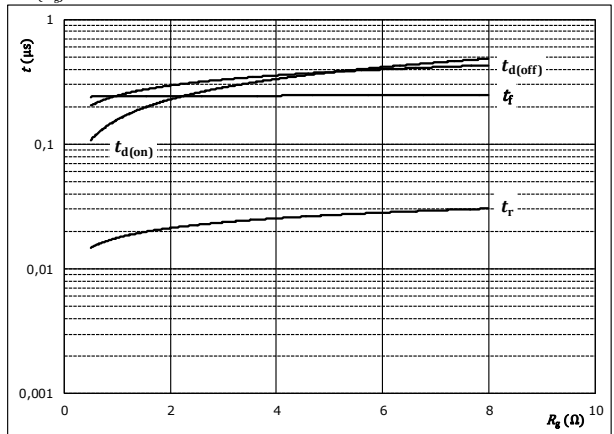
With an inductive load at

$T_j = 150 \text{ } ^\circ\text{C}$
 $V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 2 \text{ } \Omega$
 $R_{goff} = 2 \text{ } \Omega$

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



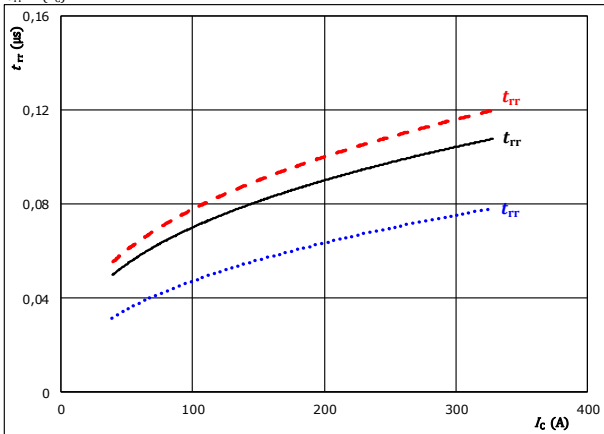
With an inductive load at

$T_j = 150 \text{ } ^\circ\text{C}$
 $V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 252 \text{ A}$

figure 7. FWD

Typical reverse recovery time as a function of collector current

$$t_{rr} = f(I_C)$$



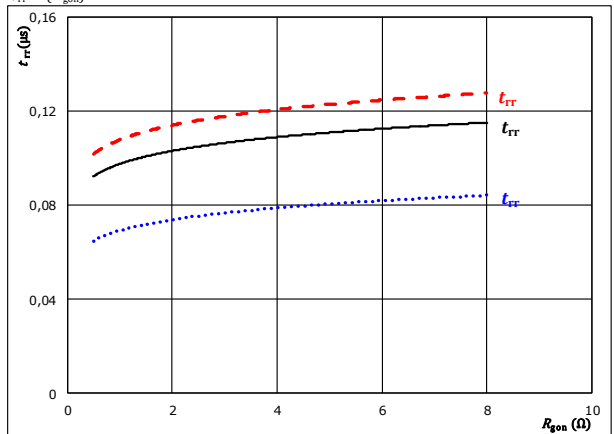
With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 2 \text{ } \Omega$
 $T_j: 25 \text{ } ^\circ\text{C}$ (dotted)
 $125 \text{ } ^\circ\text{C}$ (solid)
 $150 \text{ } ^\circ\text{C}$ (dashed)

figure 8. FWD

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

$$t_{rr} = f(R_{gon})$$



With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_C = 252 \text{ A}$
 $T_j: 25 \text{ } ^\circ\text{C}$ (dotted)
 $125 \text{ } ^\circ\text{C}$ (solid)
 $150 \text{ } ^\circ\text{C}$ (dashed)

