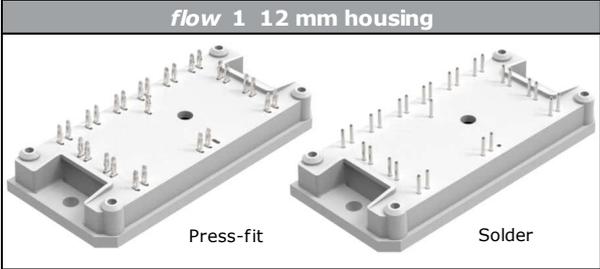
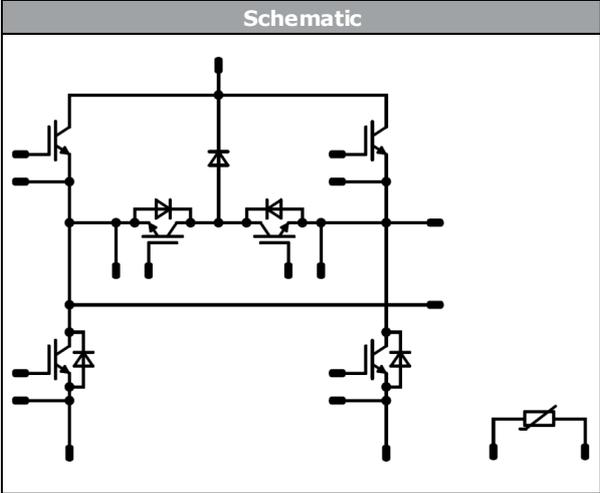




Vincotech

<i>flow</i> PACK 1 H6.5	650 V / 75 A
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; background-color: #ccc; margin: 0;">Features</p> <ul style="list-style-type: none"> Innovative H6.5 Topology IGBT S5 + IGBT L5 NTC </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; background-color: #ccc; margin: 0;">Target applications</p> <ul style="list-style-type: none"> Solar Inverters Special Application </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;">Types</p> <ul style="list-style-type: none"> 10-FY07HVA075S5-L985F08 10-PY07HVA075S5-L985F08Y </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; background-color: #ccc; margin: 0;"><i>flow</i> 1 12 mm housing</p>  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #ccc; margin: 0;">Schematic</p>  </div>

Maximum Ratings

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

Parameter	Symbol	Condition	Value	Unit
High Buck Switch / Low Buck Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	58	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	86	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
Buck Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	53	A
Repetitive peak forward current	I_{FRM}		100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	76	W
Maximum junction temperature	T_{jmax}		175	°C
Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	85	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	95	W
Gate-emitter voltage	V_{GES}		±20	V
Maximum junction temperature	T_{jmax}		175	°C
Low Boost Diode / High Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	53	A
Repetitive peak forward current	I_{FRM}		100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	76	W
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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Module Properties

Thermal Properties

Storage temperature	T_{stg}		-40...+125	°C
Operation temperature under switching condition	T_{top}		-40...(T _{max} - 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		Solder	7,99	mm
		Press-fit	8,3	mm
Comparative Tracking Index	CTI		> 200	

*100 % tested in production



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		

High Buck Switch / Low Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{GE} = V_{CE}$			0,00075	25	3,2	4	4,8	V
Collector-emitter saturation voltage	V_{CEsat}		15		75	25 125 150		1,56 1,56 1,59	1,75	V
Collector-emitter cut-off current	I_{CES}		0	650		25			50	µA
Gate-emitter leakage current	I_{GES}		20	0		25			100	nA
Internal gate resistance	r_g							none		Ω
Input capacitance	C_{ies}							4500		pF
Output capacitance	C_{oes}	$f = 1$ Mhz	0	25		25		130		
Reverse transfer capacitance	C_{res}							17		
Gate charge	Q_g		15	520	75	25		164		nC

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						1,10		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$					25 125 150		123 121 120		ns	
Rise time	t_r	$R_{goff} = 4$ Ω $R_{gon} = 4$ Ω				25 125 150		9 8 8			
Turn-off delay time	$t_{d(off)}$		±15	350	75	25 125 150		189 215 221			
Fall time	t_f					25 125 150		53 217 257			
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 2,1$ µC $Q_{tFWD} = 3,8$ µC $Q_{tFWD} = 4,4$ µC				25 125 150		0,171 0,164 0,200			mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		3,189 4,647 5,023			



Vincotech

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_{GS} [V]	V_{DS} [V]	I_D [A]	T_j [°C]	Min	Typ	Max	Unit
Forward voltage	V_F			50	25 125		1,50 1,44	1,77	V
Reverse leakage current	I_R		650		25			2,65	μA

Thermal

Parameter	Symbol	Conditions	Value	Unit
Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK	1,26	K/W

Dynamic

Parameter	Symbol	dI/dt	I_C	T_j	Value	Unit	
Peak recovery current	I_{RRM}			25 125 150	76 101 105	A	
Reverse recovery time	t_{rr}			25 125 150	58 89 101	ns	
Recovered charge	Q_r	$dI/dt = 7349$ A/μs $dI/dt = 6426$ A/μs $dI/dt = 7461$ A/μs	±15	350	75	2,102 3,817 4,395	μC
Reverse recovered energy	E_{rec}			25 125 150	0,623 0,986 1,148	mWs	
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$			25 125 150	4813 3089 2758	A/μs	



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	

Boost 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	$V_{GE(th)}$	$V_{GE} = V_{CE}$				0,001	25	4,2	5	5,8	V
Collector-emitter saturation voltage	V_{CEsat}		15			75	25		1,10	1,45	V
Collector-emitter cut-off current	I_{CES}		0	650			25			40	μA
Gate-emitter leakage current	I_{GES}		20	0			25			100	nA
Internal gate resistance	r_g								none		Ω
Input capacitance	C_{ies}	$f = 1 \text{ MHz}$	0	25			25		11625		pF
Reverse transfer capacitance	C_{res}								30		

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	$R_{th(j-s)}$	phase-change material $\lambda = 3,4 \text{ W/mK}$							1,00		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	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	-5/15	350	76			25	31		ns
Rise time	t_r							125	31		
								150	31		
								25	10		
Turn-off delay time	$t_{d(off)}$							125	10		
								150	11		
		25	110								
Fall time	t_f	125	126								
		150	132								
		25	10								
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 2,2 \mu\text{C}$ $Q_{tFWD} = 4 \mu\text{C}$ $Q_{tFWD} = 4,7 \mu\text{C}$	-5/15	350	76			25	0,450		mWs
								125	0,701		
								150	0,758		
Turn-off energy (per pulse)	E_{off}							25	0,457		
								125	0,875		
								150	1,023		



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	

Low Boost Diode / High Boost Diode

Static

Forward voltage	V_F				50	25 125		1,50 1,44	1,77	V
Reverse leakage current	I_R			650		25			2,65	μA

Thermal

Thermal resistance junction to sink	$R_{th(j-s)}$	phase-change material $\lambda = 3,4$ W/mK						1,26		K/W
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Dynamic

Peak recovery current	I_{RRM}					25 125 150		86 110 117		A
Reverse recovery time	t_{rr}					25 125 150		55 87 101		ns
Recovered charge	Q_r	$di/dt = 5329$ A/μs $di/dt = 8023$ A/μs $di/dt = 7260$ A/μs	-5/15	350	76	25 125 150		2,178 4,039 4,699		μC
Reverse recovered energy	E_{rec}					25 125 150		0,381 0,839 1,021		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		5984 4040 4174		A/μs

Thermistor

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$\Delta_{R/R}$	$R_{100} = 1484$ Ω				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	

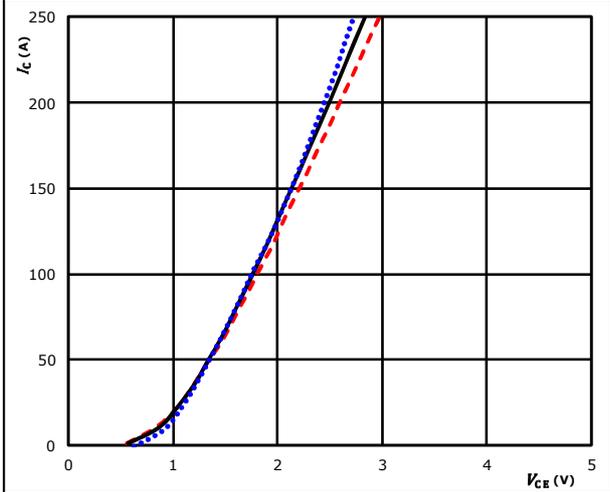


High Buck Switch / Low Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

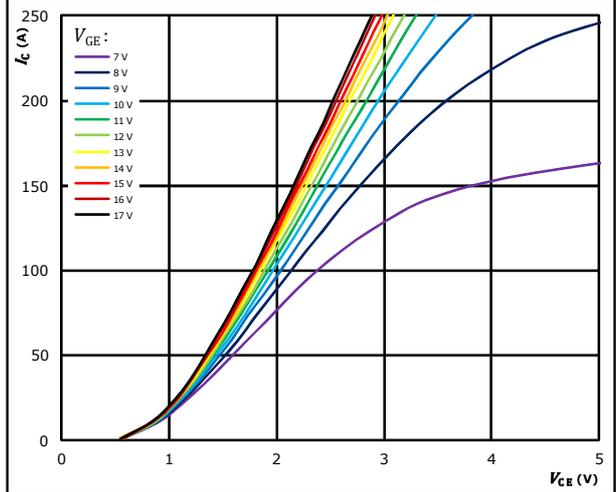


$t_p = 250 \mu s$ $T_j: 25 \text{ }^\circ C$
 $V_{GE} = 15 \text{ V}$ $T_j: 125 \text{ }^\circ C$ ———
 $T_j: 150 \text{ }^\circ C$ - - - - -

figure 2. IGBT

Typical output characteristics

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

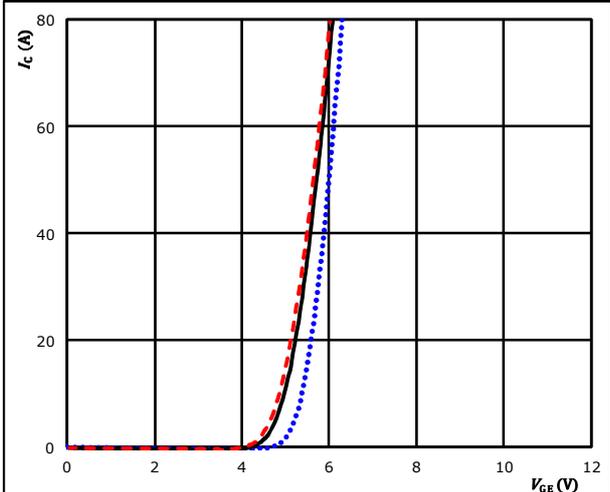


$t_p = 250 \mu s$
 $T_j = 150 \text{ }^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

