



datasheet

1200 V / 80 A

The diagram shows a three-phase inverter circuit. It consists of three input lines on the left, each connected to a phase leg. Each phase leg contains two MOSFETs in a half-bridge configuration, with a diode in series with each MOSFET. The MOSFETs are connected to a common output line, which is connected to a load (represented by a resistor and inductor in series) and a common return line. The MOSFETs are labeled with 'a', 'b', and 'c' to indicate their phase.



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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
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Buck Switch

Collector-emitter voltage	V_{CES}		1200	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	76	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	240	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	186	W
Gate-emitter voltage	V_{GES}		± 20	V
Short circuit ratings	t_{SC}	$V_{GE} = 15\text{ V}$, $V_{CC} = 600\text{ V}$ $T_j = 150\text{ °C}$	5	μs
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Buck Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	55	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	330	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	73	W
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$

Boost Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	49	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	225	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	78	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	$^{\circ}\text{C}$



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Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Boost Diode				
Peak repetitive reverse voltage	V_{RRM}		1200	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	41	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	180	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	73	W
Maximum junction temperature	T_{jmax}		175	°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* $t_p = 2\text{ s}$	6000	V
Isolation voltage	V_{isol}	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			>12,7	mm
Clearance			9,15	mm
Comparative Tracking Index	CTI		≥ 200	

*100 % tested in production



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Characteristic Values

Parameter	Symbol	Conditions					Values			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	

Buck Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,004	25	5	6	7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		80	25 125 150		2,18 2,39 2,44	2,6 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		20	0		25			50	µA
Gate-emitter leakage current	I_{GES}		20	0		25			500	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		6400		pF
Output capacitance	C_{oes}							440		pF
Reverse transfer capacitance	C_{res}							160		pF
Gate charge	Q_g	$V_{CC} = 960 \text{ V}$	0/15		80	25		316		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,51		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \Omega$ $R_{goff} = 4 \Omega$	± 15	350	55	25 125 150		53,78 54,24 53,99		ns
Rise time	t_r					25 125 150		13,28 14,15 14,47		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		70,97 86,88 91,49		ns
Fall time	t_f					25 125 150		31,85 57,69 64,42		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 1,28 \mu\text{C}$ $Q_{tFWD} = 3,75 \mu\text{C}$ $Q_{tFWD} = 4,53 \mu\text{C}$				25 125 150		0,628 0,957 1,04		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		1,03 1,73 1,96		mWs



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Characteristic Values

Parameter	Symbol	Conditions					Values			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	

Buck Diode

Static

Forward voltage	V_F				75	25 125 150		1,75 1,56 1,51	2,65 ⁽¹⁾ 2,05 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 650$ V				25 150		80	20 800	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,31		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=5117$ A/µs $di/dt=4531$ A/µs $di/dt=4450$ A/µs	± 15	350	55	25 125 150		71,27 80,6 84,28		A
Reverse recovery time	t_{rr}					25 125 150		36,04 152,53 176,93		ns
Recovered charge	Q_r					25 125 150		1,28 3,75 4,53		µC
Reverse recovered energy	E_{rec}					25 125 150		0,208 0,806 0,989		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		6622,62 3263,06 2889,89		A/µs



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Characteristic Values

Parameter	Symbol	Conditions					Values			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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,001	25	5	6	7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		75	25 125 150		1,6 1,77 1,81	2 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			25	µA
Gate-emitter leakage current	I_{GES}		20	0		25	-250		250	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25	25			4357		pF
Output capacitance	C_{oes}							264		pF
Reverse transfer capacitance	C_{res}							117		pF
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	0/15		75	25		207		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,22		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 4 \text{ } \Omega$ $R_{goff} = 4 \text{ } \Omega$	± 15	350	55	25 125 150		49,86 50,71 50,89		ns
Rise time	t_r					25 125 150		8,2 8,66 8,62		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		68,72 78,96 81,79		ns
Fall time	t_f					25 125 150		20,78 44,91 50,22		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		0,271 0,361 0,393		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,494 0,784 0,866		mWs



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Characteristic Values

Parameter	Symbol	Conditions					Values			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 Diode

Static

Forward voltage	V_F				40	25 125 150		2,49 2,02 1,91	3,8 ⁽¹⁾ 2,65 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 1200$ V				25 150		80	20 800	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,29		K/W
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Dynamic

Peak recovery current	I_{RM}	$di/dt=8284$ A/μs $di/dt=7167$ A/μs $di/dt=7023$ A/μs	± 15	350	55	25 125 150		116,19 125,78 129,68		A
Reverse recovery time	t_{rr}					25 125 150		24,27 40,3 66,98		ns
Recovered charge	Q_r					25 125 150		1,55 2,49 3,14		μC
Reverse recovered energy	E_{rec}					25 125 150		0,352 0,567 0,74		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		16660,05 9374,78 8599,26		A/μs



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Characteristic Values

Parameter	Symbol	Conditions					Values			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	

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R100	$\Delta_{R/R}$	$R_{100} = 1484 \Omega$				100	-5		5	%
Power dissipation	P					25		130		mW
Power dissipation constant	d					25		1,5		mW/K
B-value	$B_{(25/50)}$	Tol. $\pm 1 \%$						3962		K
B-value	$B_{(25/100)}$	Tol. $\pm 1 \%$						4000		K
Vincotech Thermistor Reference									I	

⁽¹⁾ Value at chip level

⁽²⁾ Only valid with pre-applied Vincotech thermal interface material.



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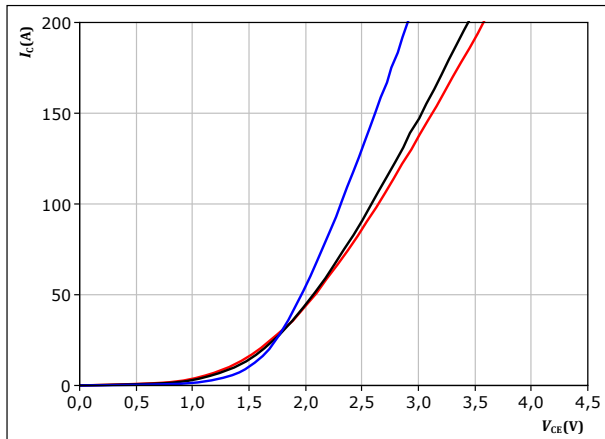
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Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