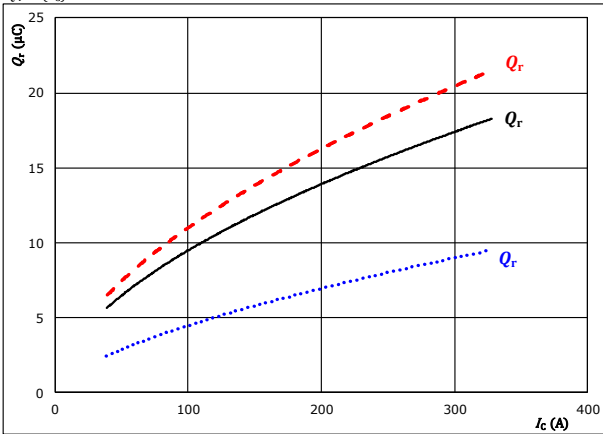


Boost Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$

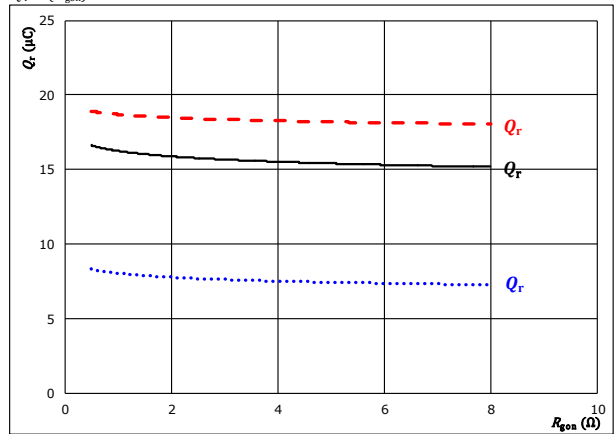


With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 10. FWD

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

$$Q_r = f(R_{gon})$$

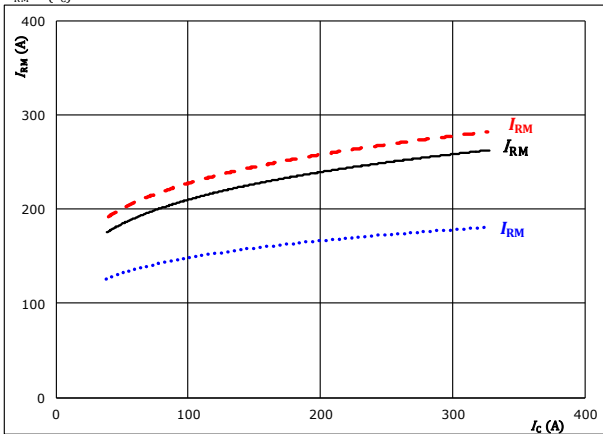


With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 252$ A
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 11. FWD

Typical peak reverse recovery current current as a function of collector current

$$I_{RM} = f(I_c)$$

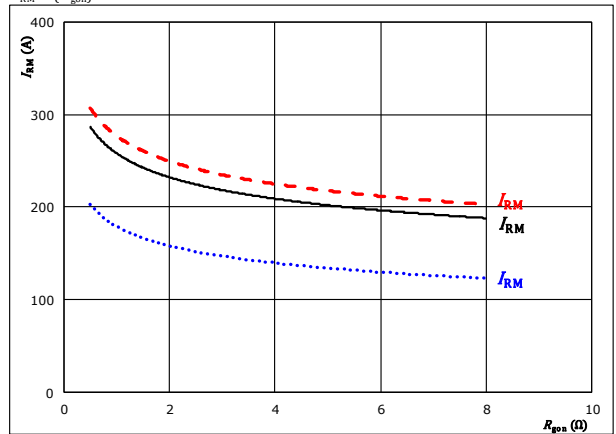


With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 2$ Ω
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 12. FWD

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

$$I_{RM} = f(R_{gon})$$



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 252$ A
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