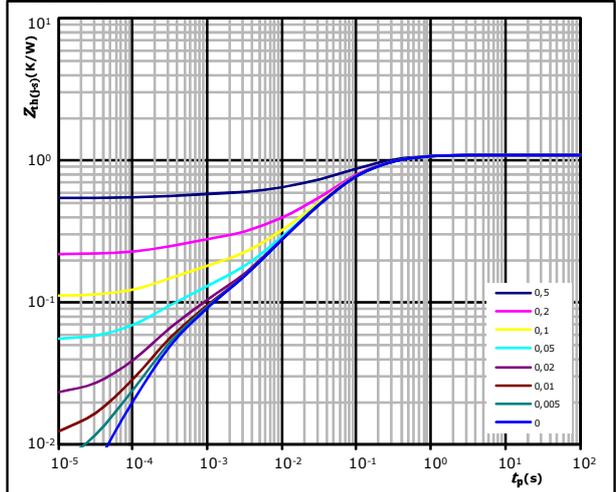


$t_p = 100 \mu s$ $T_j: 25 \text{ }^\circ C$
 $V_{CE} = 10 \text{ V}$ $T_j: 125 \text{ }^\circ C$ ———
 $T_j: 150 \text{ }^\circ C$ - - - - -

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(\theta-s)} = 1,10 \text{ K/W}$

IGBT thermal model values

R (K/W)	τ (s)
2,16E-01	4,05E-01
6,30E-01	6,87E-02
1,62E-01	1,13E-02
3,68E-02	2,51E-03
6,02E-02	3,09E-04

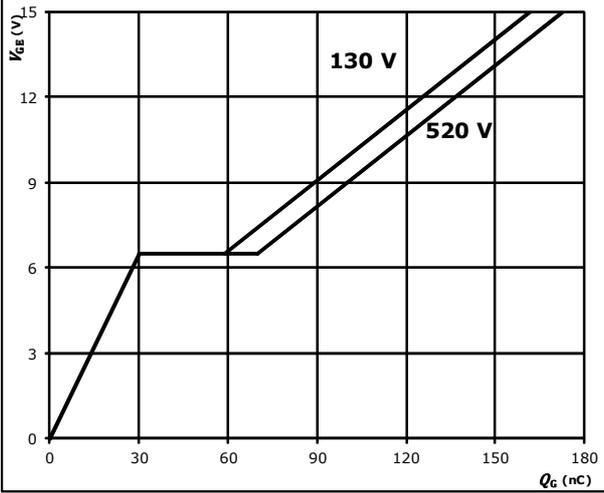


High Buck Switch / Low Buck Switch Characteristics

figure 5. IGBT

Gate voltage vs gate charge

$V_{GE} = f(Q_G)$

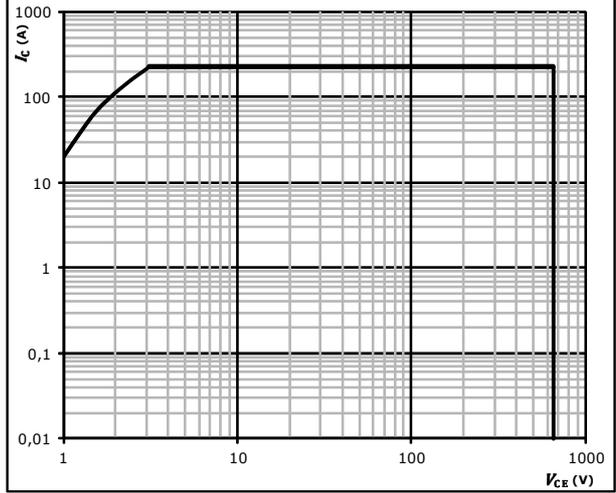


$I_C = 75$ A

figure 6. IGBT

Safe operating area

$I_C = f(V_{CE})$



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

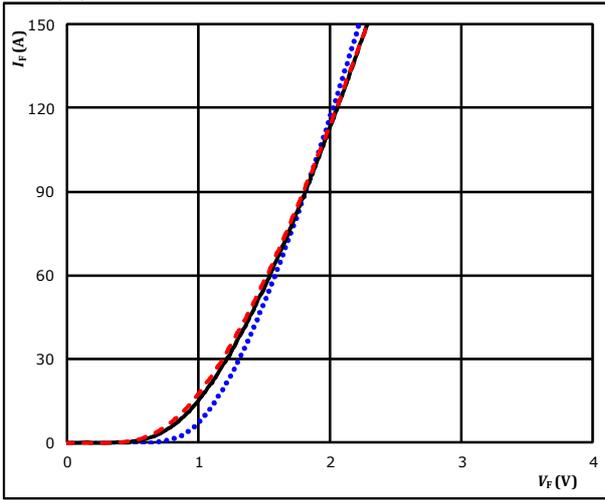


Buck Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

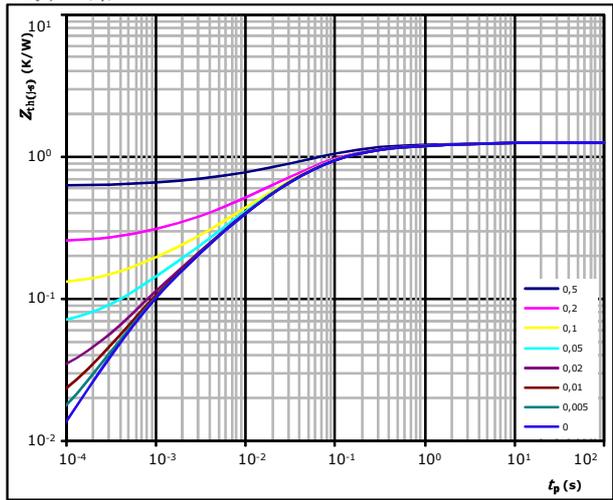


$t_p = 250 \mu s$
 T_j : 25 °C
 125 °C ———
 150 °C - - - -

figure 2. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,26 \text{ K/W}$
 FWD thermal model values

R (K/W)	τ (s)
$7,02E-02$	$3,35E+00$
$1,23E-01$	$4,61E-01$
$4,54E-01$	$8,36E-02$
$3,54E-01$	$2,44E-02$
$1,81E-01$	$5,52E-03$
$7,18E-02$	$8,18E-04$

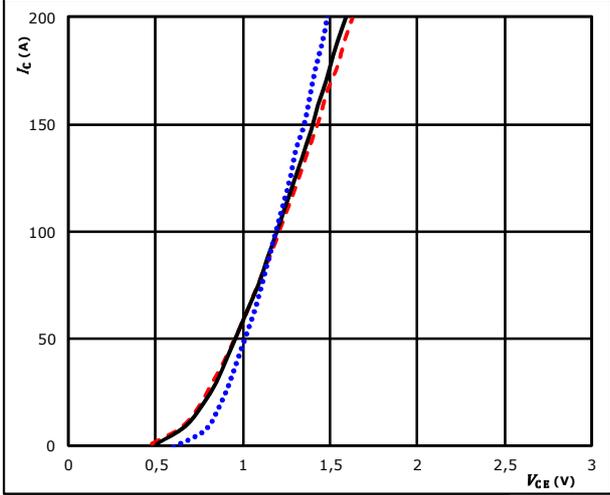


Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

$I_C = f(V_{CE})$

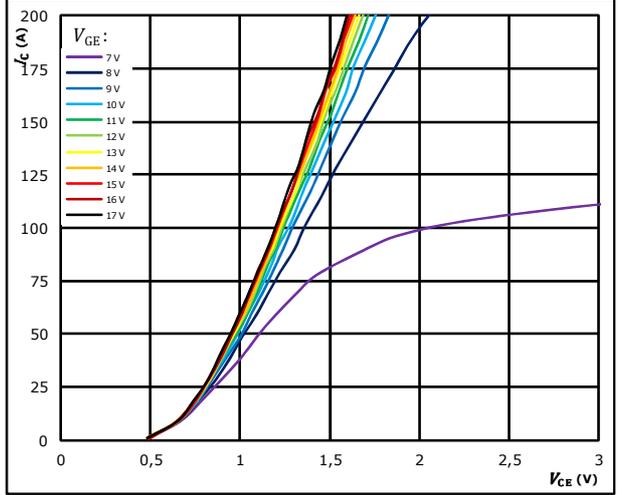


$t_p = 250 \mu s$ $T_j: 25 \text{ }^\circ C$ (dotted blue)
 $V_{GE} = 15 V$ $T_j: 125 \text{ }^\circ C$ (solid black)
 $T_j: 150 \text{ }^\circ C$ (dashed red)

figure 2. IGBT

Typical output characteristics

$I_C = f(V_{CE})$

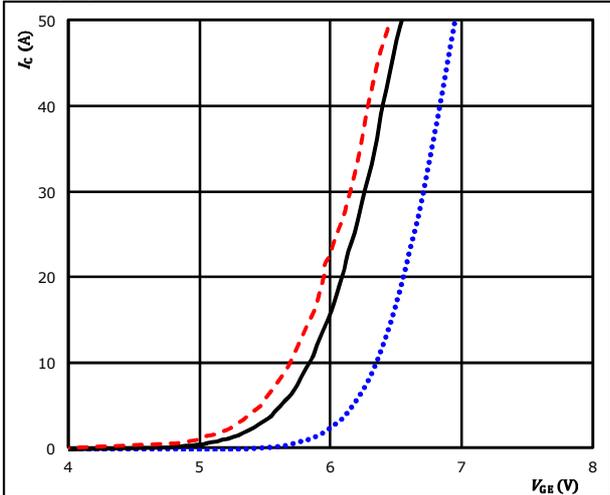


$t_p = 250 \mu s$
 $T_j = 150 \text{ }^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

$I_C = f(V_{GE})$

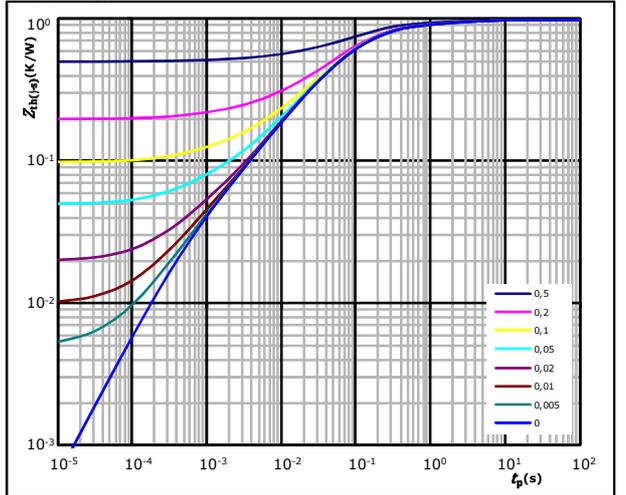


$t_p = 100 \mu s$ $T_j: 25 \text{ }^\circ C$ (dotted blue)
 $V_{CE} = 10 V$ $T_j: 125 \text{ }^\circ C$ (solid black)
 $T_j: 150 \text{ }^\circ C$ (dashed red)

figure 4. IGBT

Transient thermal impedance as function of pulse duration

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



$D = t_p / T$
 $R_{th(j-s)} = 1,00 \text{ K/W}$

IGBT thermal model values

R (K/W)	τ (s)
8,80E-02	2,68E+00
1,67E-01	3,70E-01
5,38E-01	8,09E-02
1,47E-01	1,56E-02
3,80E-02	3,42E-03
1,88E-02	5,45E-04

