



Vincotech

10-FZ07NIA050SM-P925F58

datasheet

flowNPC 0

1200 V / 50 A

Features

- High efficiency three-level half-bridge
- High efficiency IGBT
- Neutral point-clamped inverter
- Clip-In PCB mounting
- Low inductance layout

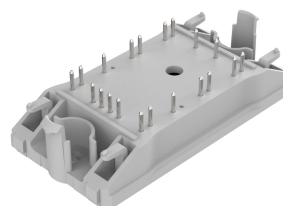
Target applications

- Solar inverters
- UPS
- Power supplies

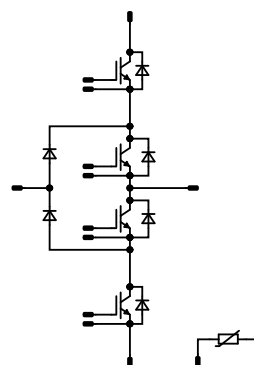
Types

- 10-FZ07NIA050SM-P925F58

flow 0 12 mm housing



Schematic





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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}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	41	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	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	°C

Buck Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	47	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	63	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	41	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	150	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	°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}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	47	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	63	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Sw. Inv. Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Continuous (direct) forward current	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	47	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	100	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	68	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			min. 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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125		1,83 2,01	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		3000		pF
Reverse transfer capacitance	C_{res}							11		pF
Gate charge	Q_g		15	520	50	25		120		nC

Thermal

Thermal resistance junction to sink*	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,22		K/W
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*Only valid with pre-applied Vincotech thermal interface material.

Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	-5/15	350	50	25 125 150		37,44 37,44 37,76		ns
Rise time	t_r					25 125 150		12,48 14,08 14,4		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		87,36 102,4 105,92		ns
Fall time	t_f					25 125 150		5,74 9,28 10,86		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		0,782 1,03 1,1		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,279 0,466 0,523		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				50	25 125 150		1,5 1,44 1,42	1,92	V
Reverse leakage current	I_R	$V_i = 650$ V				25			2,65	μA

Thermal

Thermal resistance junction to sink*	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,5		K/W
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*Only valid with pre-applied Vincotech thermal interface material.

Dynamic

Peak recovery current	I_{RRM}	$di/dt=2517$ A/μs $di/dt=2644$ A/μs $di/dt=2539$ A/μs	-5/15	350	50	25 125 150		22,74 37,47 41,12		A
Reverse recovery time	t_{rr}					25 125 150		92,2 122,56 134,22		ns
Recovered charge	Q_r					25 125 150		1,3 2,73 3,09		μC
Reverse recovered energy	E_{rec}					25 125 150		0,254 0,563 0,645		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		505,67 306,86 302,23		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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0005	25	3,3	4	4,7	V
Collector-emitter saturation voltage	V_{CEsat}		15		50	25 125		1,83 2,01	2,22	V
Collector-emitter cut-off current	I_{CES}		0	650		25			40	µA
Gate-emitter leakage current	I_{GES}		20	0		25			120	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		3000		pF
Reverse transfer capacitance	C_{res}							11		pF
Gate charge	Q_g		15	520	50	25		120		nC

Thermal

Thermal resistance junction to sink*	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						1,22		K/W
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*Only valid with pre-applied Vincotech thermal interface material.

Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 8 \Omega$ $R_{goff} = 8 \Omega$	-5/15	350	50	25 125 150		37,44 37,76 37,44		ns
Rise time	t_r					25 125 150		14,08 16 16,32		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		89,6 105,6 109,76		ns
Fall time	t_f					25 125 150		6,52 15 17,21		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		0,822 1,02 1,06		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,334 0,531 0,573		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				50	25 125 150		1,5 1,44 1,42	1,92		V
Reverse leakage current	I_R	$V_i = 650$ V				25			2,65		μA

Thermal

Thermal resistance junction to sink*	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,5			K/W
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*Only valid with pre-applied Vincotech thermal interface material.

Dynamic

Peak recovery current	I_{RRM}	$di/dt=2005$ A/μs $di/dt=2215$ A/μs $di/dt=2195$ A/μs	-5/15	350	50	25 125 150		21,56 33,23 36,98			A
Reverse recovery time	t_{rr}					25 125 150		88,7 117,4 131,38			ns
Recovered charge	Q_r					25 125 150		1,3 2,66 3,08			μC
Reverse recovered energy	E_{rec}					25 125 150		0,286 0,631 0,741			mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		2007 535,04 338,29			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 Sw. Inv. Diode

Static

Forward voltage	V_F				50	25 125	1,18	1,63 1,54	1,82	V
Reverse leakage current	I_R	$V_r = 650$ V				25			0,6	μA

Thermal

Thermal resistance junction to sink*	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,4		K/W
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*Only valid with pre-applied Vincotech thermal interface material.

Thermistor

Static

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



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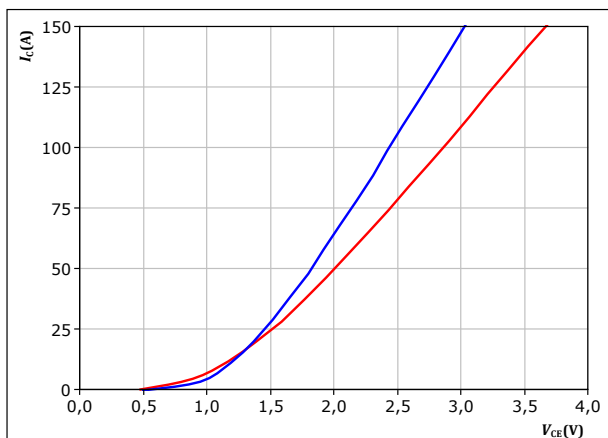
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Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

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

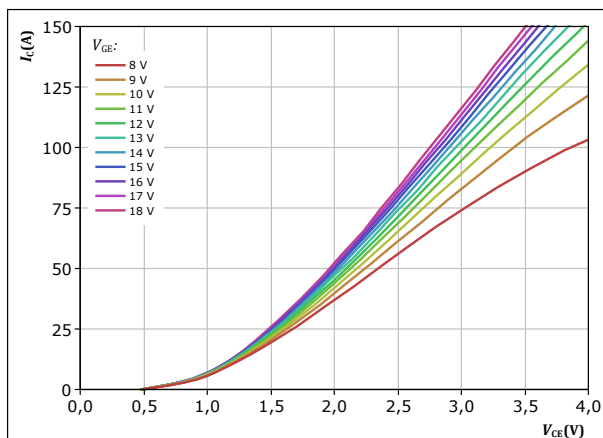


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 ^\circ C$ (blue), $125 ^\circ C$ (red)

figure 2. IGBT

Typical output characteristics

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

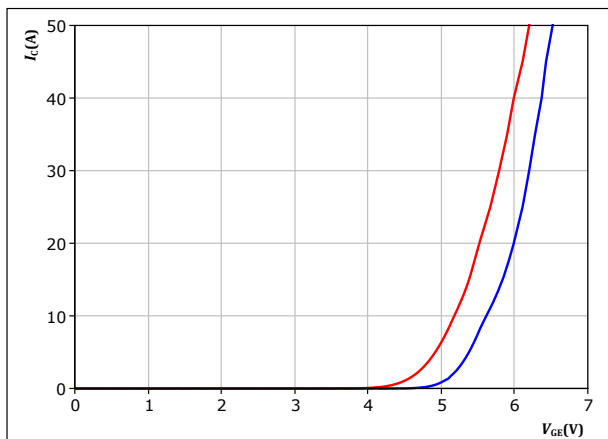


$t_p = 250 \mu s$
 $T_j = 125 ^\circ C$
 V_{GE} from 8 V to 18 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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