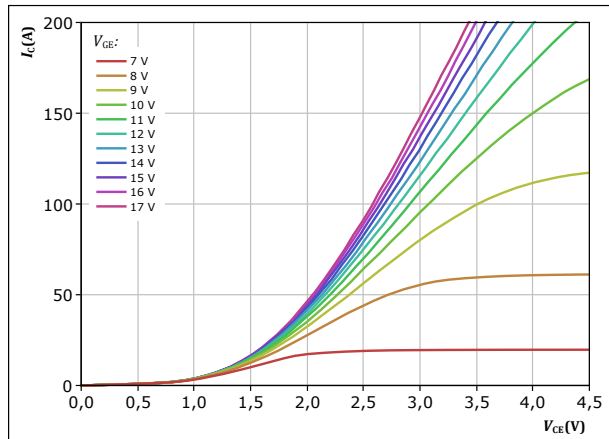


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 2. IGBT

Typical output characteristics

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

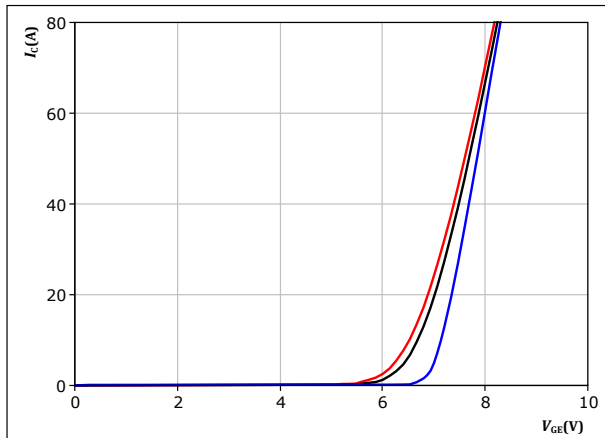


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

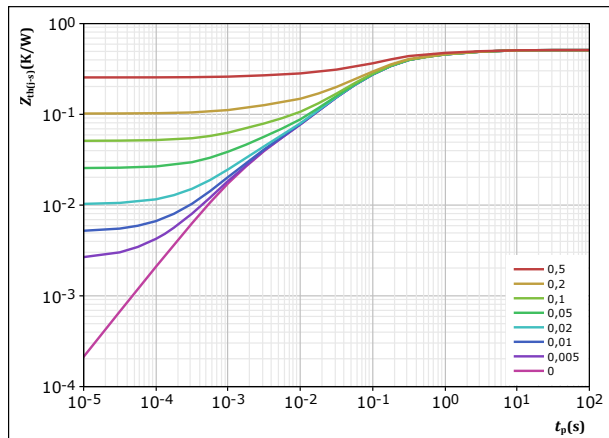


$t_p = 250 \mu s$
 $V_{CE} = 59 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,51 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
4,69E-02	3,44E+00
9,41E-02	5,98E-01
2,77E-01	1,08E-01
6,79E-02	1,98E-02
2,44E-02	1,61E-03



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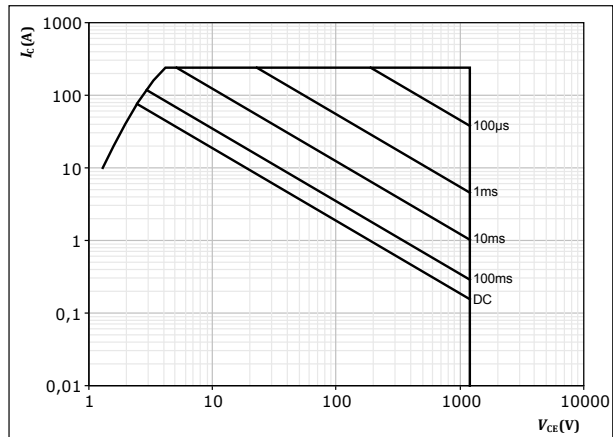
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Buck Switch Characteristics

figure 5. IGBT

Safe operating area

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

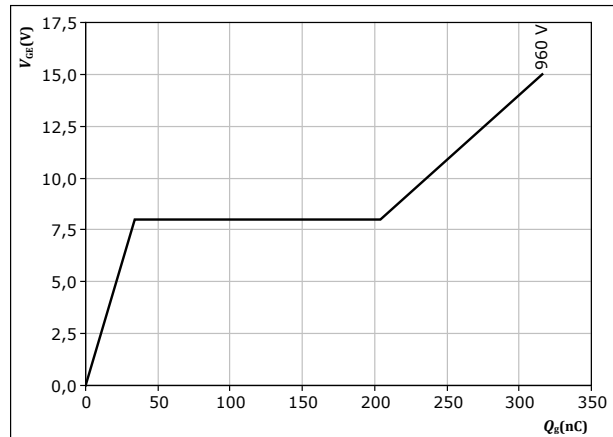


$D =$ single pulse
 $T_s = 80 \text{ } ^\circ\text{C}$
 $V_{GE} = 15 \text{ V}$
 $T_j = T_{jmax}$

figure 6. IGBT

Gate voltage vs gate charge

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



$I_C = 40 \text{ A}$
 $T_j = 25 \text{ } ^\circ\text{C}$



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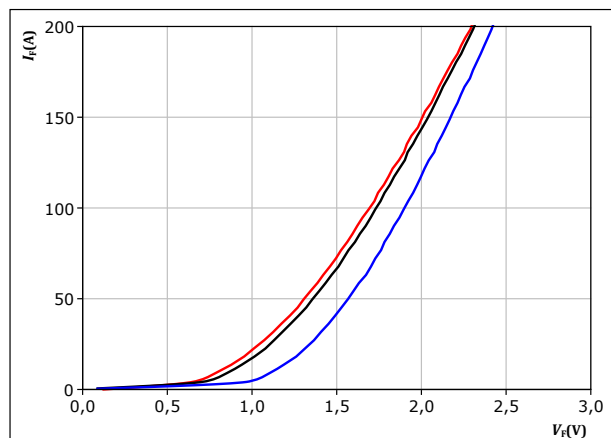
datasheet

Buck Diode Characteristics

figure 7. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



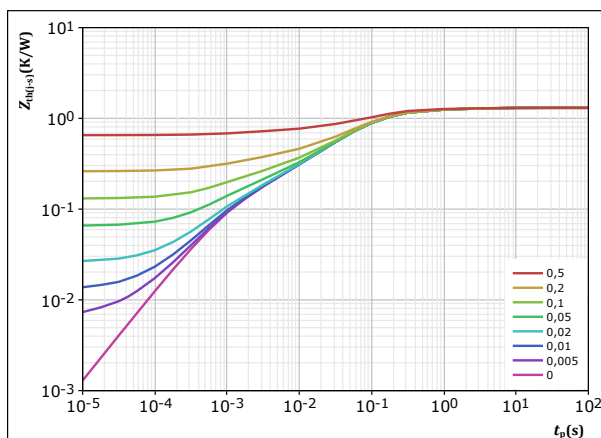
$t_p = 250 \mu s$

T_j : 25 °C, 125 °C, 150 °C

figure 8. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 1,306 \text{ K/W}$

FWD thermal model values

R (K/W)	τ (s)
6,80E-02	2,54E+00
1,91E-01	3,51E-01
7,64E-01	7,68E-02
1,79E-01	1,06E-02
1,03E-01	1,01E-03



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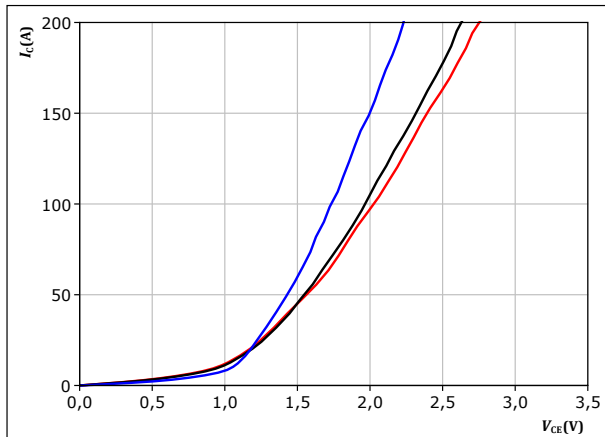
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Boost Switch Characteristics

figure 9. IGBT

Typical output characteristics

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

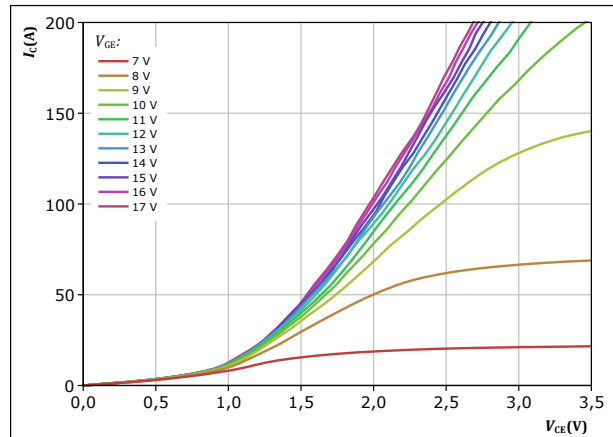


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 ^\circ C$
 $125 ^\circ C$
 $150 ^\circ C$