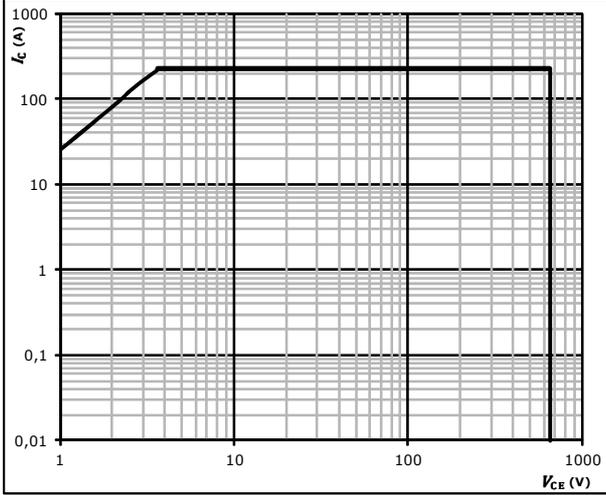


Boost Switch Characteristics

figure 5. IGBT

Safe operating area

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



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

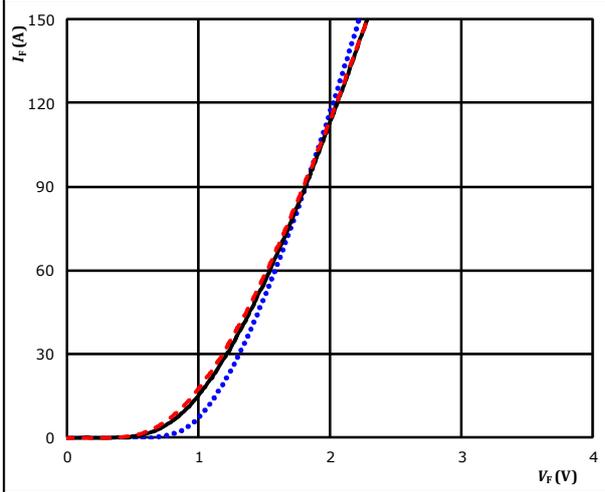


Low Boost Diode / High Boost Diode Characteristics

figure 1. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

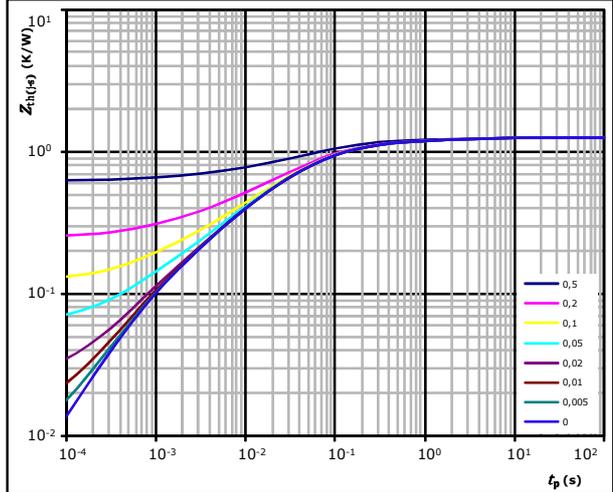


$t_p = 250 \mu s$
 T_j : 25 °C
 125 °C ———
 150 °C - - - -

figure 2. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,26$ K/W
 FWD thermal model values

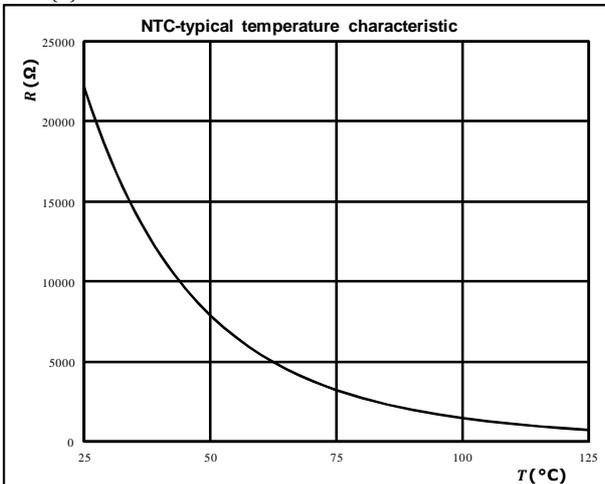
R (K/W)	τ (s)
7,02E-02	3,35E+00
1,23E-01	4,61E-01
4,54E-01	8,36E-02
3,54E-01	2,44E-02
1,81E-01	5,52E-03
7,18E-02	8,18E-04

Thermistor Characteristics

figure 1. Thermistor

Typical NTC characteristic as a function of temperature

$$R = f(T)$$

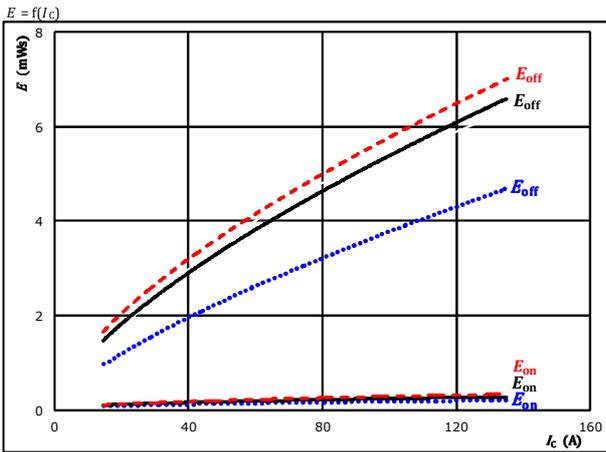




Buck Switching Characteristics

figure 1. IGBT

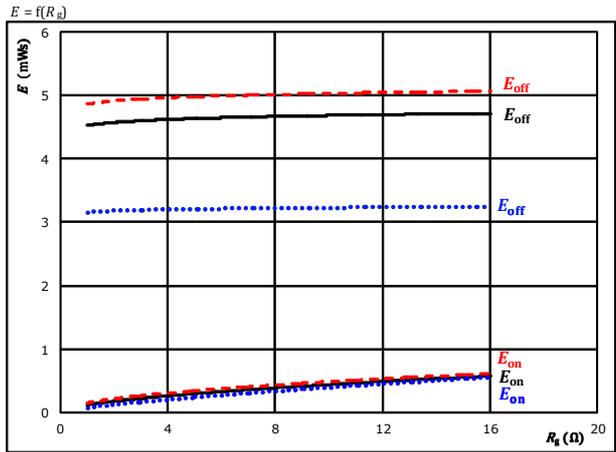
Typical switching energy losses as a function of collector current



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 2. IGBT

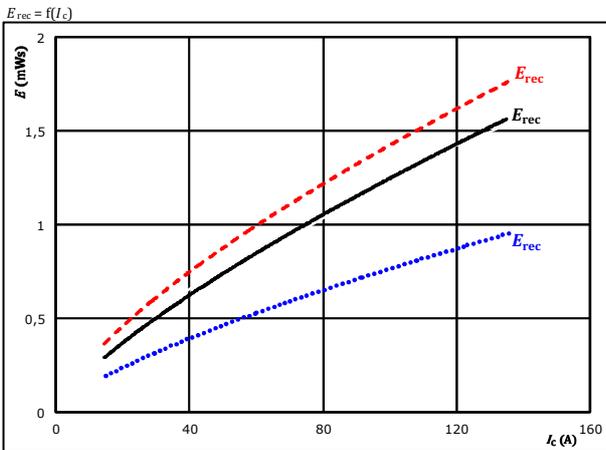
Typical switching energy losses as a function of gate resistor



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 75$ A
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 3. FWD

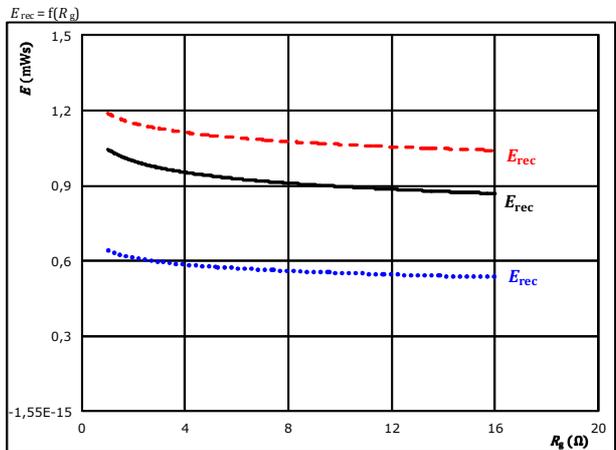
Typical reverse recovered energy loss as a function of collector current



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

figure 4. FWD

Typical reverse recovered energy loss as a function of gate resistor



With an inductive load at
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 75$ A
 T_j : 25 °C (blue dotted), 125 °C (black solid), 150 °C (red dashed)

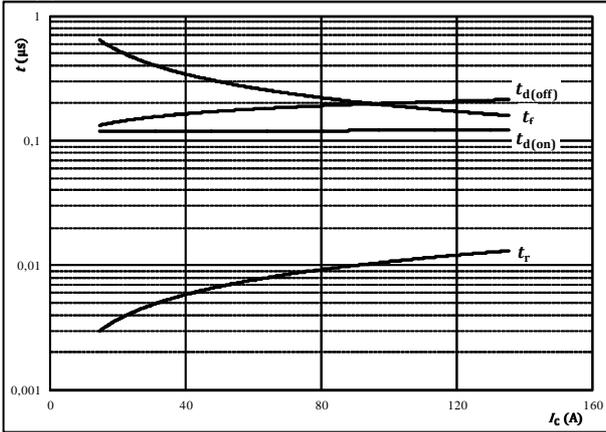


Buck Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



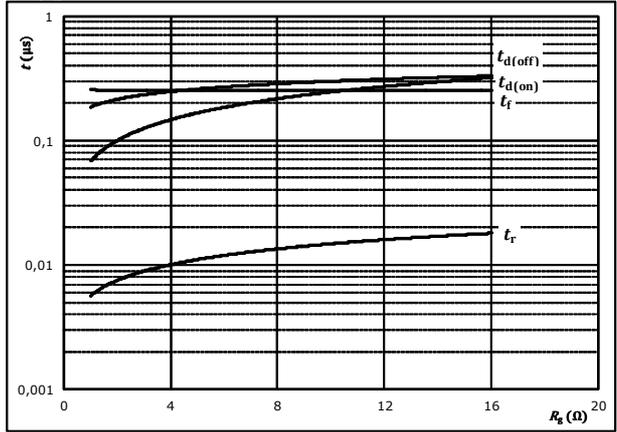
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$R_{gon} =$	4	Ω
$R_{goff} =$	4	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