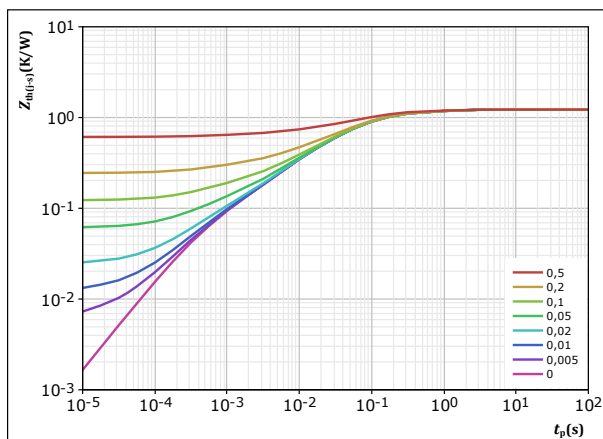


$t_p = 250 \mu s$
 $V_{CE} = 10 V$
 $T_j: 25 ^\circ C$ (blue), $125 ^\circ C$ (red)

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,222 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
1,28E-01	8,75E-01
4,40E-01	1,12E-01
3,96E-01	3,56E-02
1,75E-01	7,55E-03
3,44E-02	1,97E-03
4,80E-02	4,33E-04



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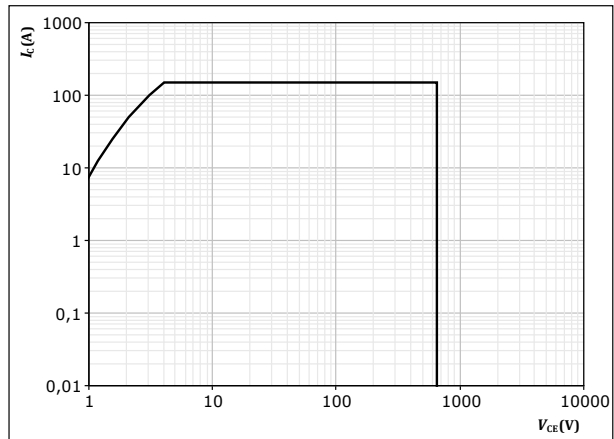
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Buck Switch Characteristics

figure 5. IGBT

Safe operating area

$I_C = f(V_{CE})$



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$

$V_{GE} = 15 \text{ V}$

$T_j = T_{jmax}$



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datasheet

Buck Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$

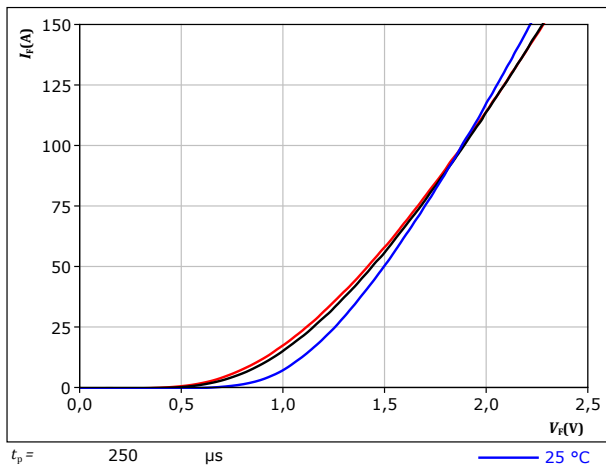
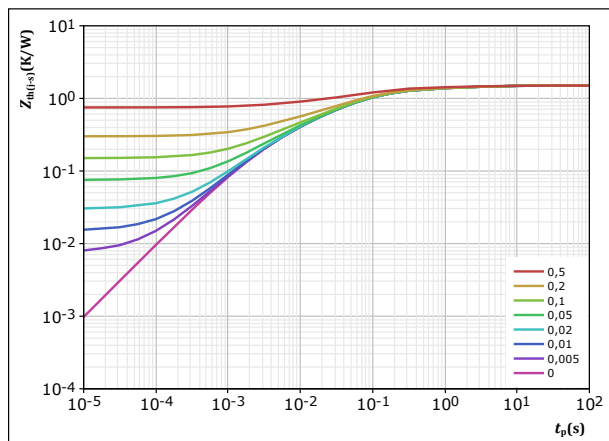


figure 7.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	1,501	K/W
IGBT thermal model values		
R (K/W)	τ (s)	
1,03E-01	4,73E+00	
2,05E-01	5,53E-01	
6,39E-01	8,31E-02	
3,39E-01	2,02E-02	
1,71E-01	4,42E-03	
4,45E-02	1,30E-03	



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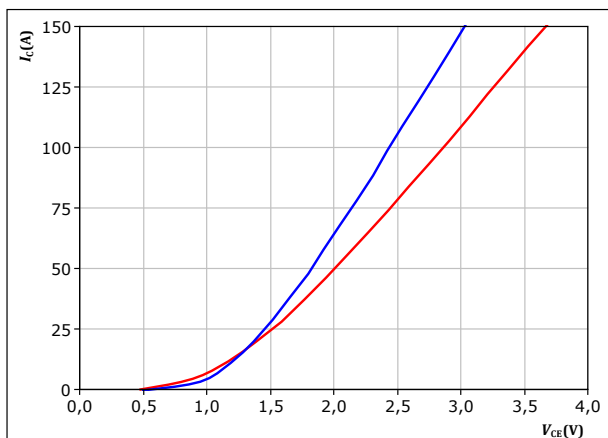
Boost Switch Characteristics

figure 8.

IGBT

Typical output characteristics

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



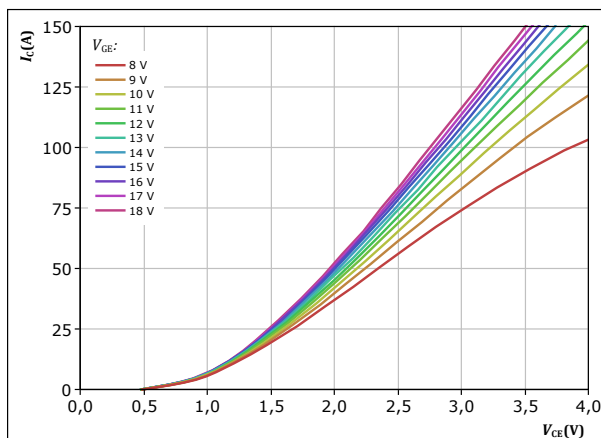
$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j: 25 ^\circ C$ (blue line)
 $125 ^\circ C$ (red line)

figure 9.

IGBT

Typical output characteristics

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



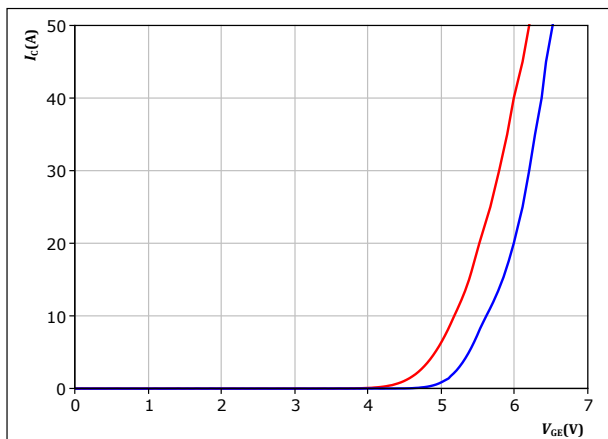
$t_p = 250 \mu s$
 $T_j = 125 ^\circ C$
 V_{GE} from 8 V to 18 V in steps of 1 V

figure 10.