figure 10. IGBT

Typical output characteristics

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

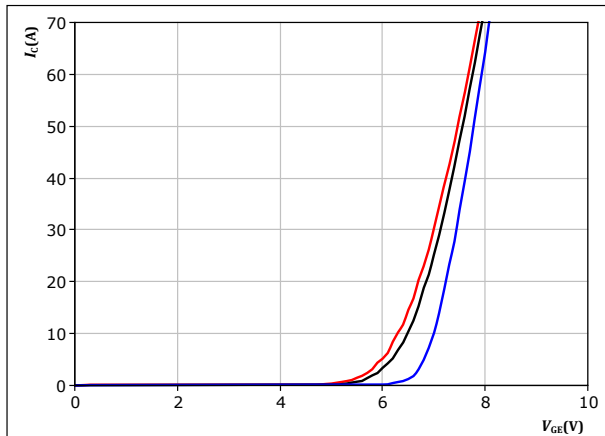


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 11. IGBT

Typical transfer characteristics

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

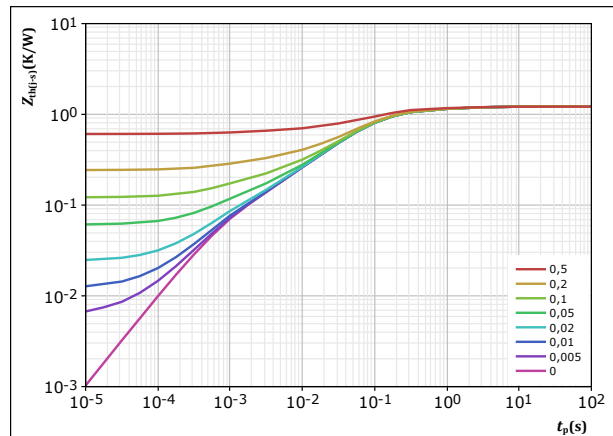


$t_p = 250 \mu s$
 $V_{CE} = 14 V$
 $T_j: 25 ^\circ C$
 $125 ^\circ C$
 $150 ^\circ C$

figure 12. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,216 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
7,96E-02	2,20E+00
1,58E-01	4,25E-01
7,44E-01	7,84E-02
1,66E-01	1,09E-02
6,84E-02	8,75E-04



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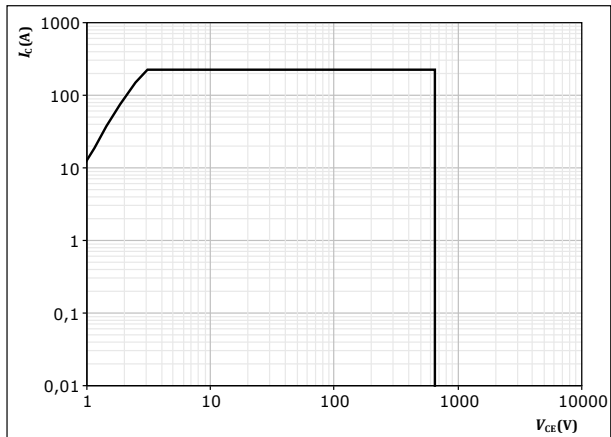
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Boost Switch Characteristics

figure 13. IGBT

Safe operating area

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

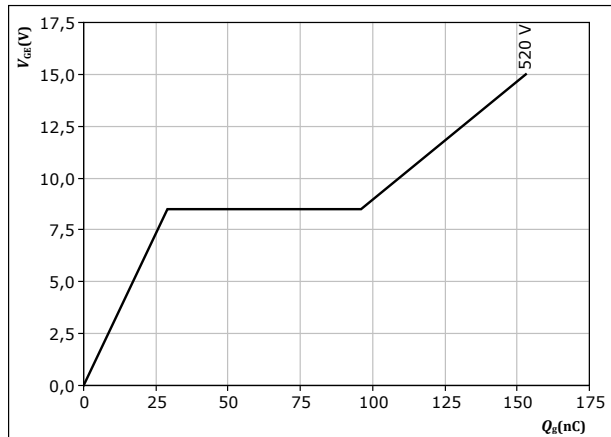


$D =$ single pulse
 $T_s = 80 \text{ } ^\circ\text{C}$
 $V_{GE} = 15 \text{ V}$
 $T_j = T_{jmax}$

figure 14. IGBT

Gate voltage vs gate charge

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



$I_C = 40 \text{ A}$
 $T_j = 25 \text{ } ^\circ\text{C}$



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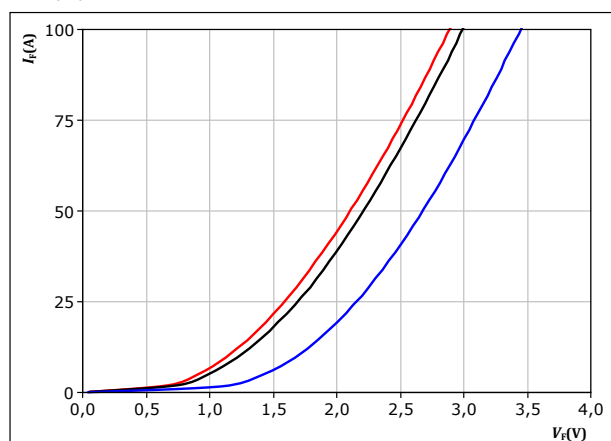
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Boost Diode Characteristics

figure 15. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

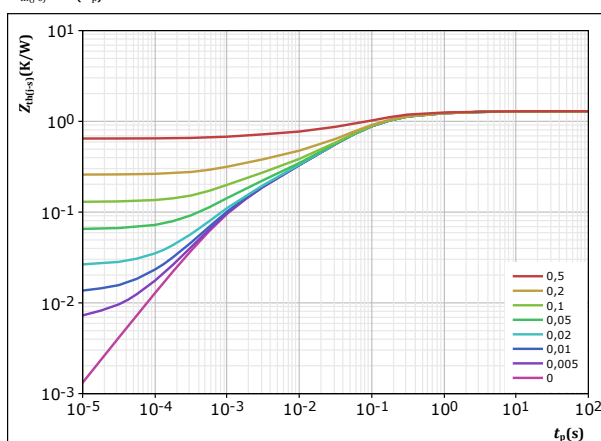
T_j :

- 25 °C
- 125 °C
- 150 °C

figure 16. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 1,293 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
7,21E-02	2,76E+00
2,08E-01	3,63E-01
7,06E-01	7,43E-02
1,96E-01	1,00E-02
1,12E-01	1,09E-03



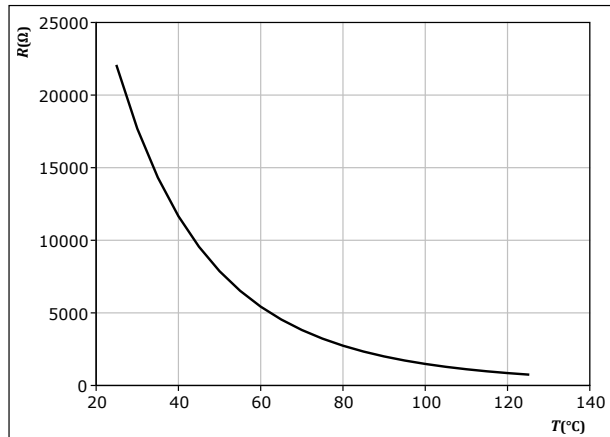
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Thermistor Characteristics

figure 17. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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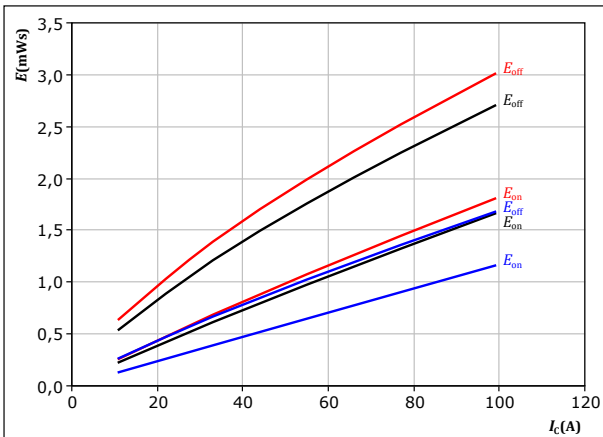
Buck Switching Characteristics

figure 18.