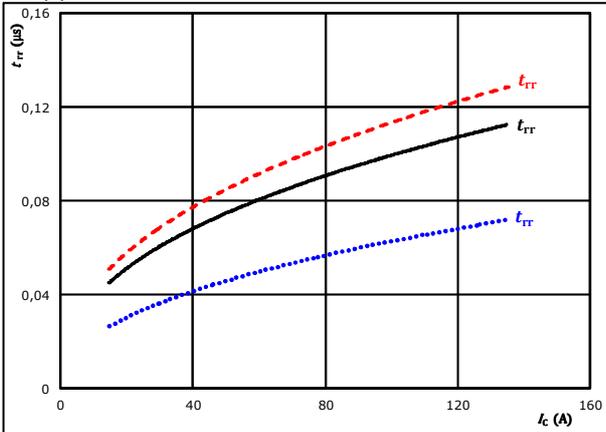
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	±15	V
$I_C =$	75	A

figure 7. FWD

Typical reverse recovery time as a function of collector current

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

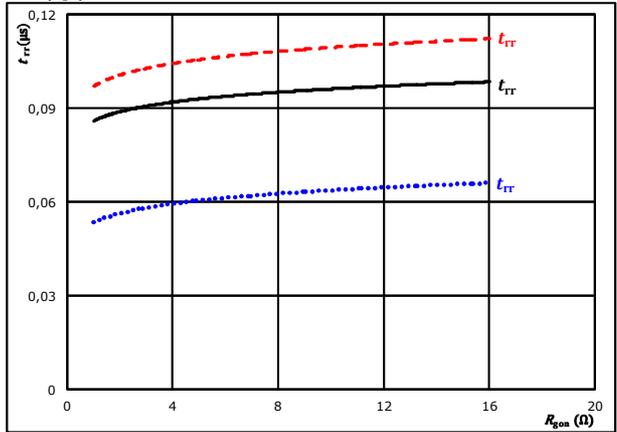


At	$V_{CE} =$	350	V	$T_j:$	25 °C
	$V_{GE} =$	±15	V		125 °C	————
	$R_{gon} =$	4	Ω		150 °C	- - - -

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	————
	$I_C =$	75	A		150 °C	- - - -

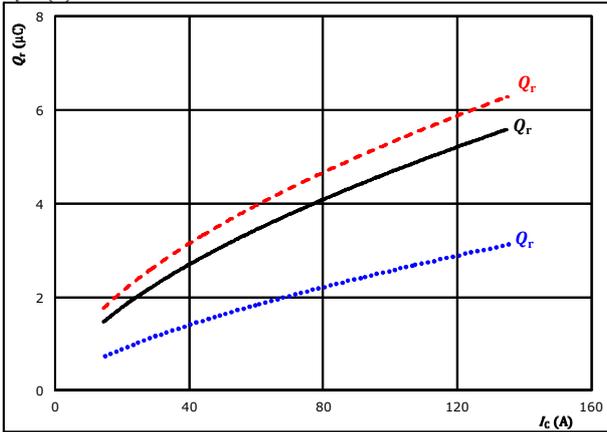


Buck Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$

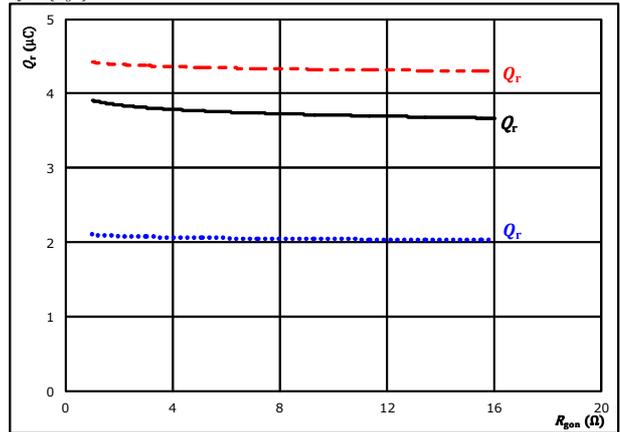


At $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gdn} = 4$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C

figure 10. FWD

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

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

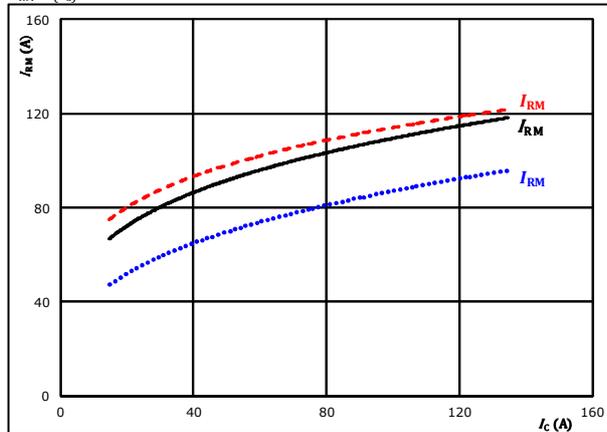


At $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 75$ A
 $T_j = 25$ °C
 125 °C
 150 °C

figure 11. FWD

Typical peak reverse recovery current as a function of collector current

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

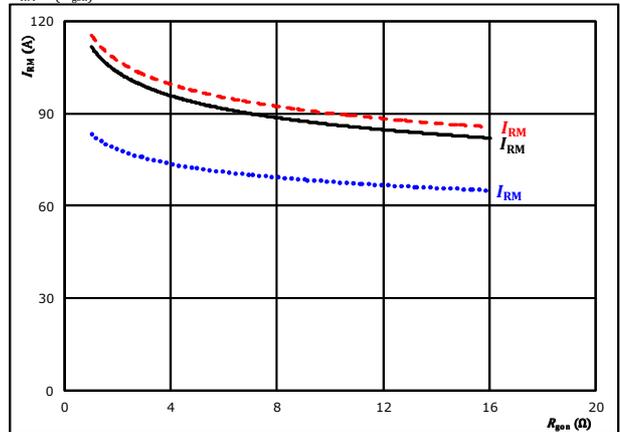


At $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gdn} = 4$ Ω
 $T_j = 25$ °C
 125 °C
 150 °C

figure 12. FWD

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

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



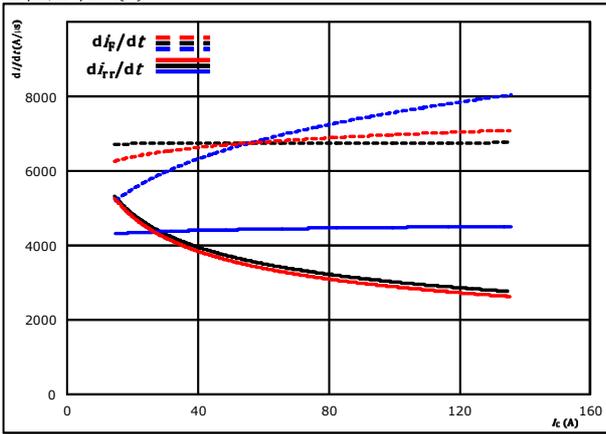
At $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 75$ A
 $T_j = 25$ °C
 125 °C
 150 °C



Buck Switching Characteristics

figure 13. FWD

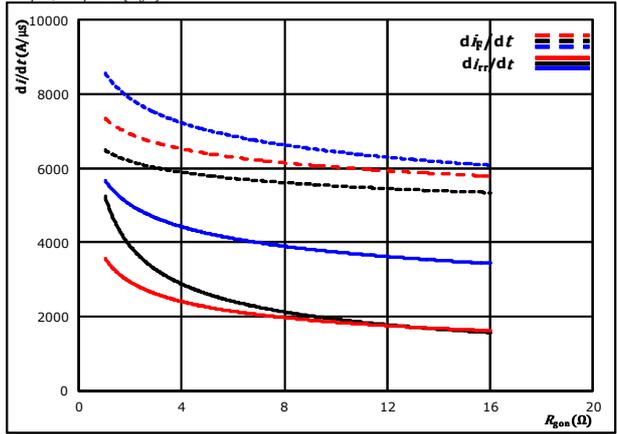
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_{rr}/dt = f(I_c)$



At $V_{CE} = 350$ V $T_j = 25$ °C (.....)
 $V_{GE} = \pm 15$ V $T_j = 125$ °C (—)
 $R_{gpn} = 4$ Ω $T_j = 150$ °C (---)

figure 14. FWD

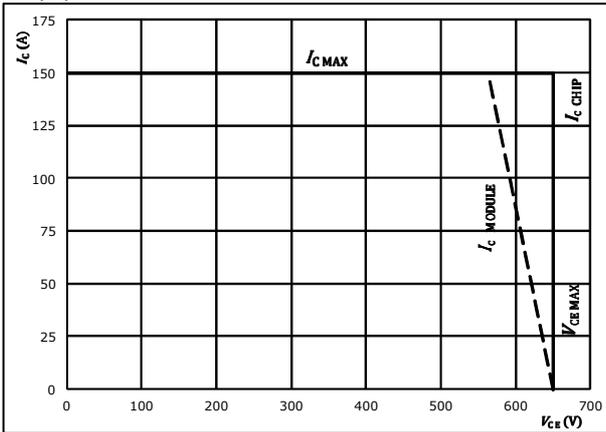
Typical rate of fall of forward and reverse recovery current as a function of IGBT turn on gate resistor
 $di_f/dt, di_{rr}/dt = f(R_{gpn})$