IGBT

Typical transfer characteristics

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



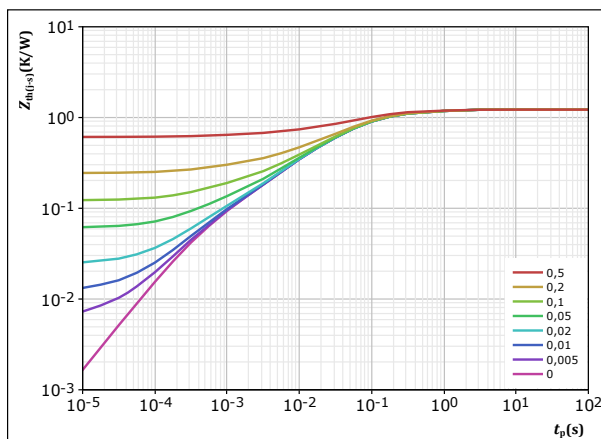
$t_p = 250 \mu s$
 $V_{CE} = 10 V$
 $T_j: 25 ^\circ C$ (blue line)
 $125 ^\circ C$ (red line)

figure 11.

IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,222 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
1,28E-01	8,75E-01
4,40E-01	1,12E-01
3,96E-01	3,56E-02
1,75E-01	7,55E-03
3,44E-02	1,97E-03
4,80E-02	4,33E-04



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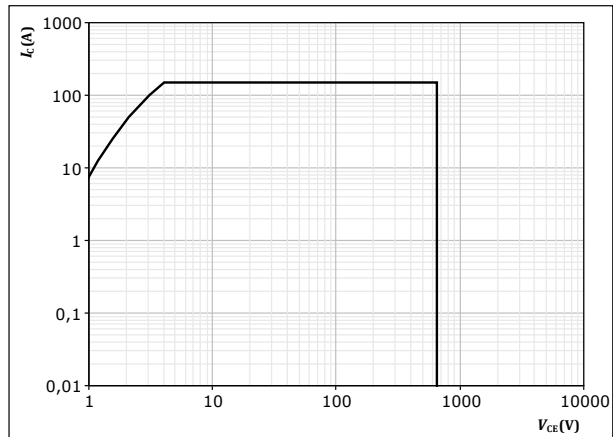
Boost Switch Characteristics

figure 12.

IGBT

Safe operating area

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



$D = \text{single pulse}$

$T_s = 80 \text{ } ^\circ\text{C}$

$V_{GE} = 15 \text{ V}$

$T_j = T_{jmax}$



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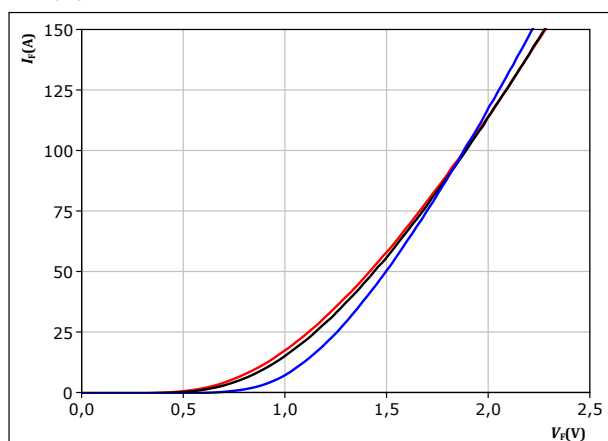
Boost Diode Characteristics

figure 13.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

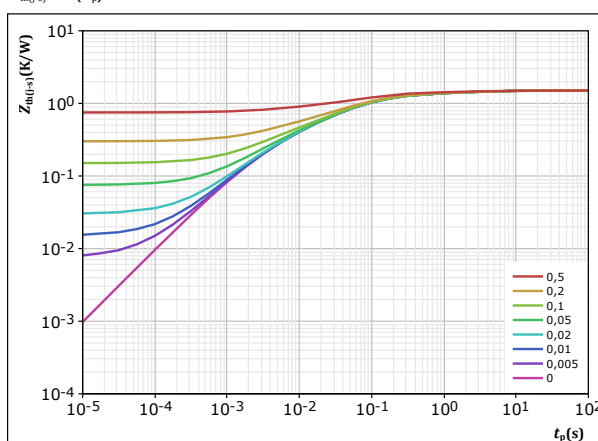
$T_j:$
— 25 °C
— 125 °C
— 150 °C

figure 14.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	1,501	K/W
IGBT thermal model values		
R (K/W)	τ (s)	
1,03E-01	4,73E+00	
2,05E-01	5,53E-01	
6,39E-01	8,31E-02	
3,39E-01	2,02E-02	
1,71E-01	4,42E-03	
4,45E-02	1,30E-03	



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Boost Sw. Inv. Diode Characteristics

figure 15. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

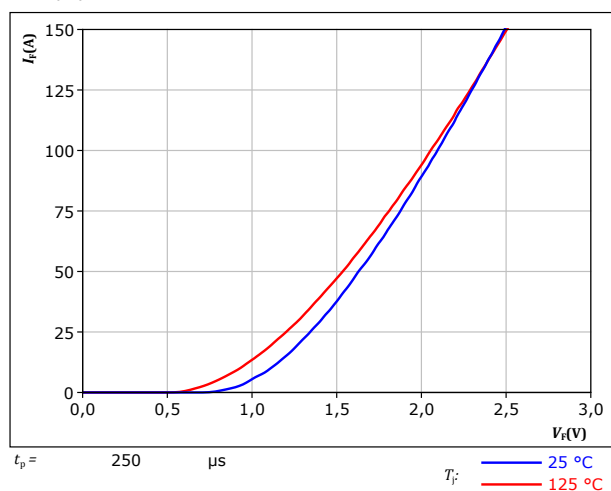
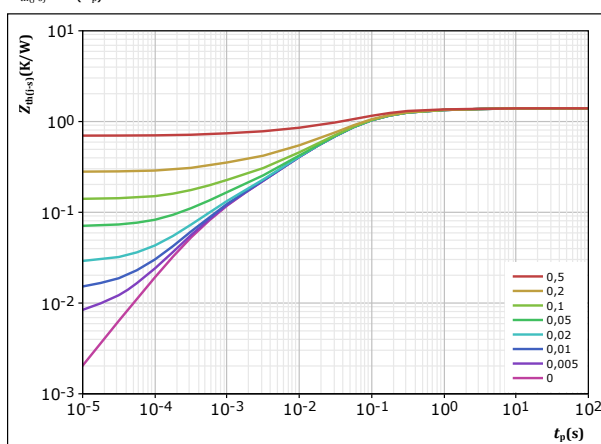


figure 16. FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	1,399	K/W
IGBT thermal model values		
R (K/W)	τ (s)	
6,76E-02	3,05E+00	
1,79E-01	3,50E-01	
6,70E-01	7,08E-02	
2,72E-01	1,81E-02	
1,35E-01	4,13E-03	
7,56E-02	5,11E-04	