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
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

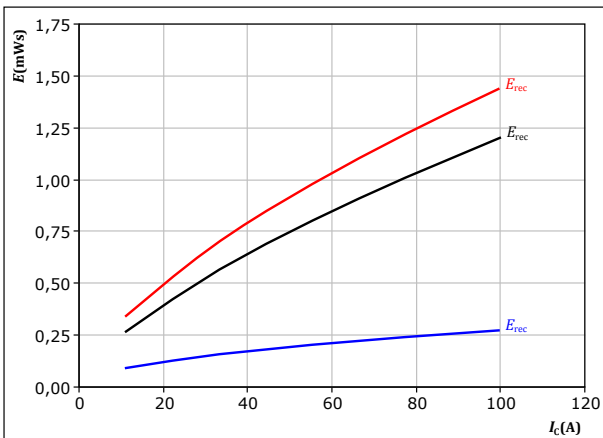
T_j : 25 °C
125 °C
150 °C

figure 20.

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
 $R_{gon} = 4$ Ω

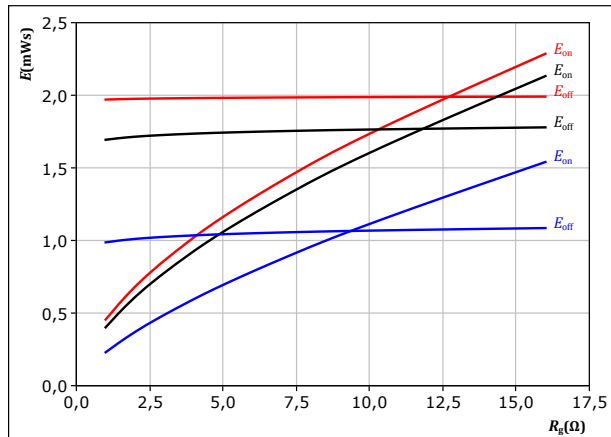
T_j : 25 °C
125 °C
150 °C

figure 19.

IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 55$ A

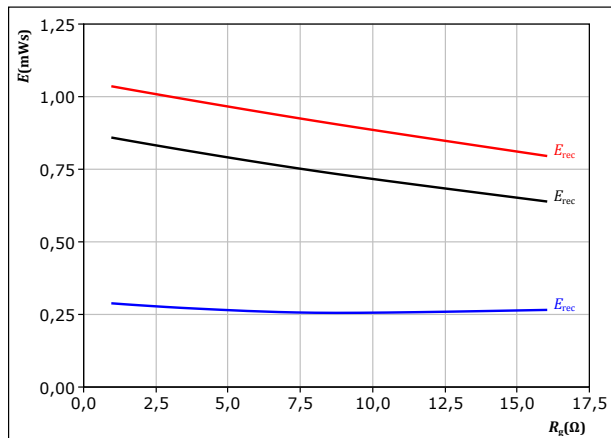
T_j : 25 °C
125 °C
150 °C

figure 21.

FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 55$ A

T_j : 25 °C
125 °C
150 °C



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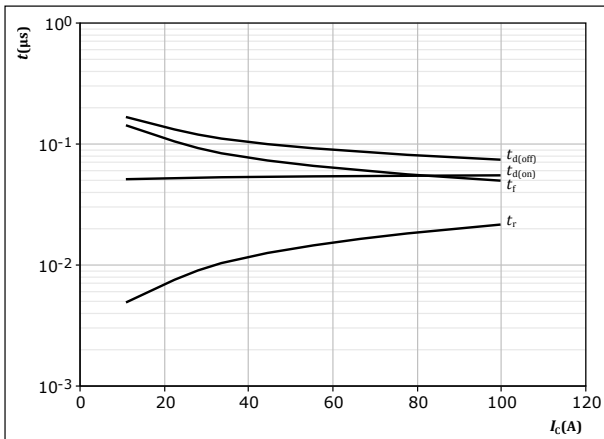
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Buck Switching Characteristics

figure 22.

IGBT

Typical switching times as a function of collector current
 $t = f(I_C)$



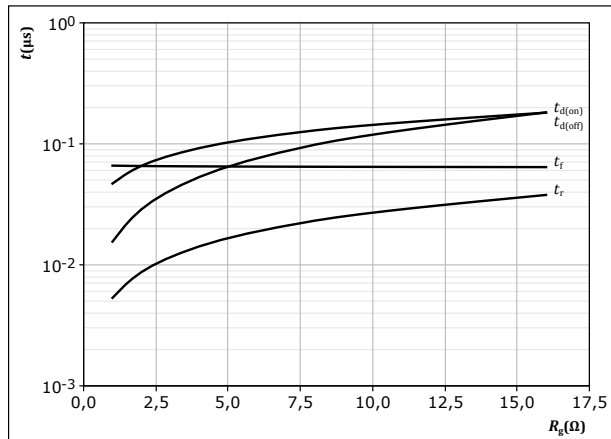
With an inductive load at

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

figure 23.

IGBT

Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$



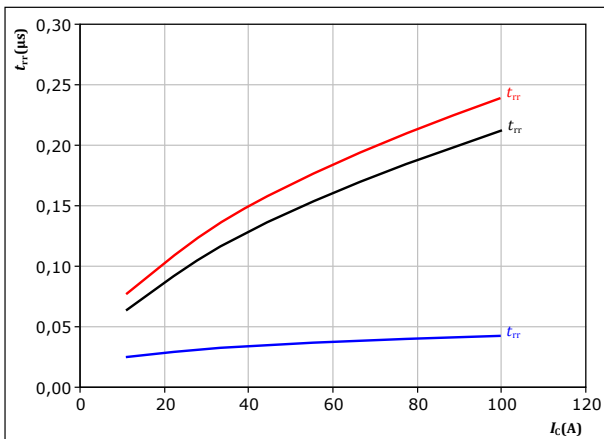
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 55$ A

figure 24.

FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_C)$



With an inductive load at

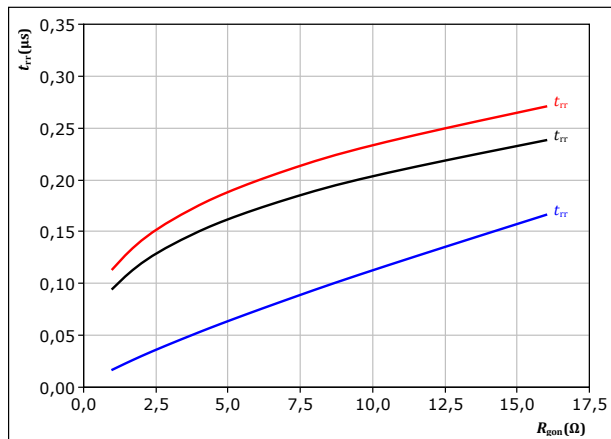
$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω

T_j : 25 °C
125 °C
150 °C

figure 25.

FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor
 $t_{rr} = f(R_{gon})$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 55$ A

T_j : 25 °C
125 °C
150 °C



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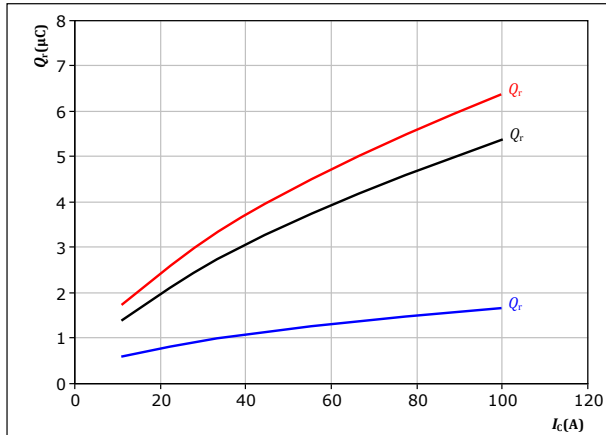
Buck Switching Characteristics

figure 26.