At $V_{CE} = 350$ V $T_j = 25$ °C (.....)
 $V_{GE} = \pm 15$ V $T_j = 125$ °C (—)
 $I_c = 75$ A $T_j = 150$ °C (---)

figure 15. IGBT

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



At $T_j = 175$ °C
 $R_{gpn} = 4$ Ω
 $R_{goff} = 4$ Ω

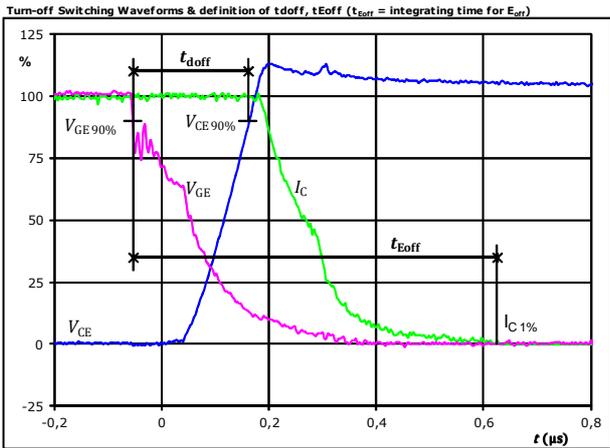


Buck Switching Definitions

General conditions

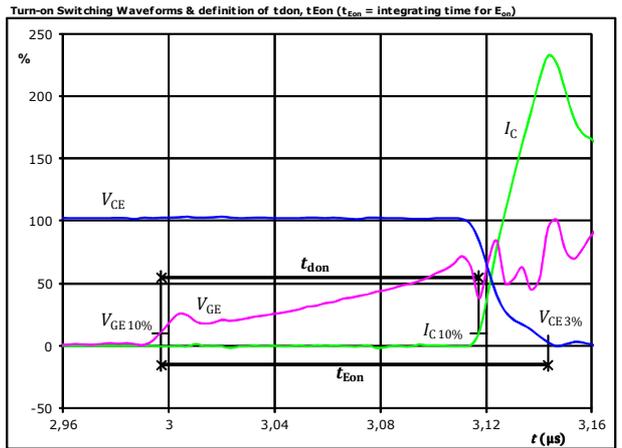
T_j	=	125 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

figure 1. IGBT



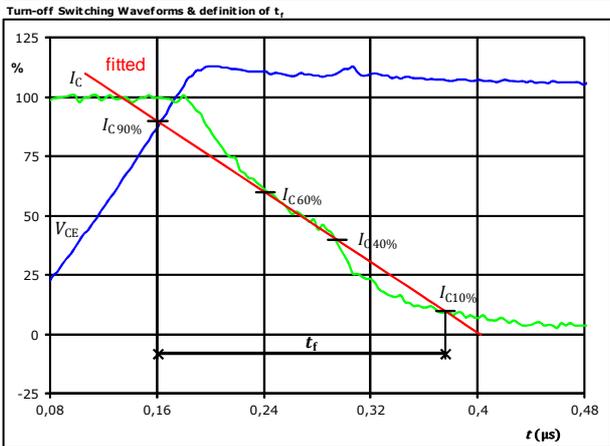
$V_{GE}(0\%)$	=	-15	V
$V_{GE}(100\%)$	=	15	V
$V_C(100\%)$	=	350	V
$I_C(100\%)$	=	75	A
t_{doff}	=	0,215	μs
t_{Eoff}	=	0,679	μs

figure 2. IGBT



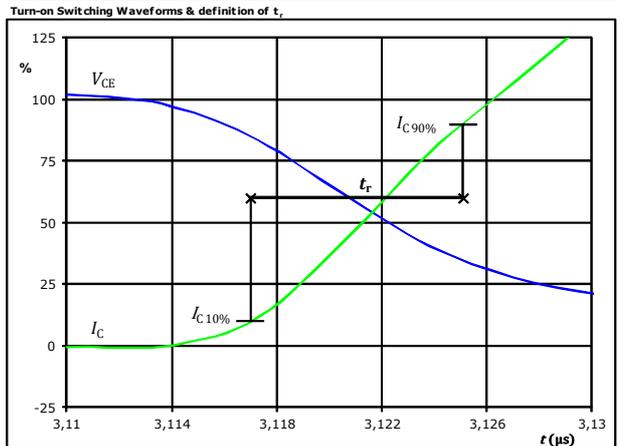
$V_{GE}(0\%)$	=	-15	V
$V_{GE}(100\%)$	=	15	V
$V_C(100\%)$	=	350	V
$I_C(100\%)$	=	75	A
t_{don}	=	0,121	μs
t_{Eon}	=	0,146	μs

figure 3. IGBT



$V_C(100\%)$	=	350	V
$I_C(100\%)$	=	75	A
t_f	=	0,217	μs

figure 4. IGBT



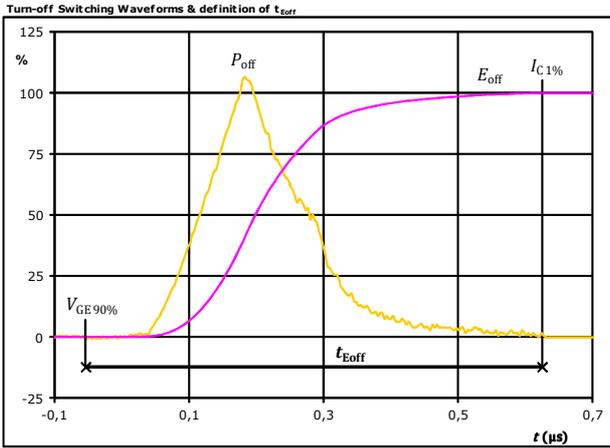
$V_C(100\%)$	=	350	V
$I_C(100\%)$	=	75	A
t_r	=	0,008	μs



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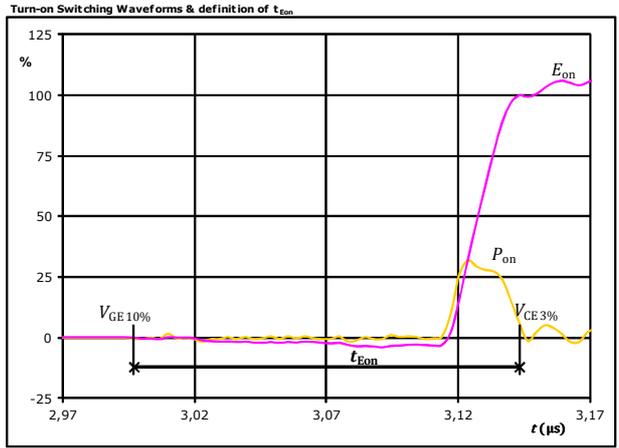
Buck Switching Characteristics

figure 5. IGBT



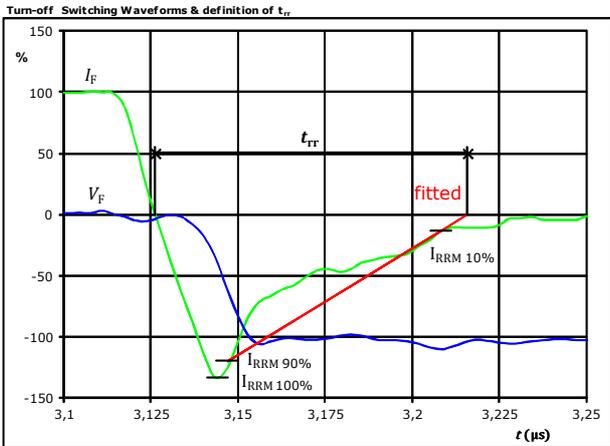
$P_{off}(100\%) = 26,22$ kW
 $E_{off}(100\%) = 4,65$ mJ
 $t_{Eoff} = 0,68$ μs

figure 6. IGBT



$P_{on}(100\%) = 26,22$ kW
 $E_{on}(100\%) = 0,16$ mJ
 $t_{Eon} = 0,15$ μs

figure 7. FWD



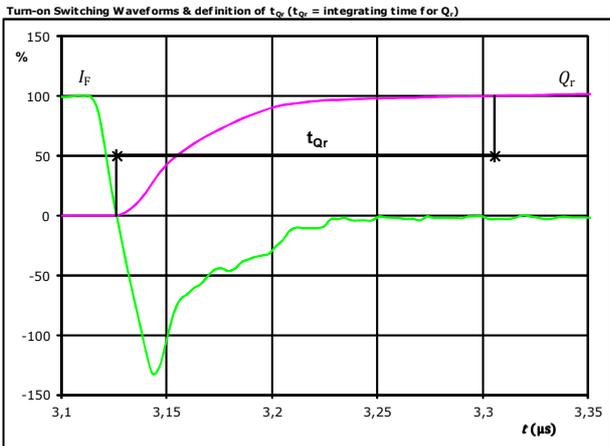
$V_F(100\%) = 350$ V
 $I_F(100\%) = 75$ A
 $I_{RRM}(100\%) = -101$ A
 $t_{rr} = 0,089$ μs



Vincotech

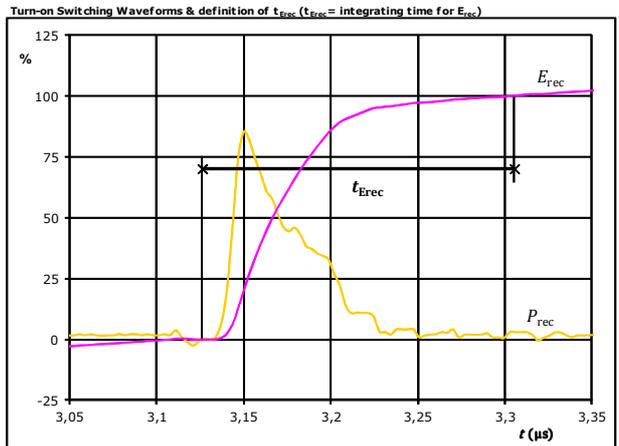
Buck Switching Characteristics

figure 8. FWD



I_F (100%) =	75	A
Q_r (100%) =	3,82	μC
t_{Qr} =	0,18	μs

figure 9. FWD

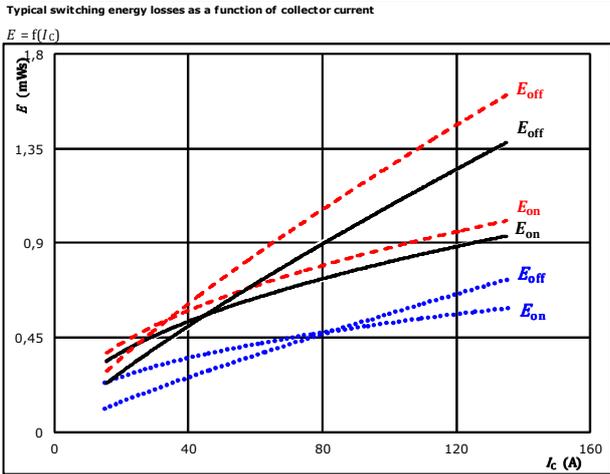


P_{rec} (100%) =	26,22	kW
E_{rec} (100%) =	0,99	mJ
t_{Erec} =	0,18	μs



Boost Switching Characteristics

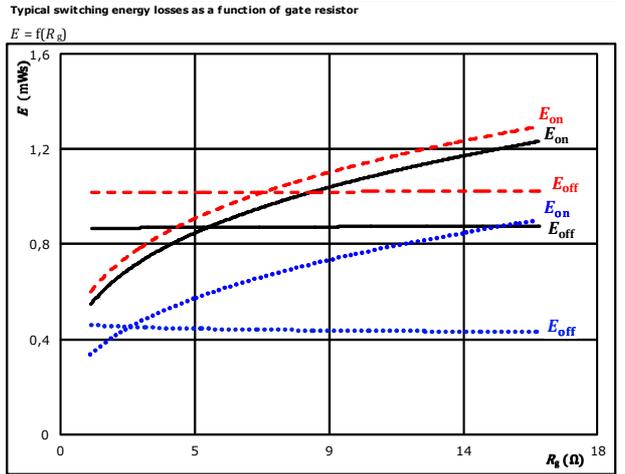
figure 1. IGBT



With an inductive load at

$V_{CE} = 350$ V	$T_j: 25$ °C
$V_{GE} = -5/15$ V	125 °C	————
$R_{gon} = 4$ Ω	150 °C	-----
$R_{goff} = 4$ Ω		