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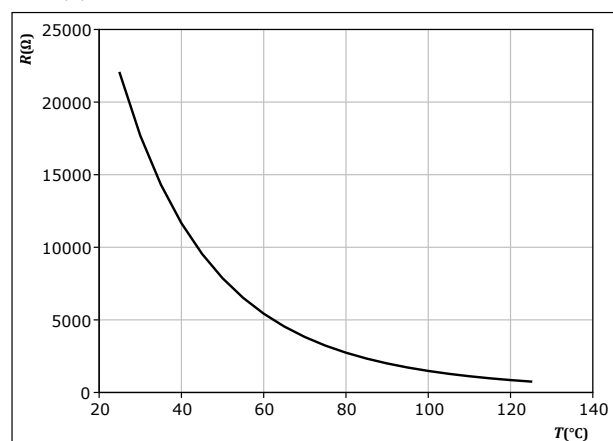
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Thermistor Characteristics

figure 17. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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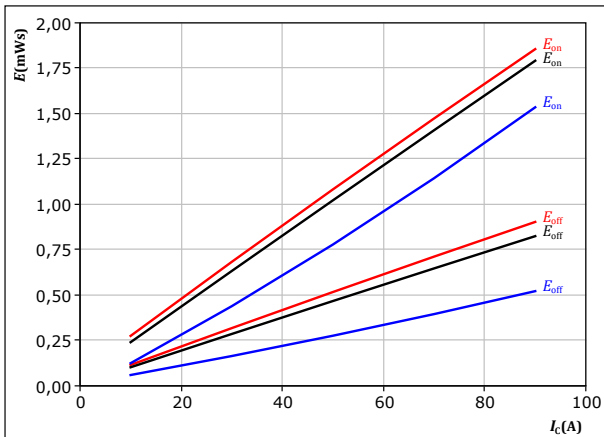
Buck Switching Characteristics

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω

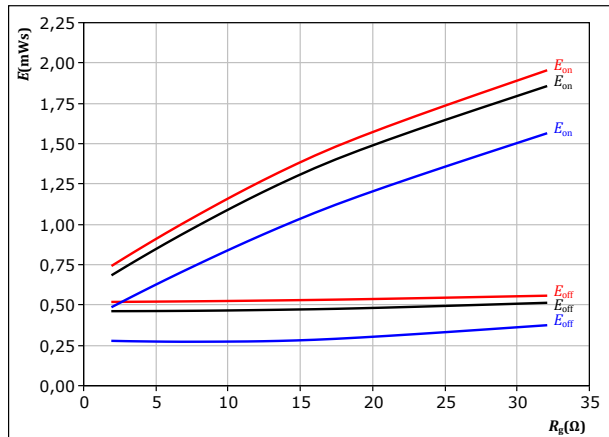
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 19.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 50$ A

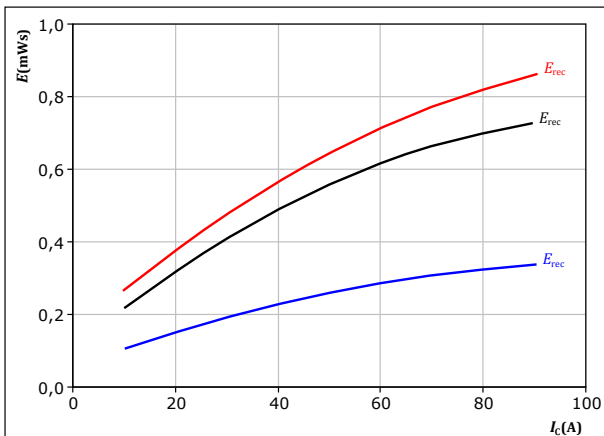
T_j :
— 25 °C
— 125 °C
— 150 °C

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω

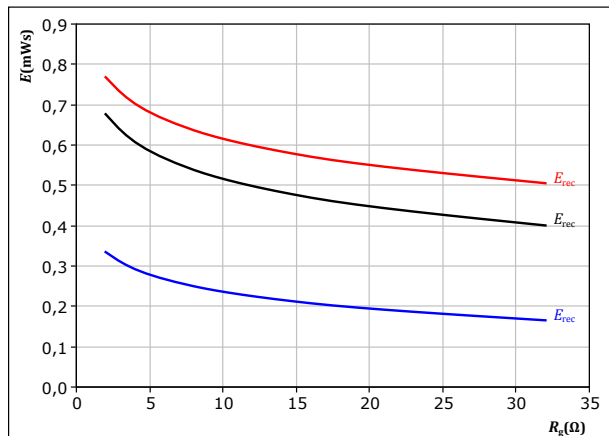
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 21.

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
 $V_{GE} = -5/15$ V
 $I_C = 50$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



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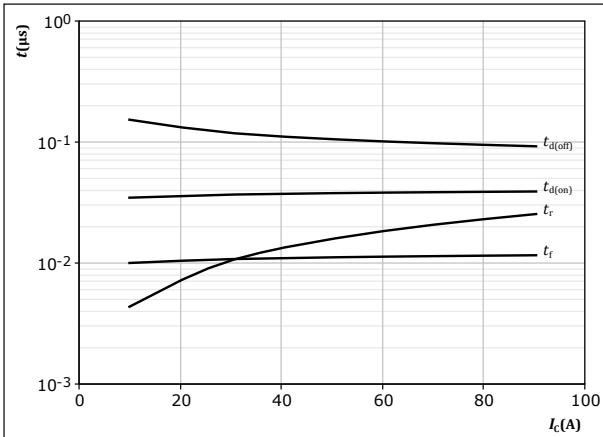
10-FZ07NIA050SM-P925F58
datasheet

Buck Switching Characteristics

figure 22.

IGBT

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



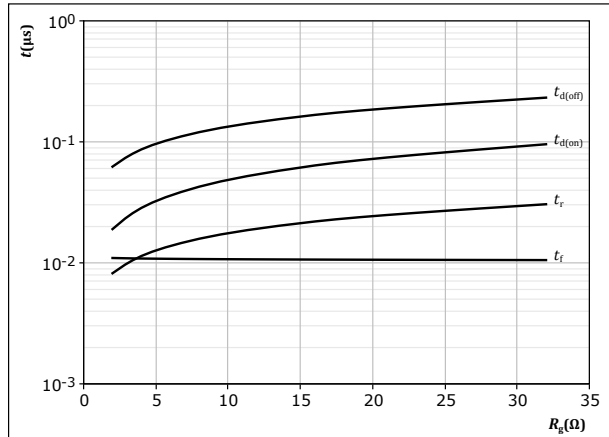
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω

figure 23.

IGBT

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



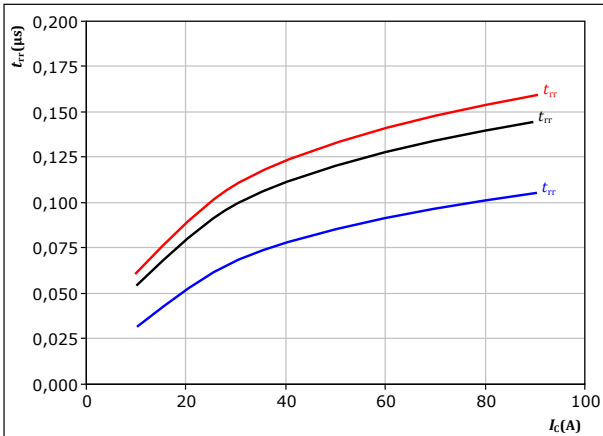
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 50$ A

figure 24.