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
 $R_{gon} = 4$ Ω

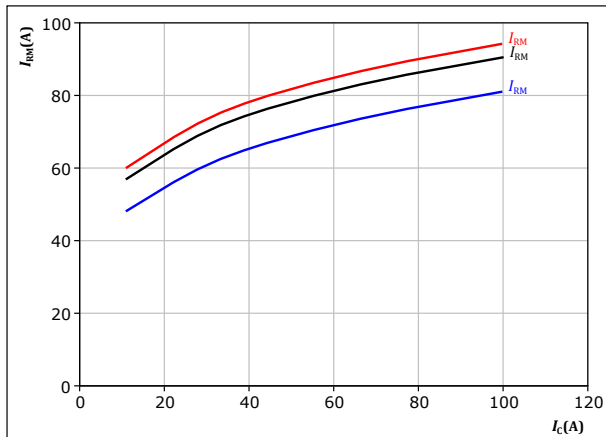
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 28.

FWD

Typical peak reverse recovery 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
 $R_{gon} = 4$ Ω

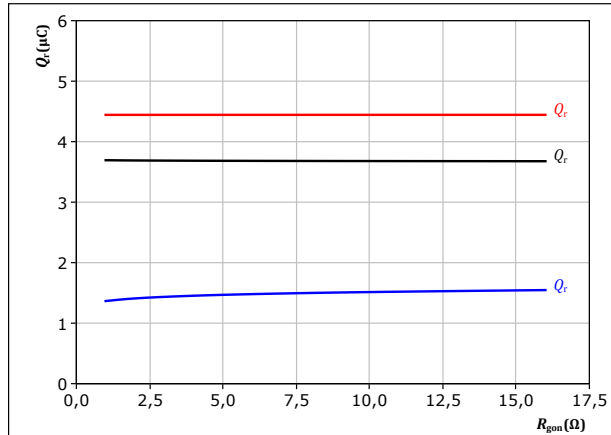
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 27.

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
 $I_c = 55$ A

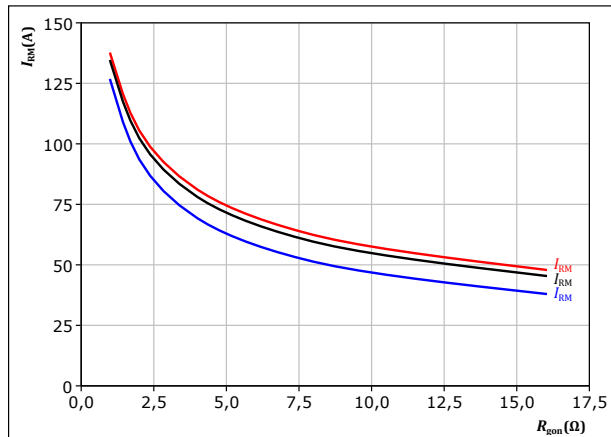
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 29.

FWD

Typical peak reverse recovery 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
 $I_c = 55$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



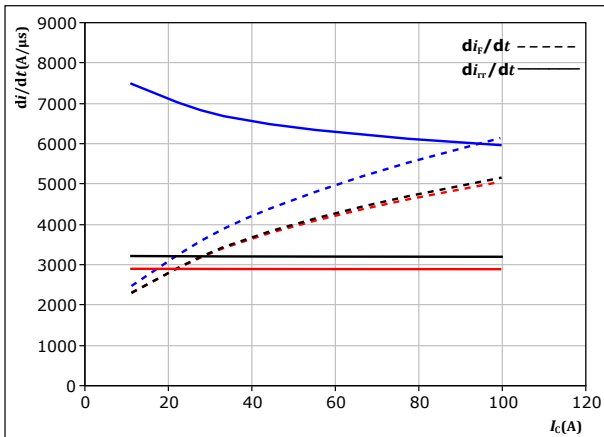
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Buck Switching Characteristics

figure 30. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$



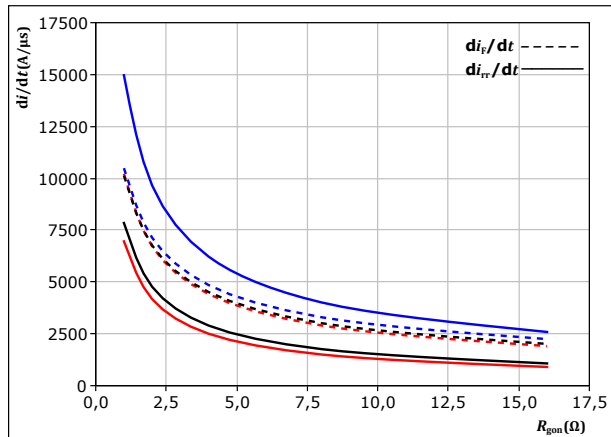
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 31. FWD

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



With an inductive load at

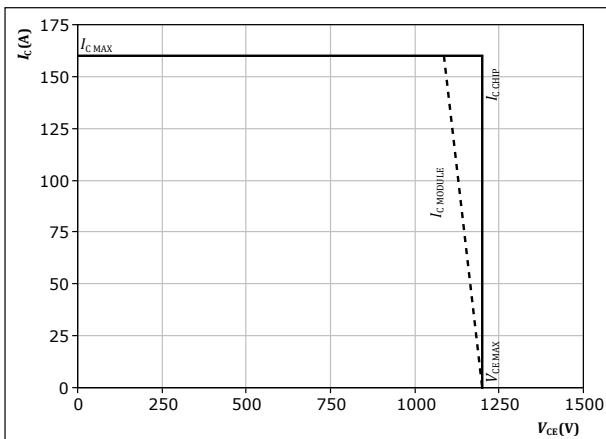
$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 55$ A

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 32. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω



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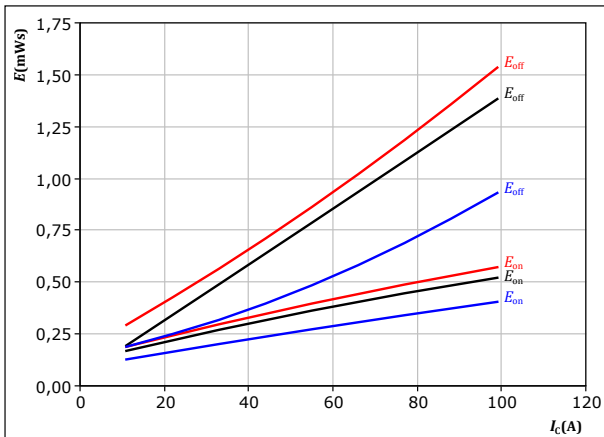
Boost Switching Characteristics

figure 33.

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
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω

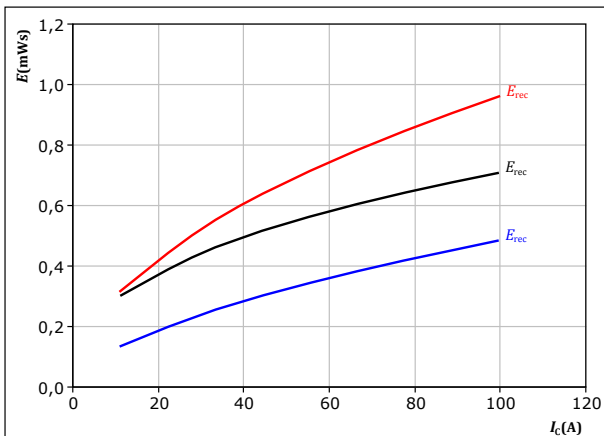
T_j : 25 °C
125 °C
150 °C

figure 35.