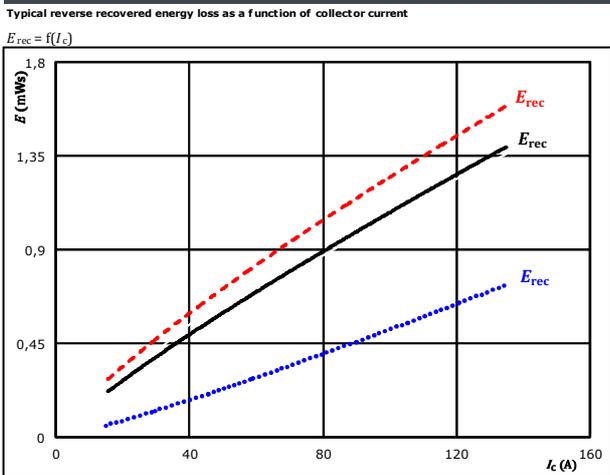
figure 2. IGBT



With an inductive load at

$V_{CE} = 350$ V	$T_j: 25$ °C
$V_{GE} = -5/15$ V	125 °C	————
$I_C = 76$ A	150 °C	-----

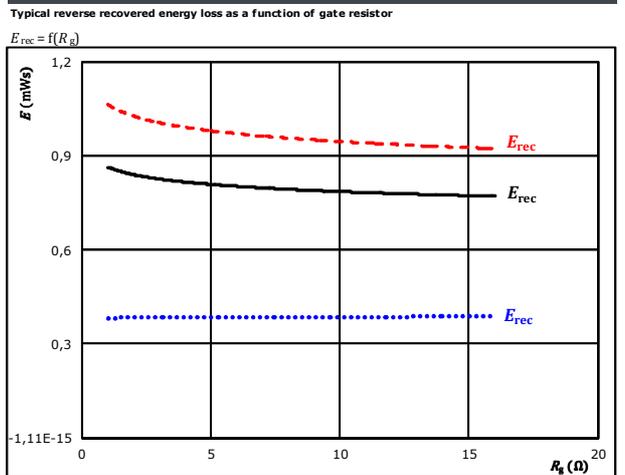
figure 3. FWD



With an inductive load at

$V_{CE} = 350$ V	$T_j: 25$ °C
$V_{GE} = -5/15$ V	125 °C	————
$R_{gon} = 4$ Ω	150 °C	-----

figure 4. FWD



With an inductive load at

$V_{CE} = 350$ V	$T_j: 25$ °C
$V_{GE} = -5/15$ V	125 °C	————
$I_C = 76$ A	150 °C	-----

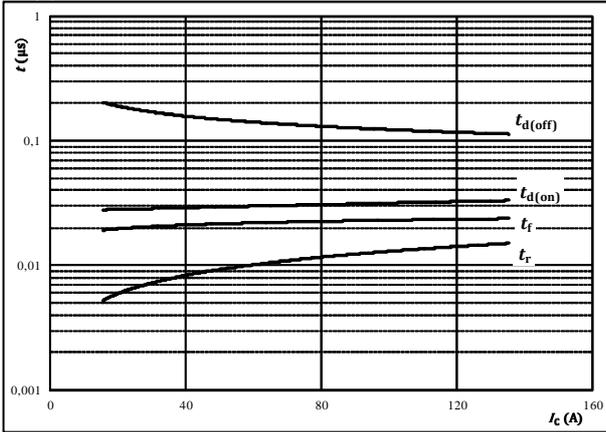


Boost Switching Characteristics

figure 5. IGBT

Typical switching times as a function of collector current

$$t = f(I_C)$$



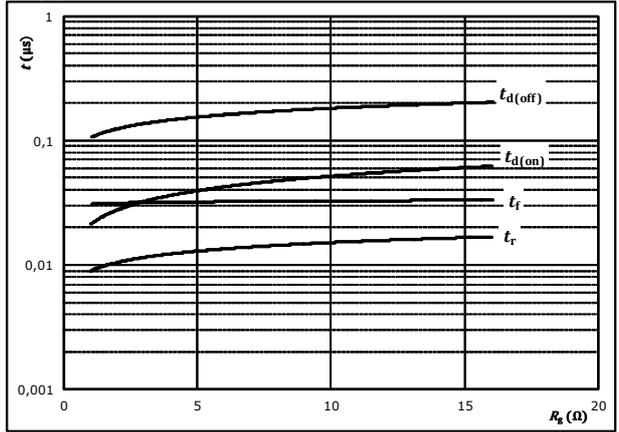
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	-5/15	V
$R_{gon} =$	4	Ω
$R_{goff} =$	4	Ω

figure 6. IGBT

Typical switching times as a function of gate resistor

$$t = f(R_g)$$



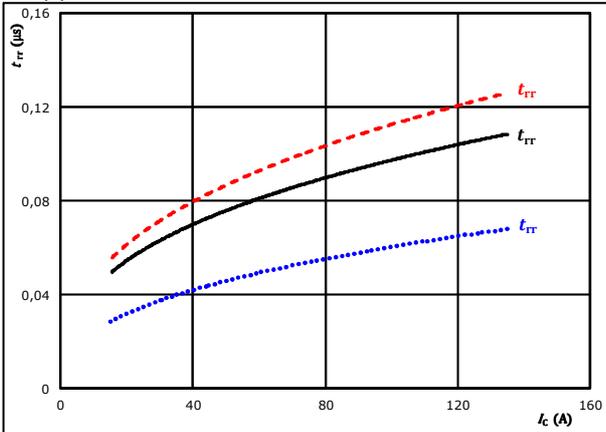
With an inductive load at

$T_j =$	150	°C
$V_{CE} =$	350	V
$V_{GE} =$	-5/15	V
$I_C =$	76	A

figure 7. FWD

Typical reverse recovery time as a function of collector current

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

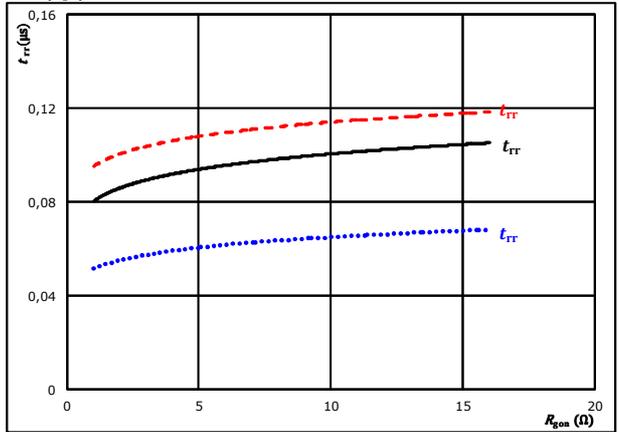


At	$V_{CE} =$	350	V	$T_j:$	25 °C
	$V_{GE} =$	-5/15	V		125 °C	————
	$R_{gon} =$	4	Ω		150 °C	-----

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
	$V_{GE} =$	-5/15	V		125 °C	————
	$I_C =$	76	A		150 °C	-----

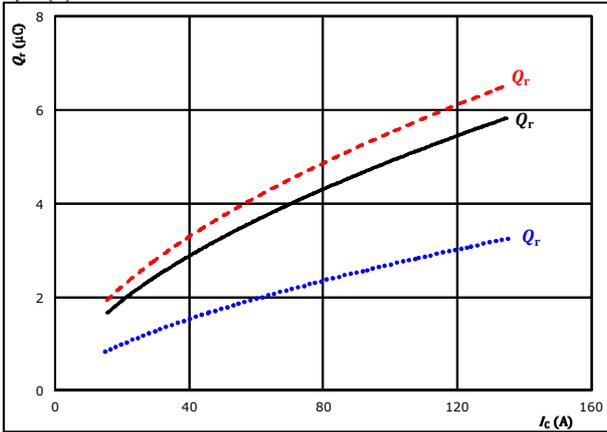


Boost Switching Characteristics

figure 9. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$

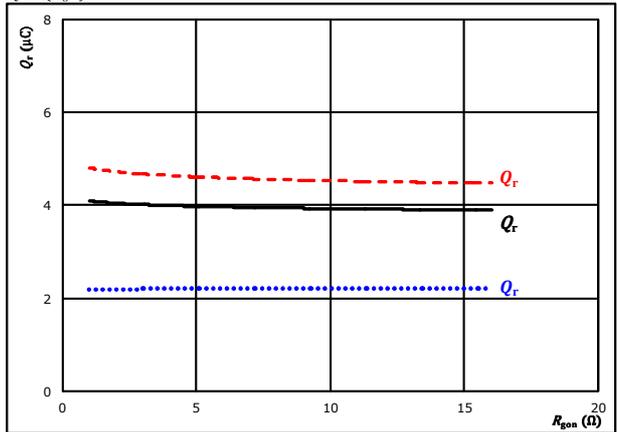


At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = -5/15$ V $T_j = 125$ °C ———
 $R_{gpn} = 4$ Ω $T_j = 150$ °C - - - - -

figure 10. FWD

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

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

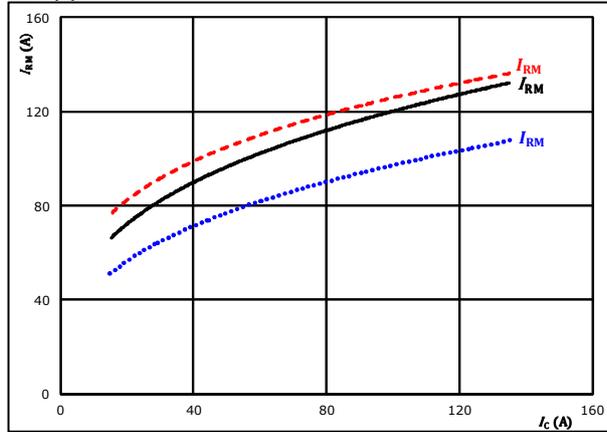


At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = -5/15$ V $T_j = 125$ °C ———
 $I_c = 76$ A $T_j = 150$ °C - - - - -

figure 11. FWD

Typical peak reverse recovery current as a function of collector current

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

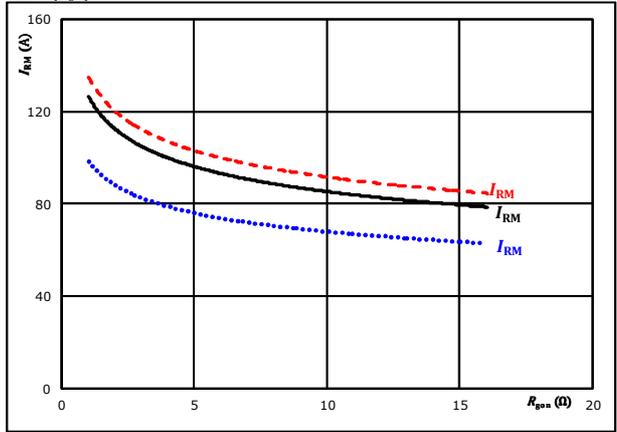


At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = -5/15$ V $T_j = 125$ °C ———
 $R_{gpn} = 4$ Ω $T_j = 150$ °C - - - - -

figure 12. FWD

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

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



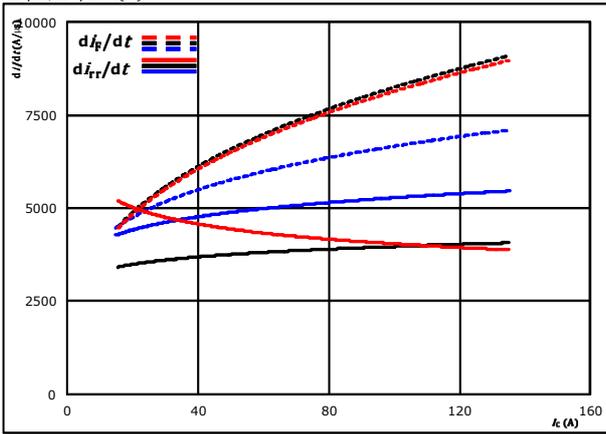
At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = -5/15$ V $T_j = 125$ °C ———
 $I_c = 76$ A $T_j = 150$ °C - - - - -