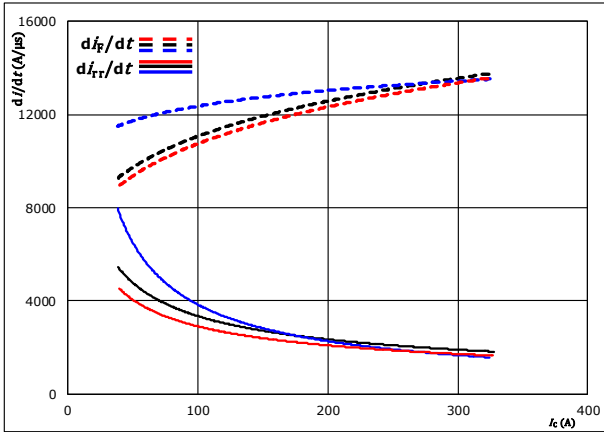


Vincotech

Boost Switching Characteristics

figure 13. FWD

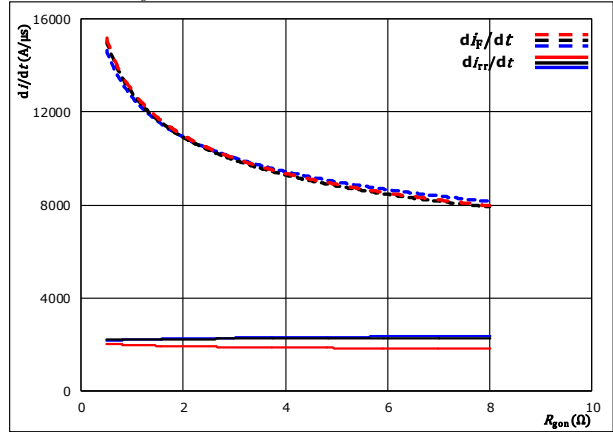
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_F/dt, di_{rr}/dt = f(I_C)$



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{g\text{on}} = 2$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C

figure 14. FWD

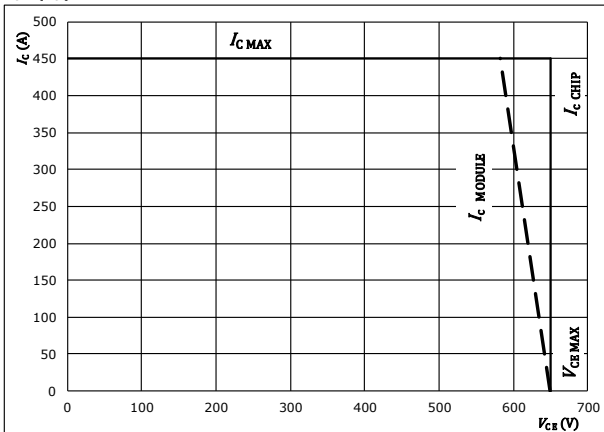
Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor
 $di_F/dt, di_{rr}/dt = f(R_{g\text{on}})$



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 252$ A
 $T_j = 25$ °C
 125 °C
 150 °C

figure 15. IGBT

Reverse bias safe operating area
 $I_C = f(V_{CE})$



At
 $T_j = 125$ °C
 $R_{g\text{on}} = 2$ Ω
 $R_{g\text{off}} = 2$ Ω

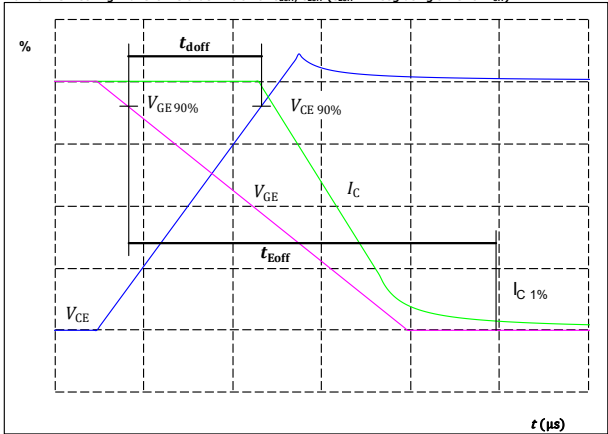


Boost Switching Definitions

General conditions		
T_j	=	125 °C
R_{gon}	=	2 Ω
R_{goff}	=	2 Ω

figure 1. IGBT

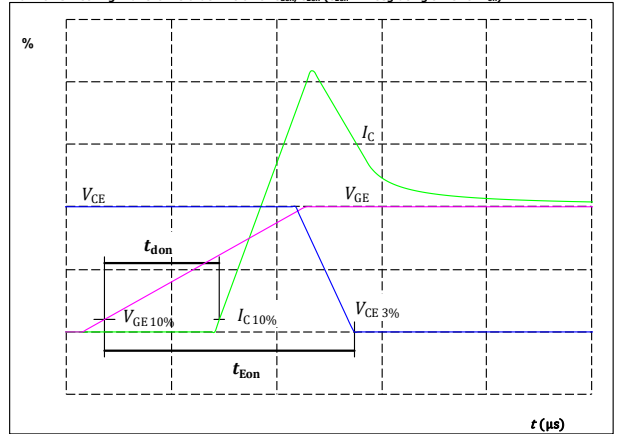
Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})