FWD

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



With an inductive load at

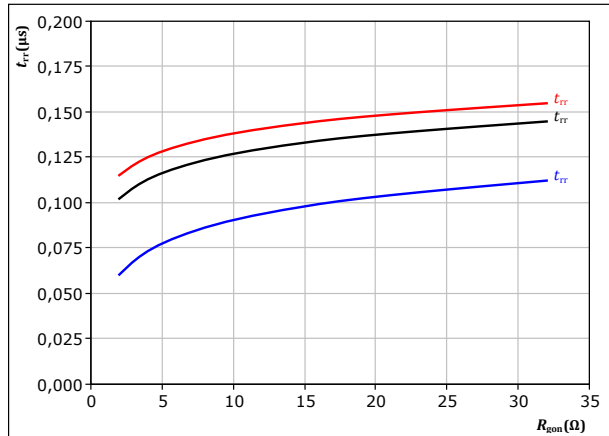
$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω

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
 $V_{GE} = -5/15$ V
 $I_C = 50$ A

T_j : 25 °C
125 °C
150 °C



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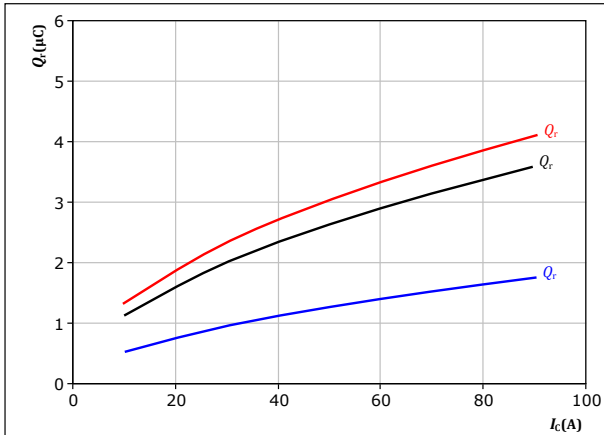
Buck Switching Characteristics

figure 26.

FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

$$\begin{aligned} V_{CE} &= 350 \text{ V} \\ V_{GE} &= -5/15 \text{ V} \\ R_{gon} &= 8 \text{ } \Omega \end{aligned}$$

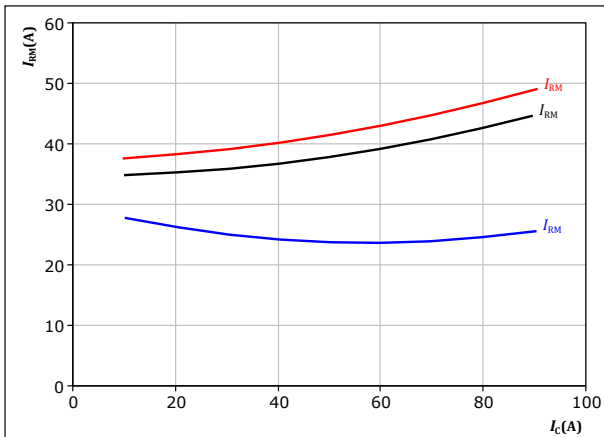
T_j : 25 °C
125 °C
150 °C

figure 28.

FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

$$\begin{aligned} V_{CE} &= 350 \text{ V} \\ V_{GE} &= -5/15 \text{ V} \\ R_{gon} &= 8 \text{ } \Omega \end{aligned}$$

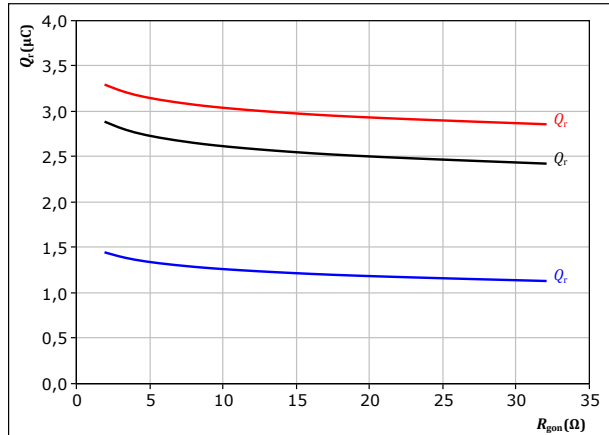
T_j : 25 °C
125 °C
150 °C

figure 27.

FWD

Typical recovered charge as a function of turn on gate resistor

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



With an inductive load at

$$\begin{aligned} V_{CE} &= 350 \text{ V} \\ V_{GE} &= -5/15 \text{ V} \\ I_c &= 50 \text{ A} \end{aligned}$$

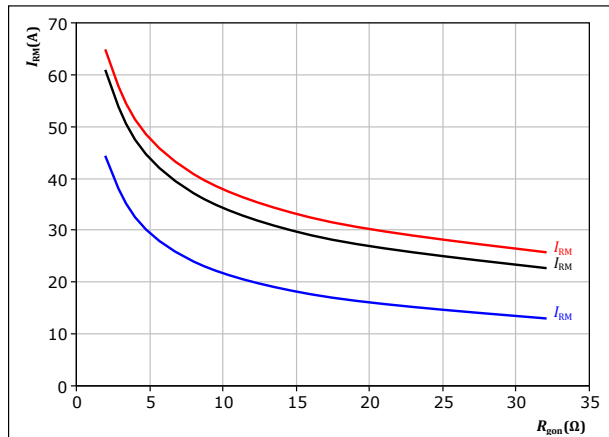
T_j : 25 °C
125 °C
150 °C

figure 29.

FWD

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

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



With an inductive load at

$$\begin{aligned} V_{CE} &= 350 \text{ V} \\ V_{GE} &= -5/15 \text{ V} \\ I_c &= 50 \text{ A} \end{aligned}$$

T_j : 25 °C
125 °C
150 °C



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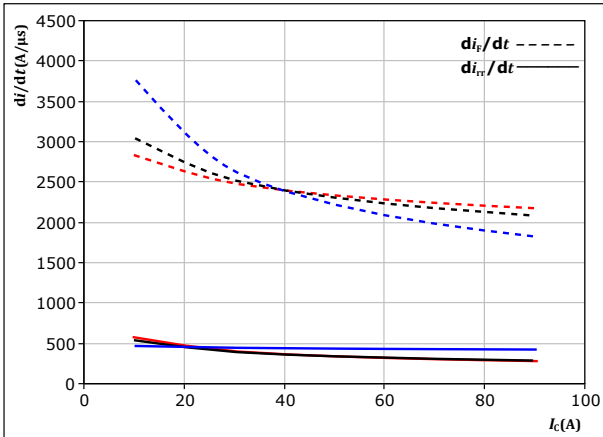
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datasheet

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

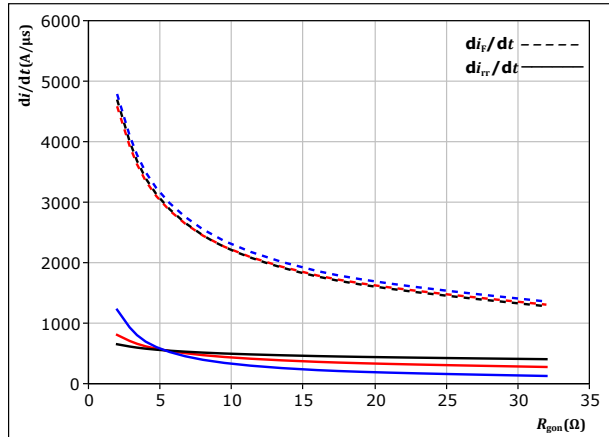
$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω

T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

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
 $V_{GE} = -5/15$ V
 $I_C = 50$ A

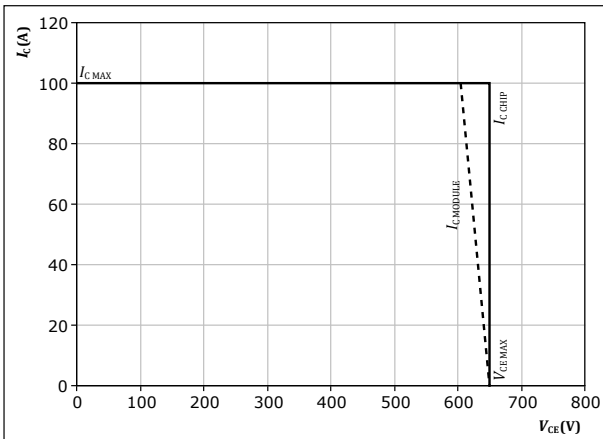
T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 32.

IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 8$ Ω
 $R_{goff} = 8$ Ω



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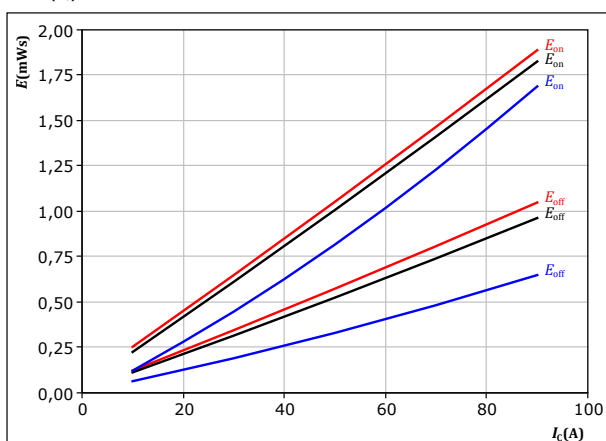
Boost Switching Characteristics

figure 33.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = -5/15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$
 $R_{goff} = 8 \text{ } \Omega$

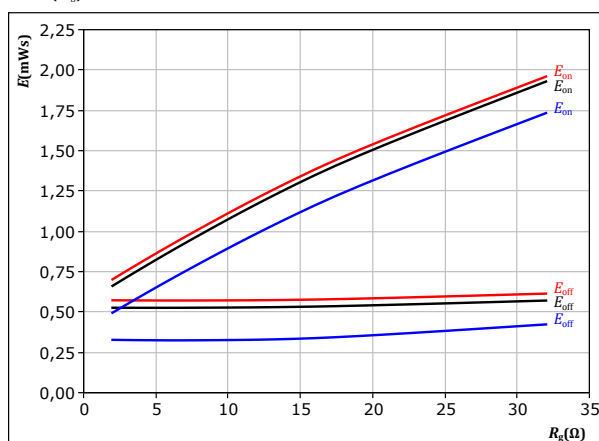
T_j : 25 °C
125 °C
150 °C

figure 34.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = -5/15 \text{ V}$
 $I_C = 50 \text{ A}$

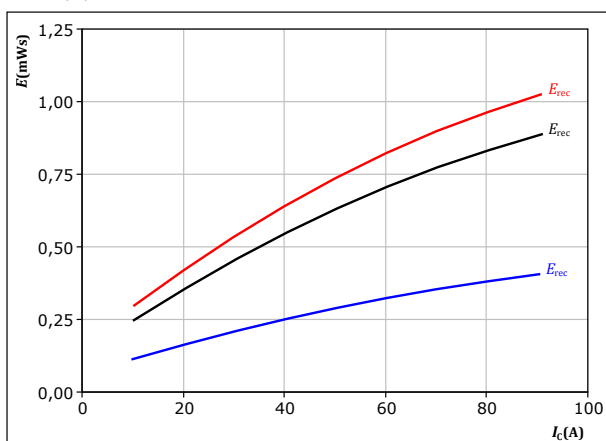
T_j : 25 °C
125 °C
150 °C

figure 35.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = -5/15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$

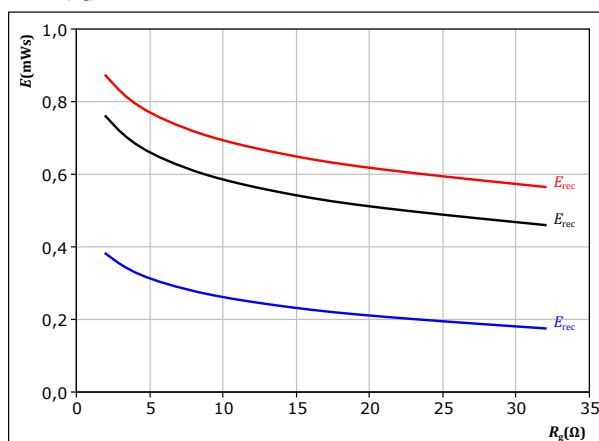
T_j : 25 °C
125 °C
150 °C

figure 36.

FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = -5/15 \text{ V}$
 $I_C = 50 \text{ A}$

T_j : 25 °C
125 °C
150 °C



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datasheet

Boost Switching Characteristics

figure 37.

IGBT

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

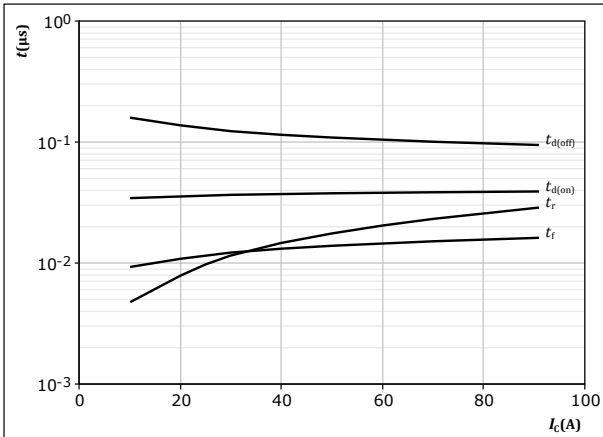


figure 38.

IGBT

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

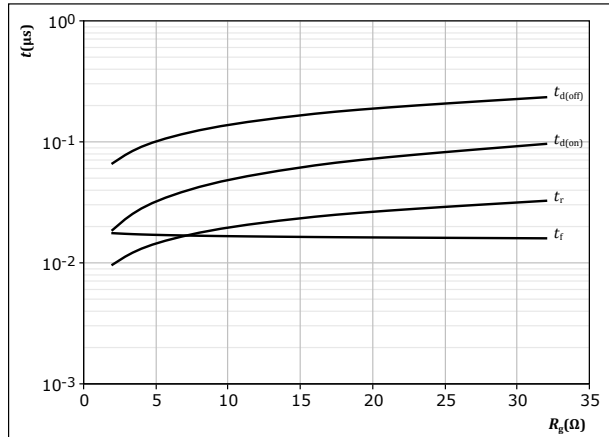


figure 39.

FWD

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

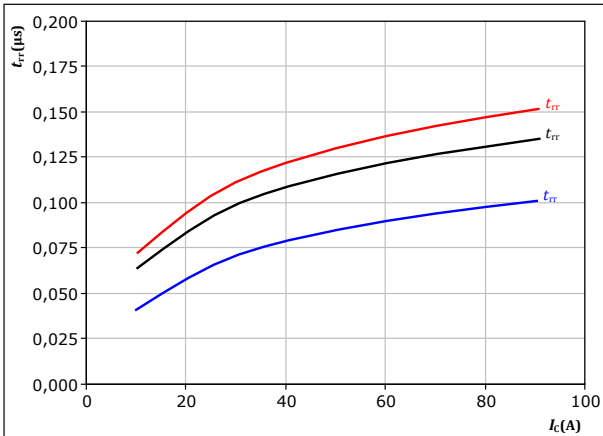
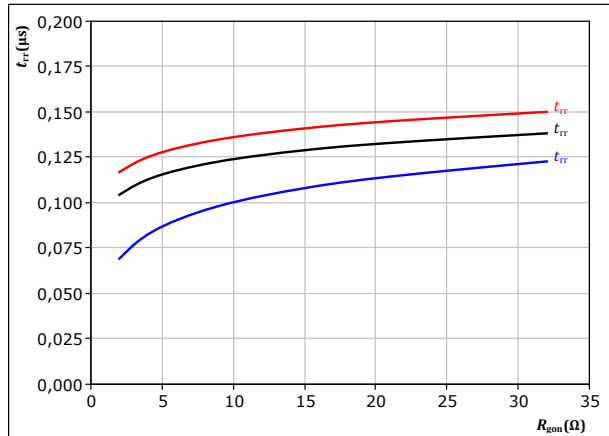


figure 40.