Boost Switching Characteristics

figure 13. FWD

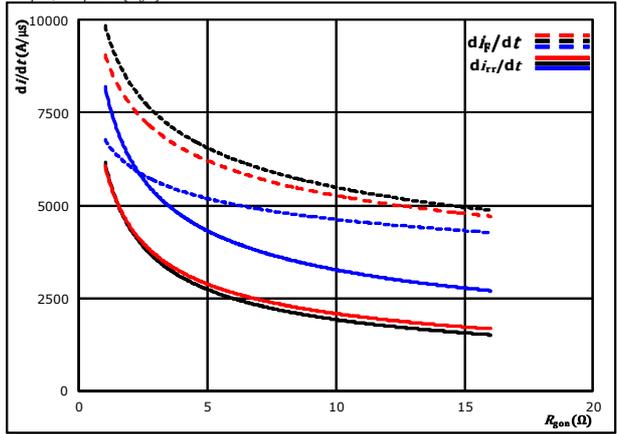
Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_{rr}/dt = f(I_c)$



At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = -5/15$ V $T_j = 125$ °C ———
 $R_{gpn} = 4$ 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
 $di_f/dt, di_{rr}/dt = f(R_{gpn})$

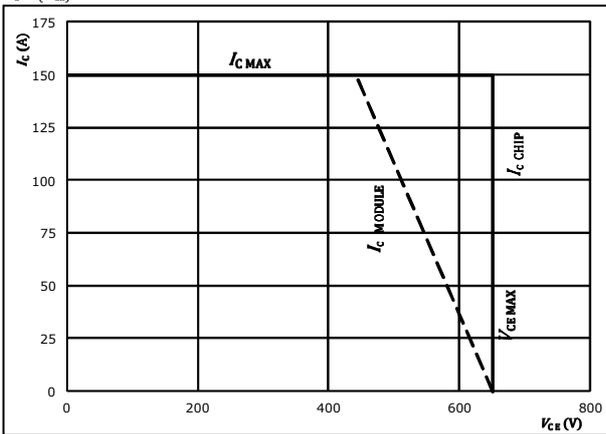


At $V_{CE} = 350$ V $T_j = 25$ °C
 $V_{GE} = -5/15$ V $T_j = 125$ °C ———
 $I_c = 76$ A $T_j = 150$ °C - - - - -

figure 15. IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$



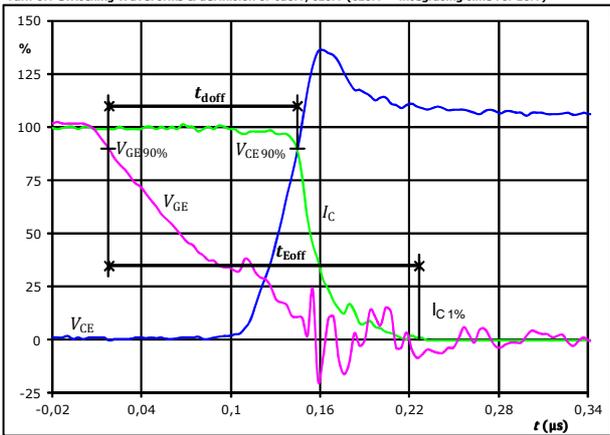
At $T_j = 175$ °C
 $R_{gpn} = 4$ Ω
 $R_{goff} = 4$ Ω



Boost Switching Definitions

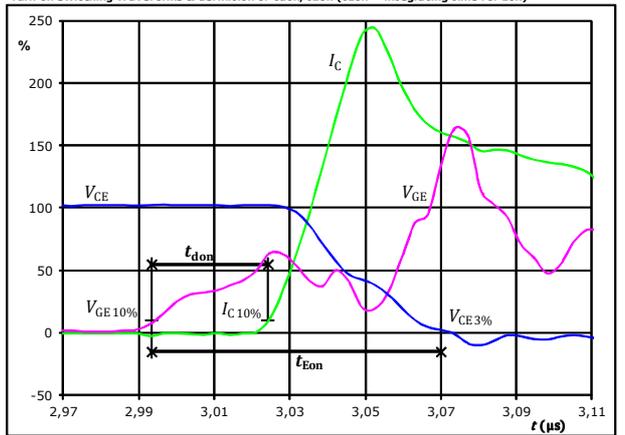
General conditions		
T_j	=	125 °C
R_{gon}	=	4 Ω
R_{goff}	=	4 Ω

figure 1. IGBT
 Turn-off Switching Waveforms & definition of t_{doff} , t_{Eoff} (t_{Eoff} = integrating time for E_{off})



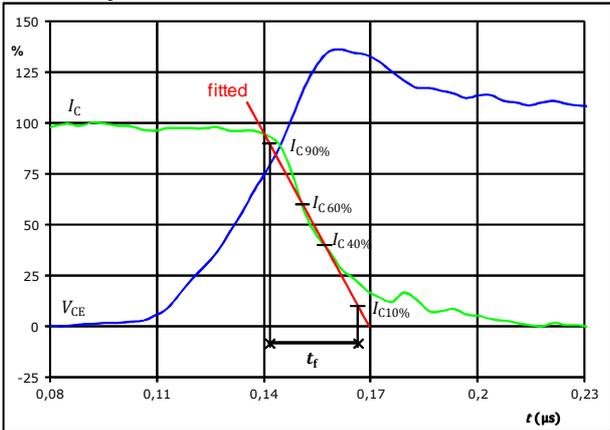
$V_{GE}(0\%) =$	-5	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	76	A
$t_{doff} =$	0,126	μs
$t_{Eoff} =$	0,208	μs

figure 2. IGBT
 Turn-on Switching Waveforms & definition of t_{don} , t_{Eon} (t_{Eon} = integrating time for E_{on})



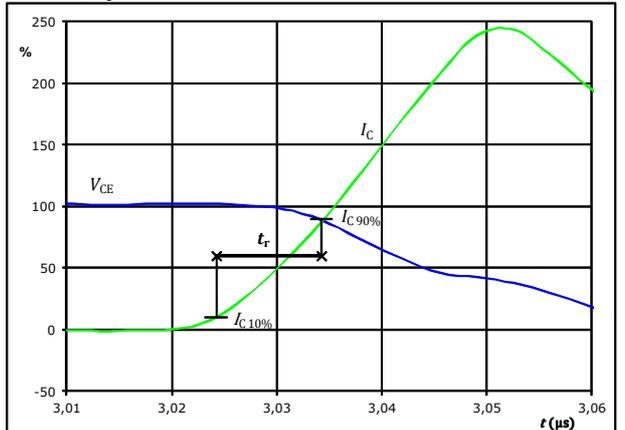
$V_{GE}(0\%) =$	-5	V
$V_{GE}(100\%) =$	15	V
$V_C(100\%) =$	350	V
$I_C(100\%) =$	76	A
$t_{don} =$	0,031	μs
$t_{Eon} =$	0,077	μs

figure 3. IGBT
 Turn-off Switching Waveforms & definition of t_f



$V_C(100\%) =$	350	V
$I_C(100\%) =$	76	A
$t_f =$	0,025	μs

figure 4. IGBT
 Turn-on Switching Waveforms & definition of t_r



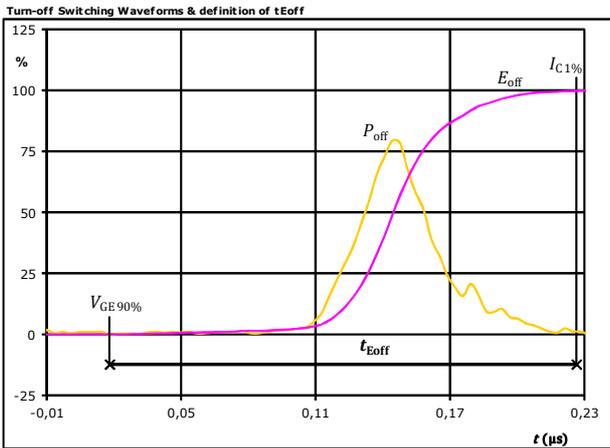
$V_C(100\%) =$	350	V
$I_C(100\%) =$	76	A
$t_r =$	0,010	μs