$V_{CE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_{doff} =$	253	ns

figure 2. IGBT

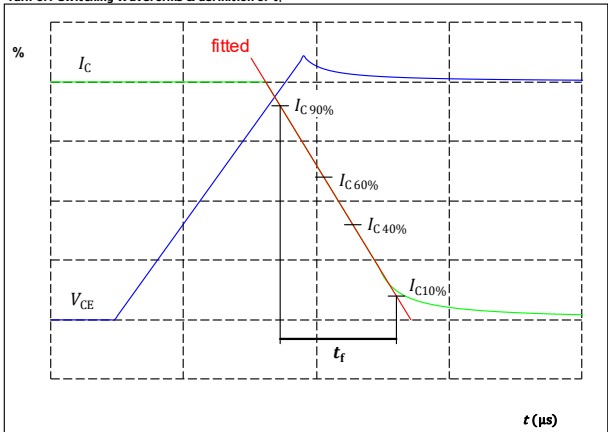
Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})



$V_{CE}(0\%) =$	-15	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_{don} =$	188	ns

figure 3. IGBT

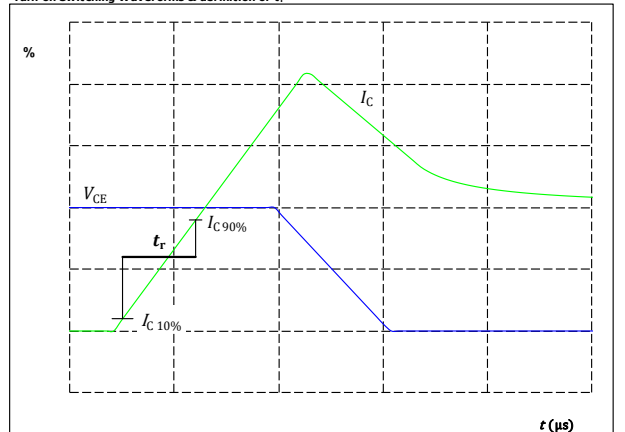
Turn-off Switching Waveforms & definition of t_f



$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_f =$	210	ns

figure 4. IGBT

Turn-on Switching Waveforms & definition of t_r



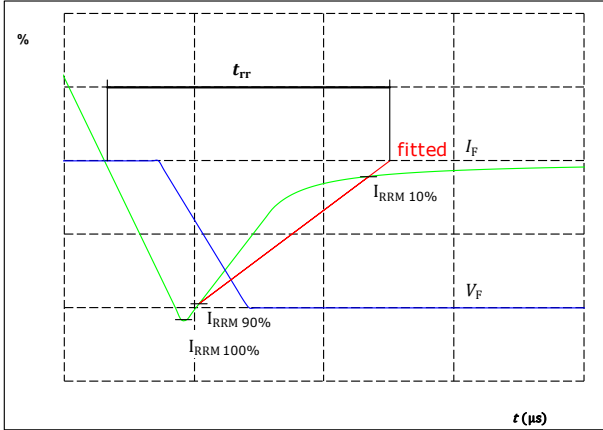
$V_C(100\%) =$	350	V
$I_C(100\%) =$	252	A
$t_r =$	18	ns



Boost Switching Characteristics

figure 5. FWD

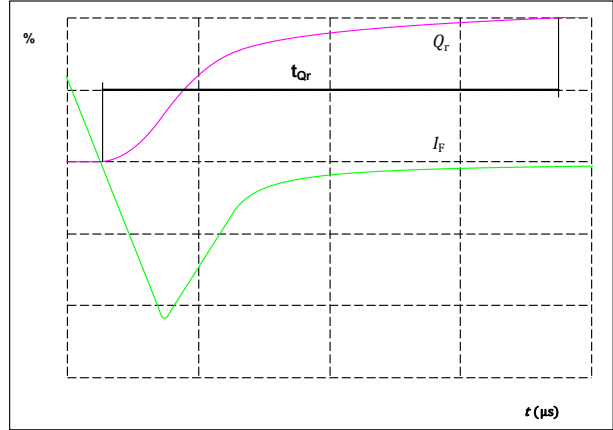
Turn-off Switching Waveforms & definition of t_{rr}