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
 $R_{gon} = 4$ Ω

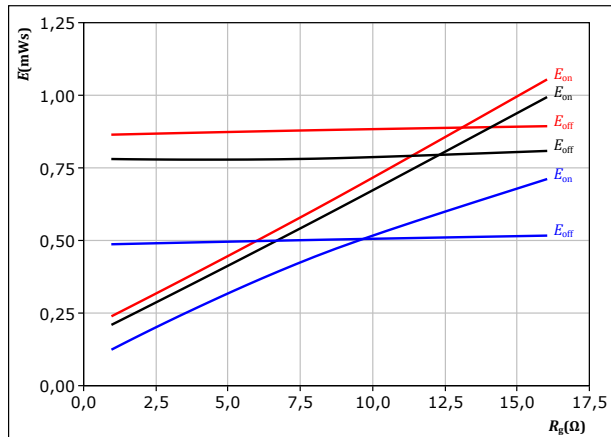
T_j : 25 °C
125 °C
150 °C

figure 34.

IGBT

Typical switching energy losses as a function of IGBT turn on gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 55$ A

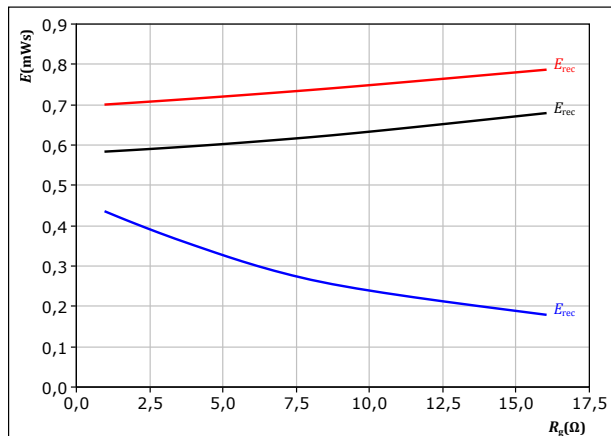
T_j : 25 °C
125 °C
150 °C

figure 36.

FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 55$ A

T_j : 25 °C
125 °C
150 °C



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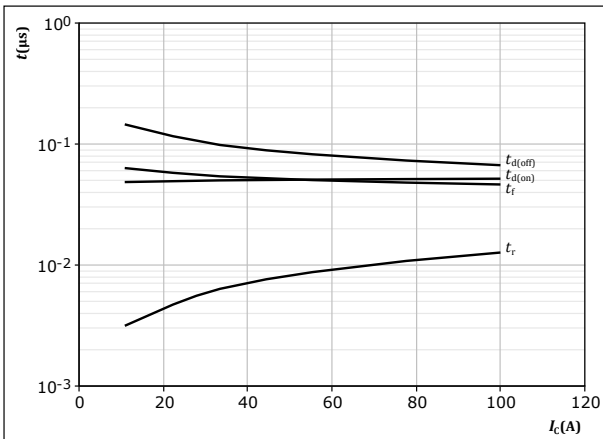
10-FZ12NMA080F202-M260F48 datasheet

Boost Switching Characteristics

figure 37.

IGBT

Typical switching times as a function of collector current
 $t = f(I_c)$



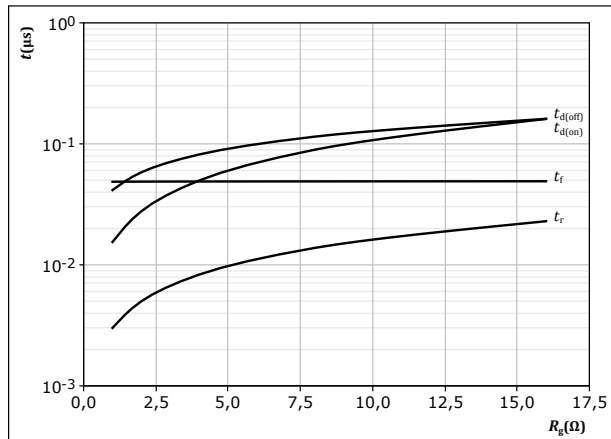
With an inductive load at

$T_j = 150 \text{ } ^\circ\text{C}$
 $V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$
 $R_{goff} = 4 \text{ } \Omega$

figure 38.

IGBT

Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$



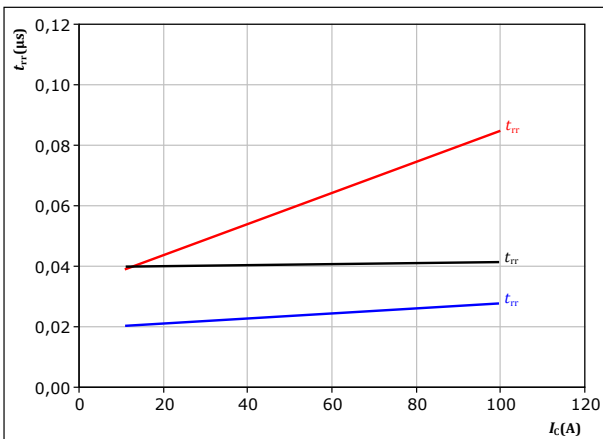
With an inductive load at

$T_j = 150 \text{ } ^\circ\text{C}$
 $V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 55 \text{ A}$

figure 39.

FWD

Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_c)$



With an inductive load at

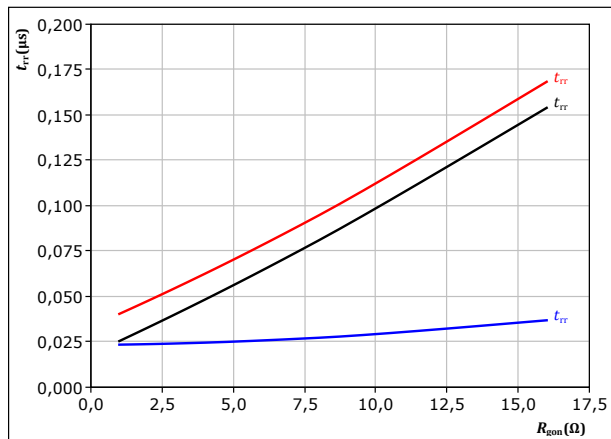
$V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $R_{gon} = 4 \text{ } \Omega$

T_j : — 25 °C
— 125 °C
— 150 °C

figure 40.

FWD

Typical reverse recovery time as a function of IGBT turn on gate resistor
 $t_{rr} = f(R_{gon})$



With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = \pm 15 \text{ V}$
 $I_c = 55 \text{ A}$

T_j : — 25 °C
— 125 °C
— 150 °C



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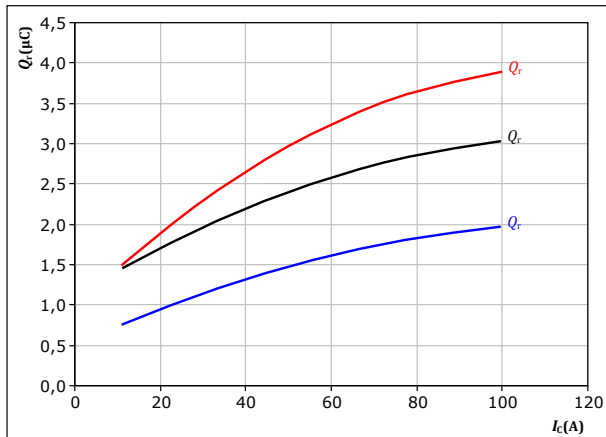
datasheet

Boost Switching Characteristics

figure 41. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



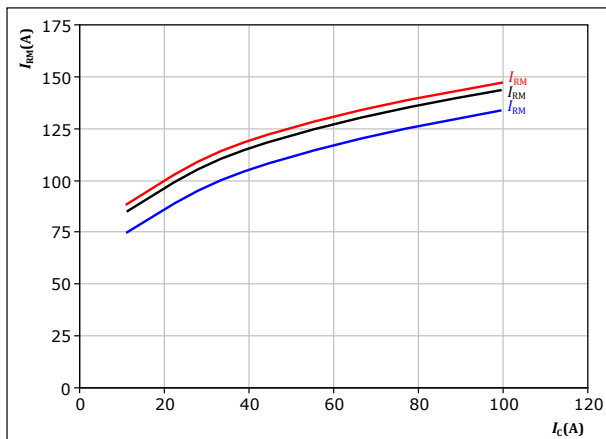
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 43. FWD