FWD

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





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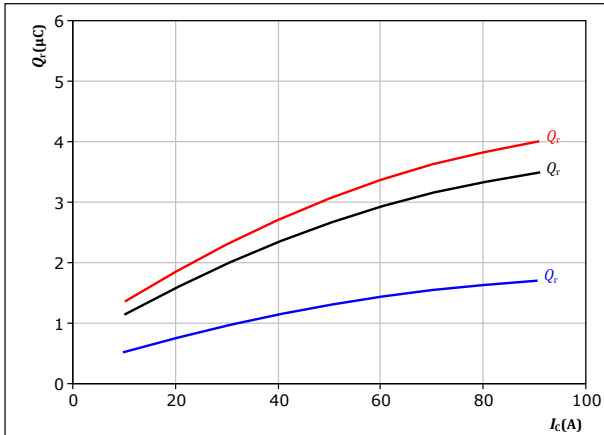
Boost Switching Characteristics

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω

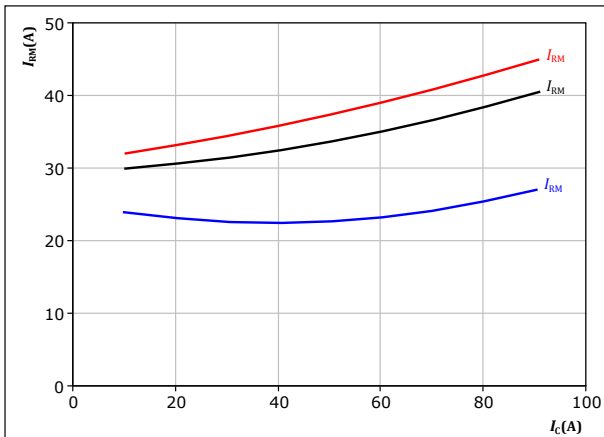
T_j : 25 °C (blue)
125 °C (black)
150 °C (red)

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 8$ Ω

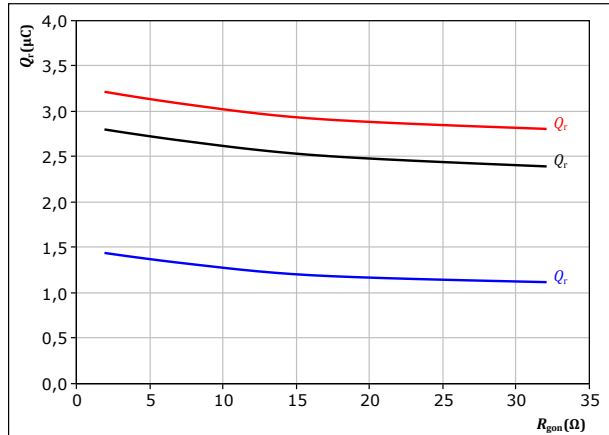
T_j : 25 °C (blue)
125 °C (black)
150 °C (red)

figure 42.

FWD

Typical recovered charge as a function of turn on gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_c = 50$ A

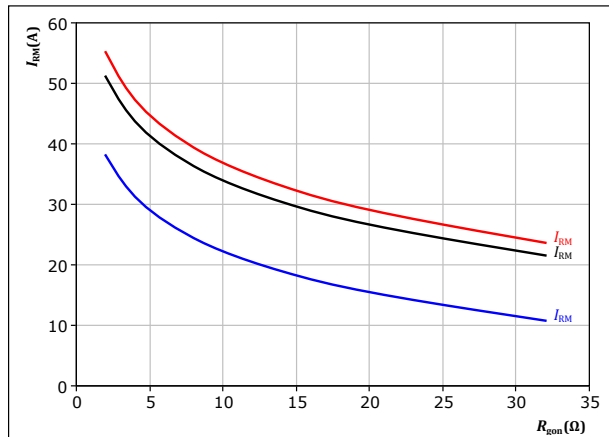
T_j : 25 °C (blue)
125 °C (black)
150 °C (red)

figure 44.

FWD

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

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_c = 50$ A

T_j : 25 °C (blue)
125 °C (black)
150 °C (red)



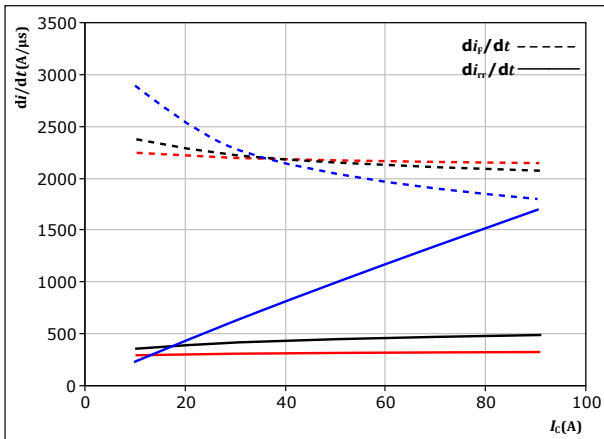
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datasheet

Boost Switching Characteristics

figure 45. FWD

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



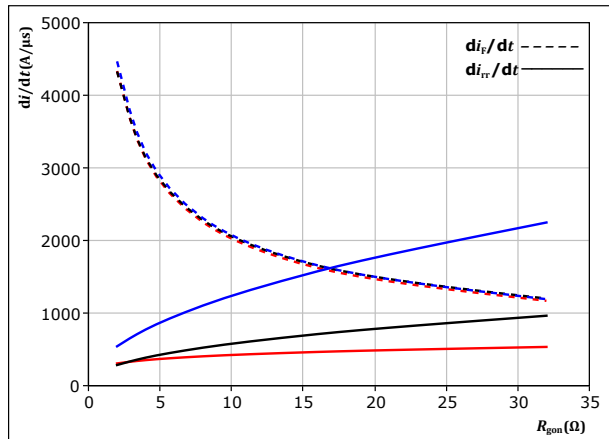
With an inductive load at

$V_{CE} = 350 \text{ V}$
 $V_{GE} = -5/15 \text{ V}$
 $R_{gon} = 8 \text{ } \Omega$

T_j :
 — 25 °C
 — 125 °C
 — 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

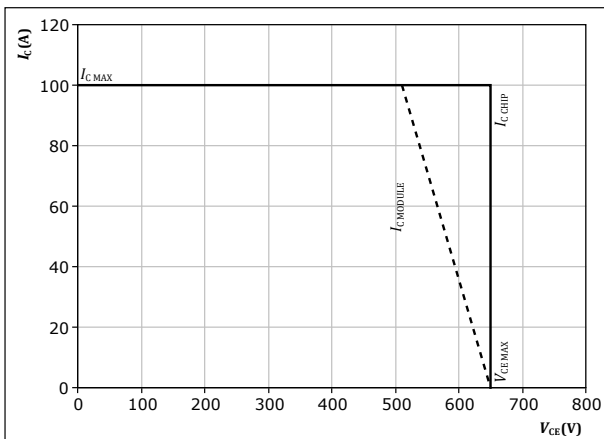
$V_{CE} = 350 \text{ V}$
 $V_{GE} = -5/15 \text{ V}$
 $I_C = 50 \text{ A}$

T_j :
 — 25 °C
 — 125 °C
 — 150 °C

figure 47. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150 \text{ } ^\circ\text{C}$
 $R_{gon} = 8 \text{ } \Omega$
 $R_{goff} = 8 \text{ } \Omega$