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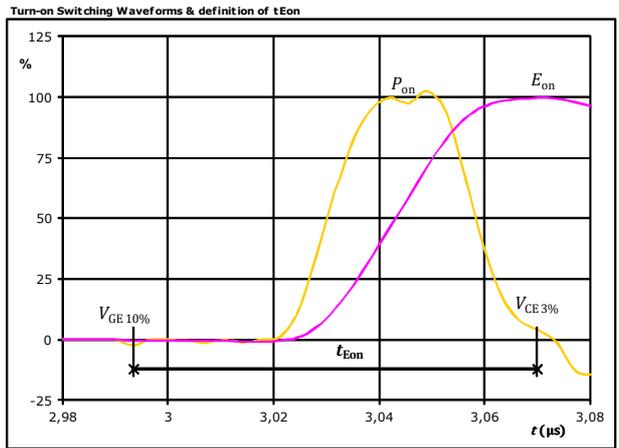
Boost Switching Characteristics

figure 5. IGBT



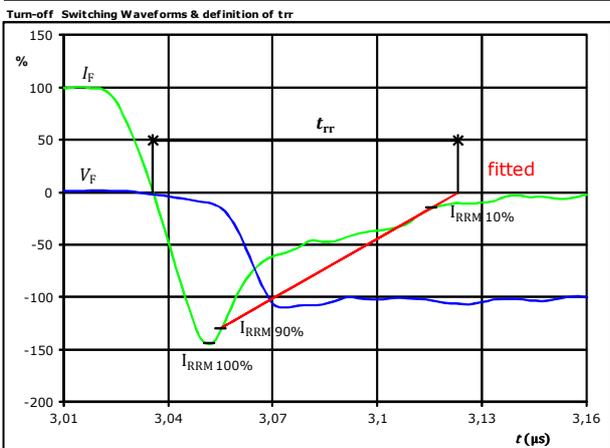
$P_{off}(100\%) =$	26,56	kW
$E_{off}(100\%) =$	0,88	mJ
$t_{Eoff} =$	0,21	µs

figure 6. IGBT



$P_{on}(100\%) =$	26,56	kW
$E_{on}(100\%) =$	0,70	mJ
$t_{Eon} =$	0,08	µs

figure 7. FWD



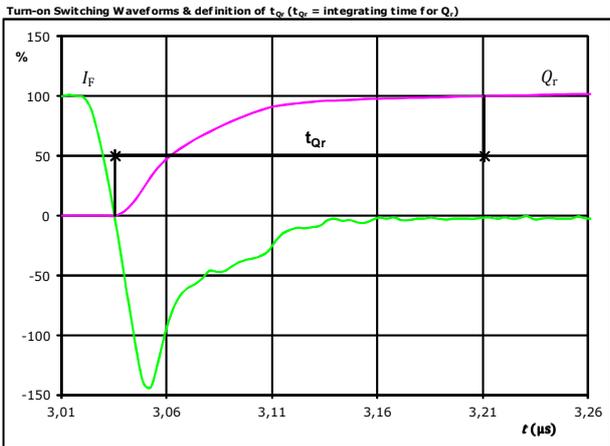
$V_F(100\%) =$	350	V
$I_F(100\%) =$	76	A
$I_{RRM}(100\%) =$	-110	A
$t_{rr} =$	0,087	µs



Vincotech

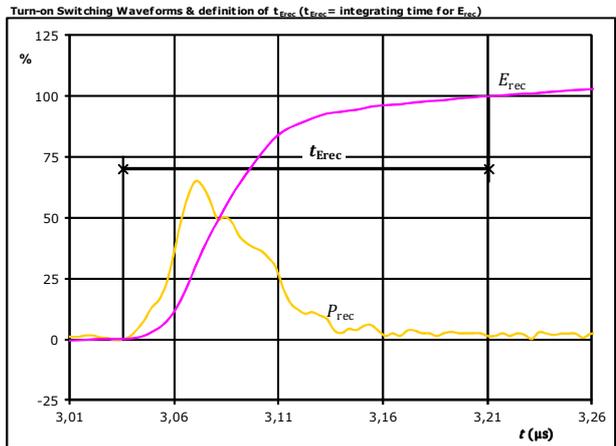
Boost Switching Characteristics

figure 8. FWD



I_F (100%) =	76	A
Q_r (100%) =	4,04	μC
t_{Qr} =	0,18	μs

figure 9. FWD



P_{rec} (100%) =	26,56	kW
E_{rec} (100%) =	0,84	mJ
t_{Erec} =	0,18	μs



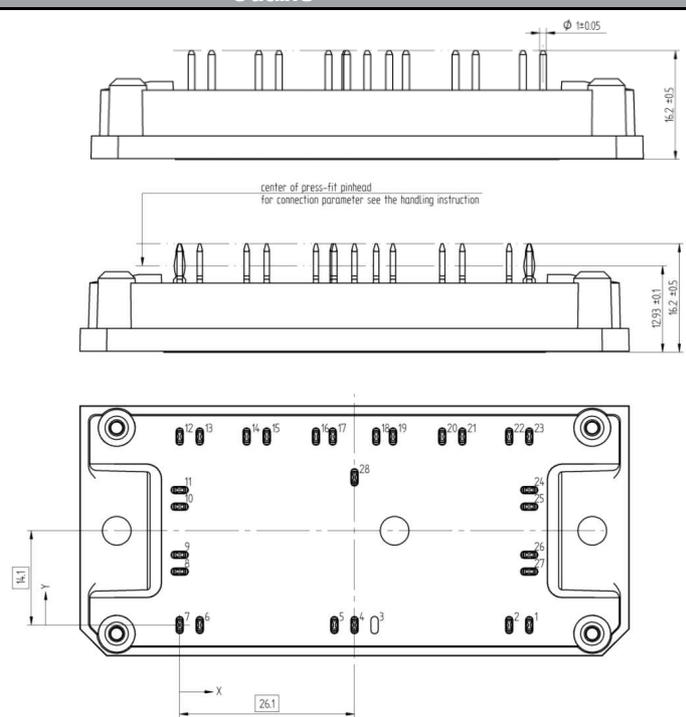
10-FY07HVA075S5-L985F08
10-PY07HVA075S5-L985F08Y
 datasheet

Vincotech

Ordering Code & Marking						
Version			Ordering Code			
without thermal paste with solder pin 12 mm housing			10-FY07HVA075S5-L985F08			
without thermal paste with press-fit 12 mm housing			10-PY07HVA075S5-L985F08Y			
NN-NNNNNNNNNNNN TTTTIVVWWYY UL VIN LLLL SSSS						
Text	Name		Date code	UL & VIN	Lot	Serial
	NN-NNNNNNNNNNNN-TTTTIVV		WWYY	UL VIN	LLLL	SSSS
Datamatrix	Type&Ver	Lot number	Serial	Date code		
	TTTTTIVV	LLLL	SSSS	WWYY		

Pin table			
Pin	X	Y	Function
1	52,2	0	G14
2	49,2	0	S14
3	Not assembled		
4	26,1	0	Therm2
5	23,1	0	Therm1
6	3	0	S12
7	0	0	G12
8	0	8	DC+
9	0	10,5	DC+
10	0	17,7	DC-1
11	0	20,2	DC-1
12	0	28,2	G11
13	3	28,2	S11
14	10	28,2	G21
15	13	28,2	S21
16	20,35	28,2	Ph2
17	22,85	28,2	Ph2
18	29,35	28,2	Ph1
19	31,85	28,2	Ph1
20	39,2	28,2	S22
21	42,2	28,2	G22
22	49,2	28,2	S13
23	52,2	28,2	G13
24	52,2	20,2	DC-2
25	52,2	17,7	DC-2
26	52,2	10,5	DC+
27	52,2	8	DC+
28	26,1	22,1	A20

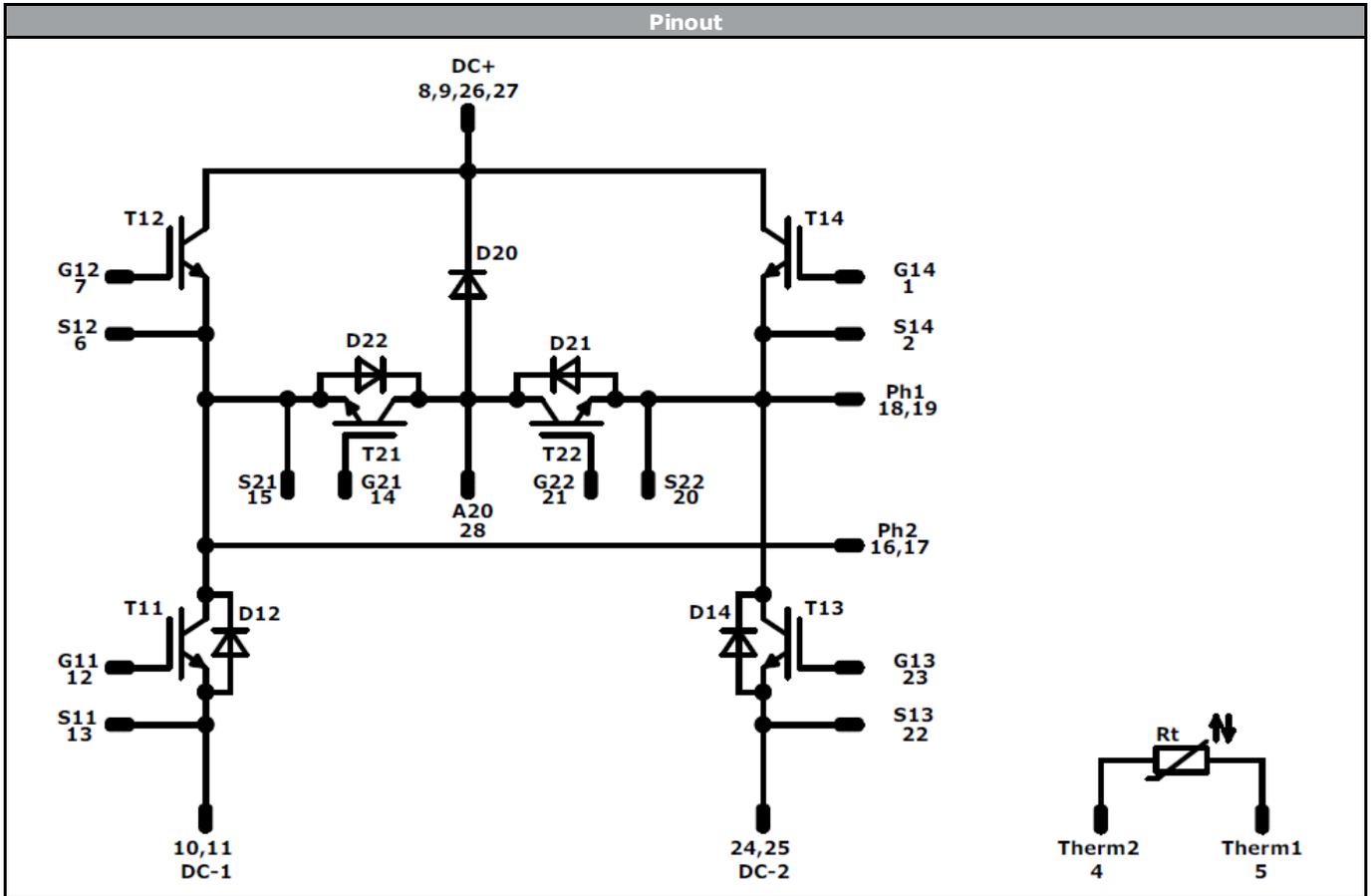
Outline



Tolerance of pinpositions: ±0.5mm 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 , T13, T14	IGBT	650 V	75 A	High Buck Switch / Low Buck Switch	
D21, D22	FWD	650 V	50 A	Buck Diode	
T21, T22	IGBT	650 V	75 A	Boost Switch	
D12, D14, D20	FWD	650 V	50 A	Low Boost Diode / High Boost Diode	
Rt	NTC			Thermistor	



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

Handling instruction
Handling instructions for <i>flow 1</i> packages see vincotech.com website.

Package data
Package data for <i>flow 1</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
10-xY07HVA075S5-L985F08x-D1-14	02 Aug. 2017		

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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.