$V_F(100\%) =$	350	V
$I_F(100\%) =$	252	A
$I_{RRM}(100\%) =$	254	A
$t_{rr} =$	99	ns

figure 6. FWD

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



$I_F(100\%) =$	252	A
$Q_r(100\%) =$	16,20	μC



30-FT07NIB300S503-LH36F58 30-PT07NIB300S503-LH36F58Y

datasheet

Vincotech

Ordering Code & Marking						
Version				Ordering Code		
without thermal paste with 13mm housing with Solder pins				30-FT07NIB300S503-LH36F58		
without thermal paste with 13mm housing with Press-fit pins				30-PT07NIB300S503-LH36F58Y		
Text	Name		Date code	UL & VIN	Lot	Serial
	NN-NNNNNNNNNNNNNN-TTTTITTV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code	
	TTTTITTV	LLLLL	SSSS	WWYY		

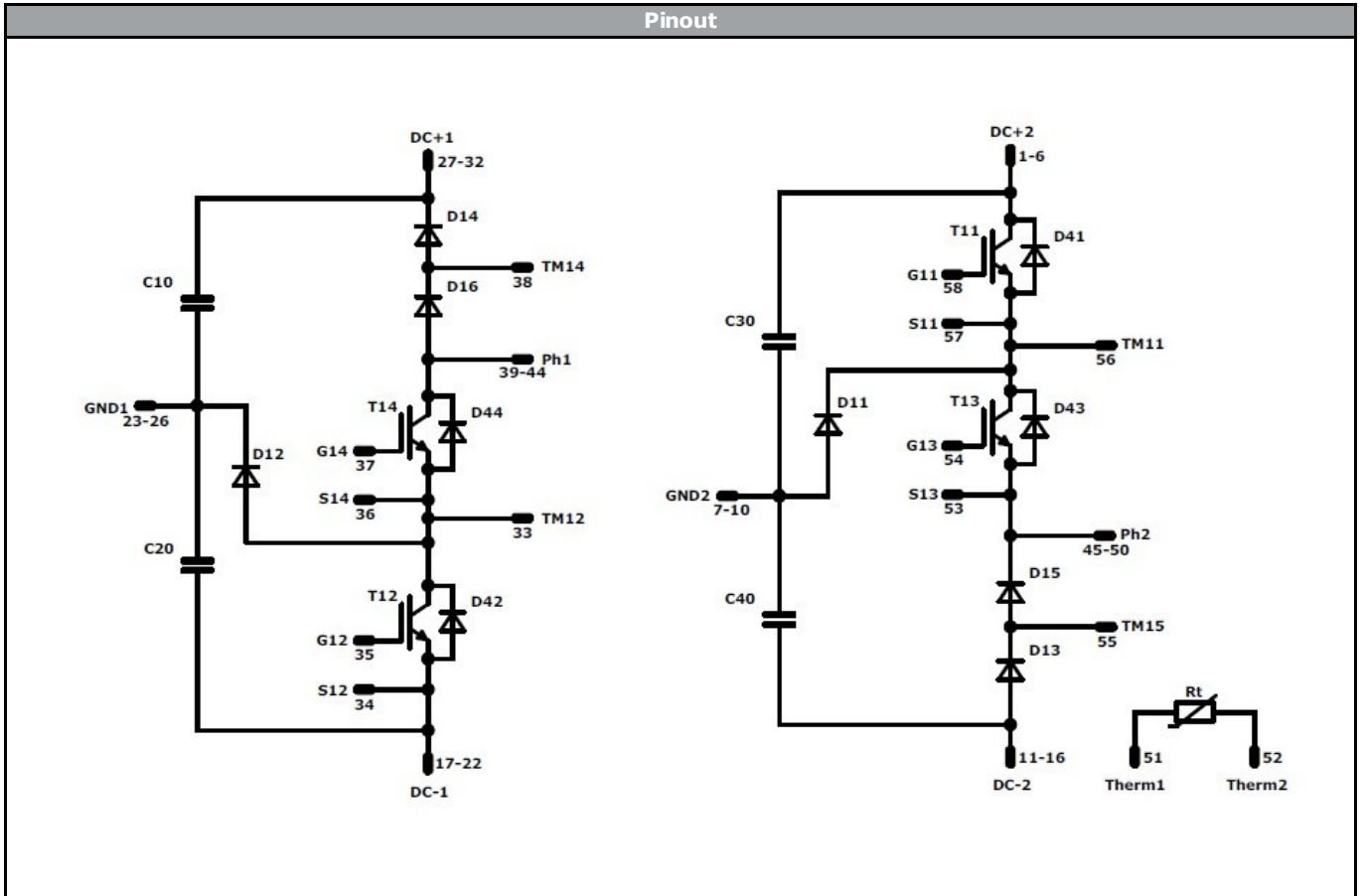
Outline							
Pin table				Pin table			
Pin	X	Y	Function	Pin	X	Y	Function
1	70,25	6	DC+2	48	45,75	36	Ph2
2	70,25	3	DC+2	49	48,25	36	Ph2
3	70,25	0	DC+2	50	50,75	36	Ph2
4	67,75	3	DC+2	51	64,45	36,6	Therm1
5	67,75	0	DC+2	52	70,85	36,55	Therm2
6	65,25	0	DC+2	53	45,95	24,05	S13
7	58	0	GND2	54	48,95	24,05	G13
8	55,5	0	GND2	55	48,75	12,85	TM15
9	53	0	GND2	56	59,05	16,8	TM11
10	50,5	0	GND2	57	59,45	22	S11
11	43,25	3	DC-2	58	62,45	22	G11
12	43,25	0	DC-2				
13	40,75	3	DC-2				
14	40,75	0	DC-2				
15	38,25	3	DC-2				
16	38,25	0	DC-2				
17	32,25	3	DC-1				
18	32,25	0	DC-1				
19	29,75	3	DC-1				
20	29,75	0	DC-1				
21	27,25	3	DC-1				
22	27,25	0	DC-1				
23	20	0	GND1				
24	17,5	0	GND1				
25	15	0	GND1				
26	12,5	0	GND1				
27	5,25	3	DC+1				
28	5,25	0	DC+1				
29	2,75	3	DC+1				
30	2,75	0	DC+1				
31	0,25	3	DC+1				
32	0,25	0	DC+1				
33	20,1	13,75	TM12				
34	32,5	23,55	S12				
35	29,5	23,55	G12				
36	20,2	23,95	S14				
37	17,2	25,55	G14				
38	0	16,15	TM14				
39	2,25	36	Ph1				
40	4,75	36	Ph1				
41	7,25	36	Ph1				
42	9,75	36	Ph1				
43	12,25	36	Ph1				
44	14,75	36	Ph1				
45	38,25	36	Ph2				
46	40,75	36	Ph2				
47	43,25	36	Ph2				