Typical peak reverse recovery current as a function of collector current

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



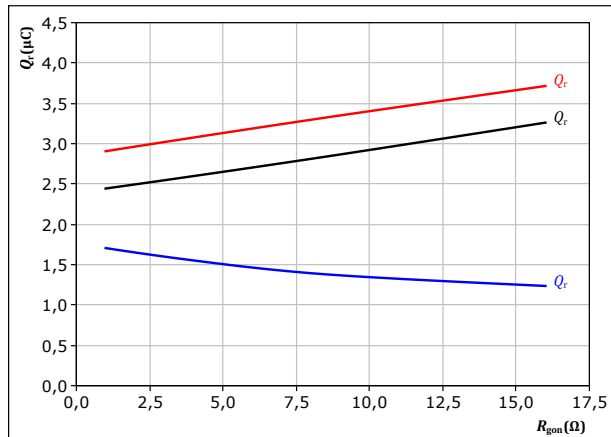
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $R_{gon} = 4$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 42. FWD

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

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



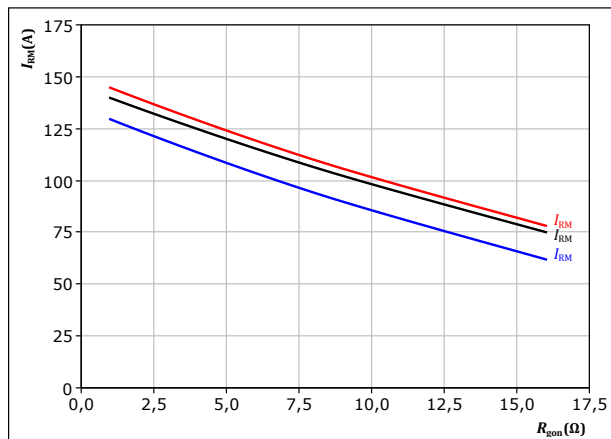
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_c = 55$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 44. FWD

Typical peak reverse recovery 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
 $I_c = 55$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



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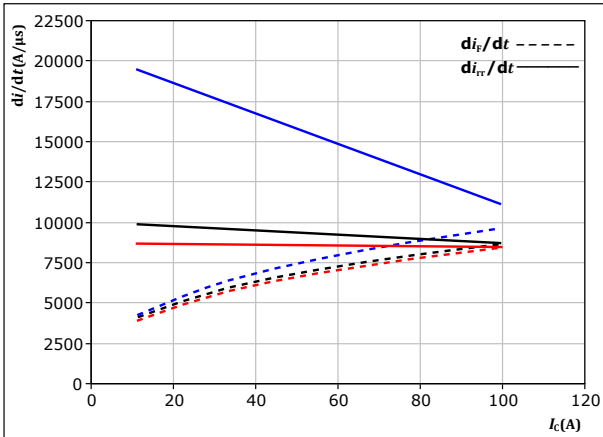
10-FZ12NMA080F202-M260F48

datasheet

Boost Switching Characteristics

figure 45. FWD

Typical rate of fall of forward and reverse recovery current as a function of collector current
 $di_f/dt, di_r/dt = f(I_C)$

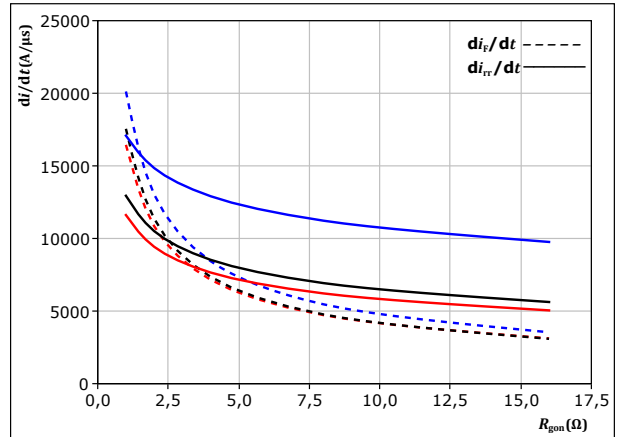


With an inductive load at

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

figure 46. FWD

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



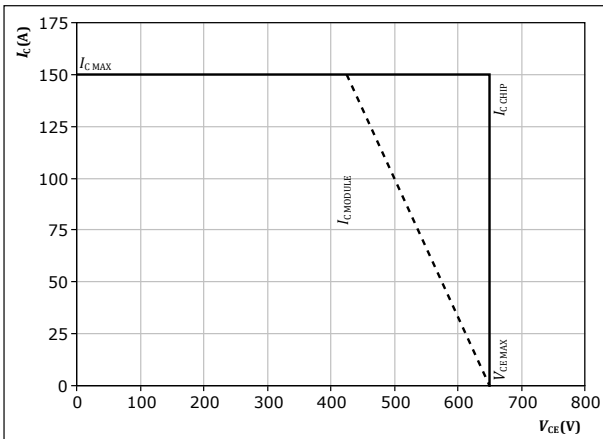
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = \pm 15$ V
 $I_C = 55$ A
 $T_j = 25$ °C
 $T_j = 125$ °C
 $T_j = 150$ °C

figure 47. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 4$ Ω
 $R_{goff} = 4$ Ω



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datasheet

Switching Definitions

figure 48. IGBT

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

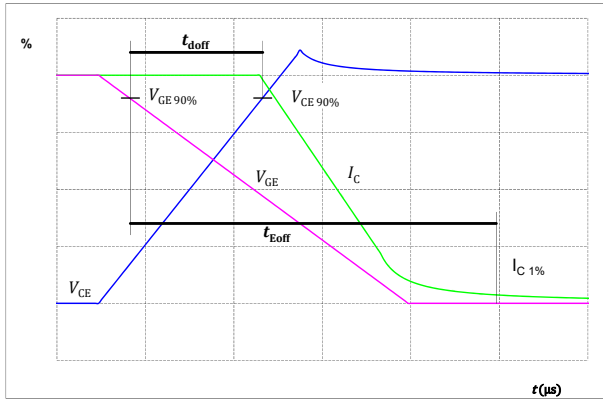


figure 49. IGBT

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

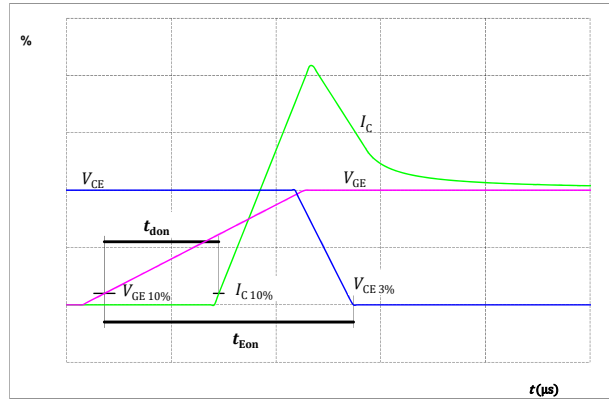


figure 50. IGBT

Turn-off Switching Waveforms & definition of t_f

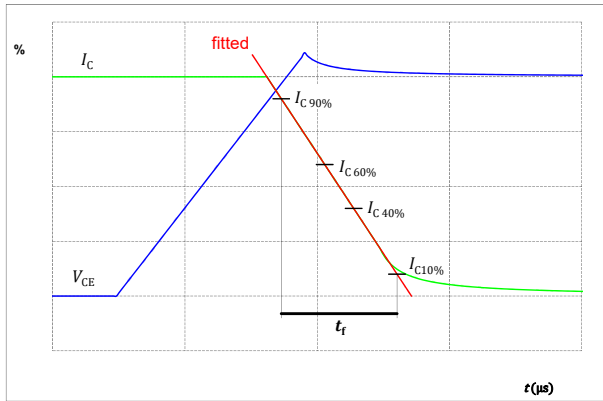
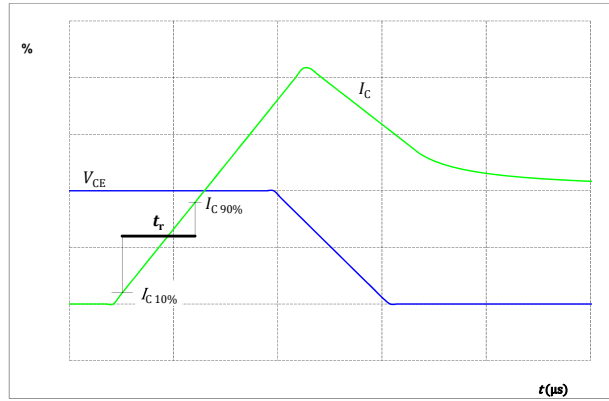


figure 51. IGBT

Turn-on Switching Waveforms & definition of t_r





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Switching Definitions

figure 52.

FWD

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

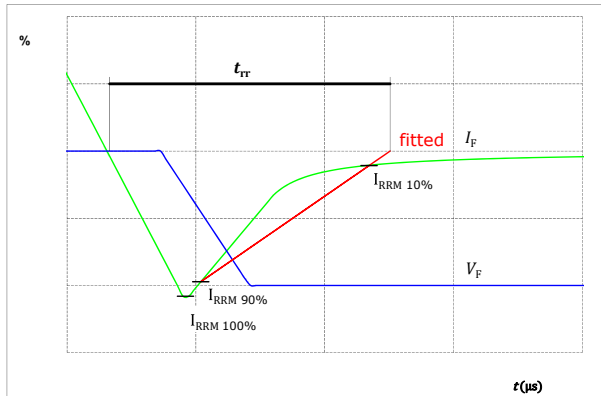
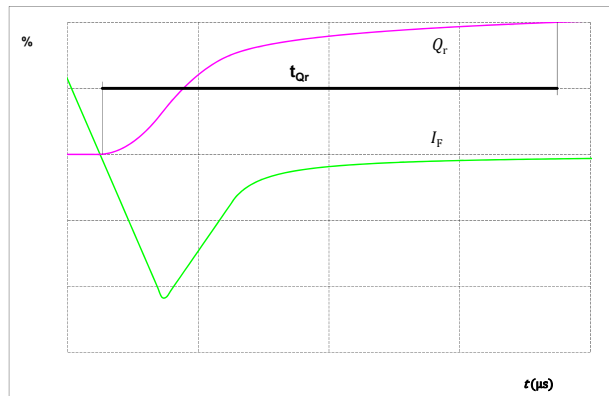


figure 53.

FWD


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





datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-FZ12NMA080F202-M260F48
With thermal paste (5,2 W/mK, PTM6000HV)	10-FZ12NMA080F202-M260F48-/7/
With thermal paste (3,4 W/mK, PSX-P7)	10-FZ12NMA080F202-M260F48-/3/

Marking							
	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNNN- TTTTTV		WWYY	UL VIN	LLLLL	SSSS
	Datamatrix	Type&Ver	Lot number	Serial	Date code		
		TTTTTTVV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	33,6	0	S2
2	30,8	0	G2
3	22	0	-DC
4	19,2	0	-DC
5	10,1	0	GND
6	2,8	0	S4
7	0	0	G4
8	0	7,1	Line
9	0	9,9	Line
10	0	12,7	Line
11	0	15,5	Line
12	0	22,6	G3
13	2,8	22,6	S3
14	10,1	22,6	GND
15	19,2	22,6	+DC
16	22	22,6	+DC
17	30,8	22,6	G1
18	33,6	22,6	S1
19	33,6	14,8	NTC1
20	33,6	8,2	NTC2
21	not assembled		
22	not assembled		

Top view of the sensor module showing pin locations and dimensions. The module is rectangular with a central circular feature. Pins are numbered 1 through 22. Dimensions include a width of 16.3 ± 0.5 mm and a height of 11.3 mm. A coordinate system (X, Y) is shown at the bottom right, with X offset by 16.8 mm.

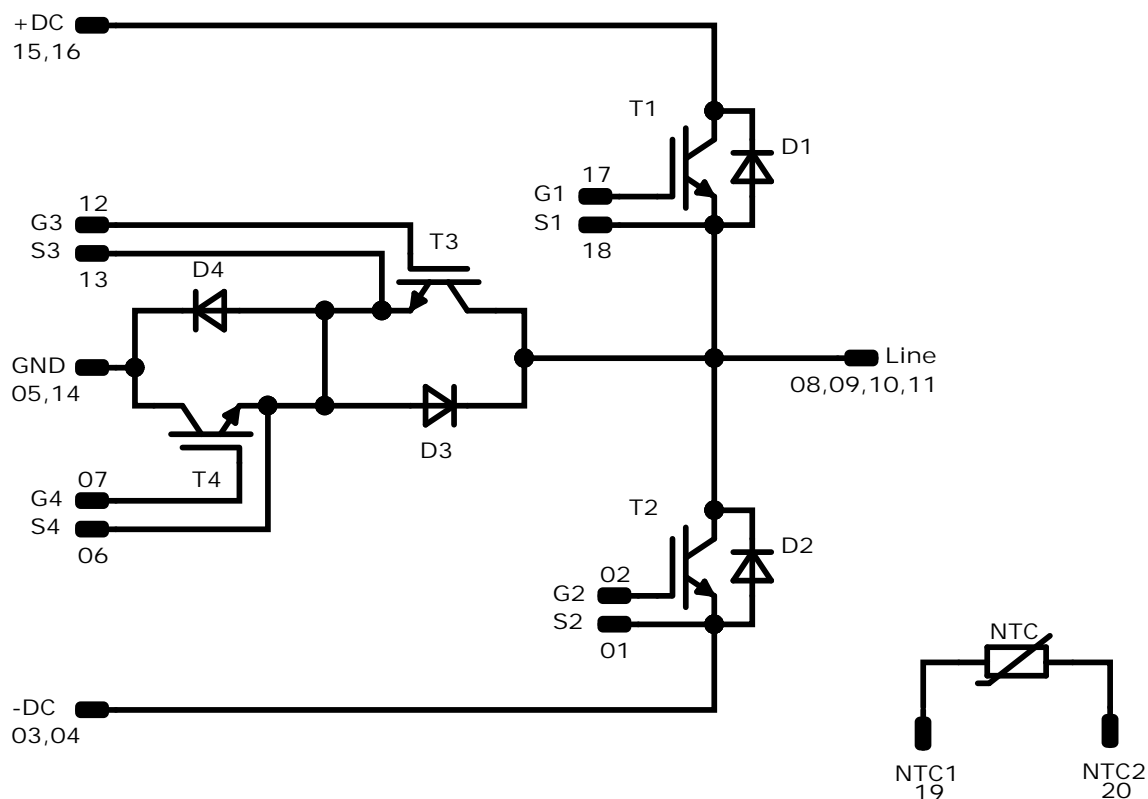
Side view of the sensor module showing the profile of the pins and the housing. The pins are arranged in a row with a diameter of 1 ± 0.05 mm. The housing has a height of 16.3 ± 0.5 mm.

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



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Pinout




Identification

ID	Component	Voltage	Current	Function	Comment
T1, T2	IGBT	1200 V	80 A	Buck Switch	
D4, D3	FWD	650 V	75 A	Buck Diode	
T4, T3	IGBT	650 V	75 A	Boost Switch	
D1, D2	FWD	1200 V	40 A	Boost Diode	
NTC	Thermistor			Thermistor	



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datasheet

Packaging instruction				
Standard packaging quantity (SPQ) 135	>SPQ	Standard	<SPQ	Sample
Handling instruction				
Handling instructions for <i>flow 0</i> packages see vincotech.com website.				
Package data				
Package data for <i>flow 0</i> packages see vincotech.com website.				
Vincotech thermistor reference				
See Vincotech thermistor reference table at 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-FZ12NMA080F202-M260F48-D1-14	17 Nov. 2022		

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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.