Technical drawings showing side views and a top view of the component. Dimensions include: $\phi \pm 0,05$, $17,2 \pm 0,05$, $14,08 \pm 0,21$, $17,4 \pm 0,05$, 18 , and $35,25$. The top view shows pin locations numbered 1 through 58. A note indicates: "center of press-fit pinhead for connection parameter see the handling instruction".

Tolerance of pinpositions: $\pm 0,05$ mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



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Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T12	IGBT	650 V	300 A	Buck Switch	
D11, D12	FWD	650 V	300 A	Buck Diode	
D41, D42	FWD	650 V	30 A	Buck Sw. Protection Diode	
T13, T14	IGBT	650 V	225 A	Boost Switch	
D13, D14	FWD	650 V	300 A	Boost Diode	
D15, D16	FWD	650 V	300 A	Boost Sw.Inv.Diode	
D43, D44	FWD	650 V	30 A	Boost Sw. Protection Diode	
C10, C20, C30, C40	Capacitor	630 V		Capacitor (DC)	
Rt	NTC			Thermistor	




Vincotech

Packaging instruction			
Standard packaging quantity (SPQ) 36	>SPQ	Standard	<SPQ Sample

Handling instruction
Handling instructions for <i>flow 2</i> packages see vincotech.com website.

Package data
Package data for <i>flow 2</i> 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
30-xT07NIB300S503-LH36F58x-D1-14	24 Aug. 2018		

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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.