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Switching Definitions

figure 48. IGBT

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

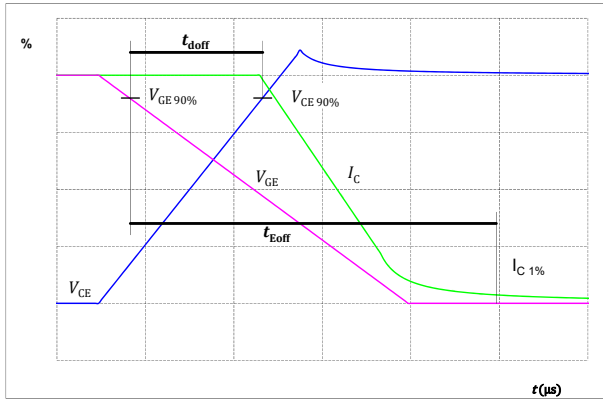


figure 49. IGBT

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

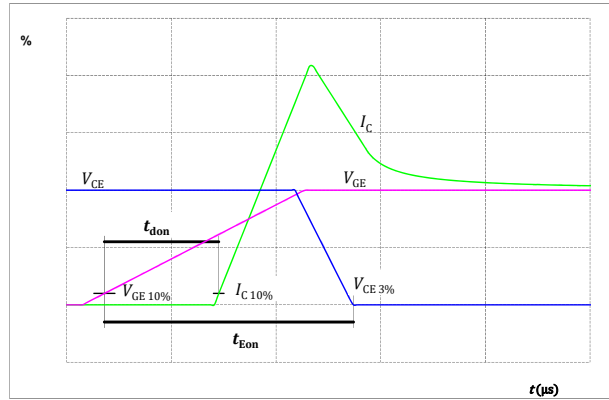


figure 50. IGBT

Turn-off Switching Waveforms & definition of t_f

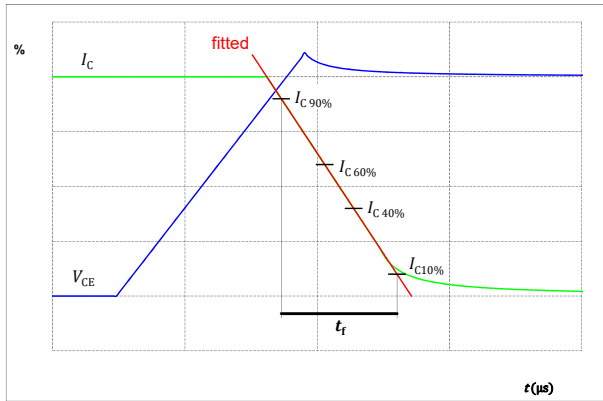
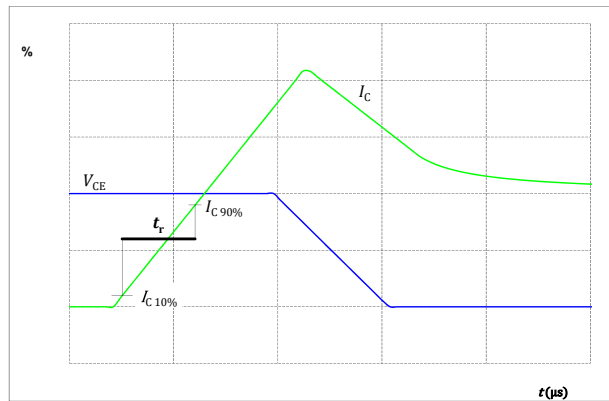


figure 51. IGBT

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}

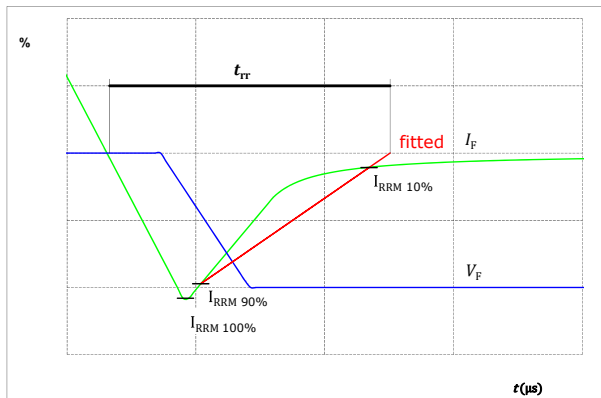
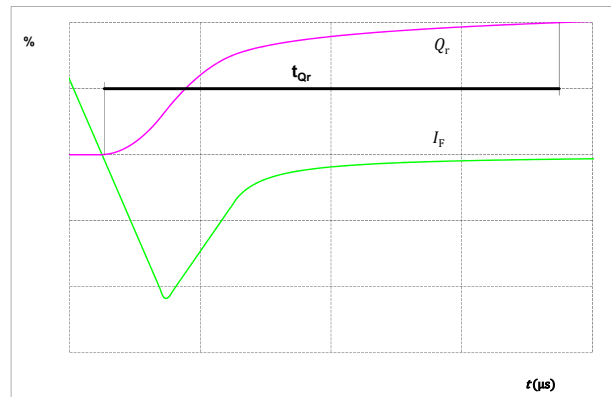


figure 53.

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-FZ07NIA050SM-P925F58
With thermal paste	10-FZ07NIA050SM-P925F58-/3/

Marking							
	Text	Name		Date code	UL & VIN	Lot	Serial
		NN-NNNNNNNNNNNNN- TTTTTIVV		WWYY	UL VIN	LLLLL	SSSS
		Datamatrix	Type&Ver	Lot number	Serial	Date code	
TTTTTIVV			LLLLL	SSSS	WWYY		

Pin table [mm]

Pin	X	Y	Function
1	33,6	0	G2
2	30,8	0	S2
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	S1
18	33,6	22,6	G1
19	33,6	14,8	NTC1
20	33,6	8,2	NTC2
21	not assembled		
22	not assembled		

Outline

The technical drawing consists of two views: a side view (top) and a top view (bottom).
Side View: Shows the profile of the module. The total height is 16.3 ±0.5 mm. The top surface has a width of 16.8 mm. There are 10 pins on the top edge, with a pitch of 1 ±0.05 mm between the last two pins.
Top View: Shows the layout of the pins. The pins are numbered 1 through 22. Pins 1-10 are on the top edge, and pins 11-20 are on the bottom edge. Pins 21 and 22 are marked as 'not assembled'. The module has a central cutout and mounting tabs on the sides. Dimensions include a total width of 16.8 mm and a central cutout width of 13.3 mm.

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

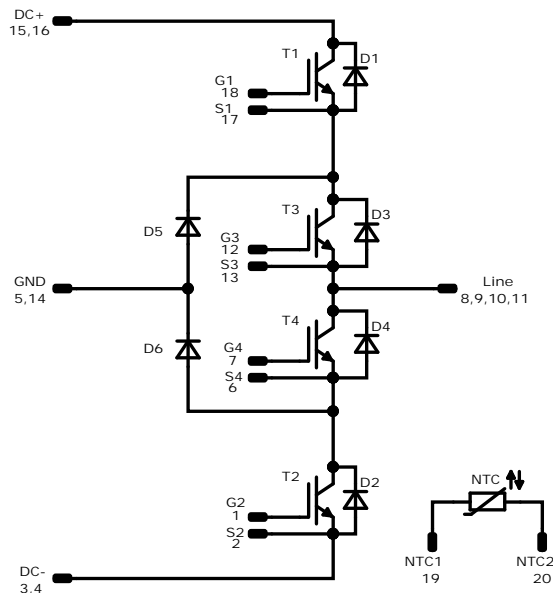


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datasheet

Pinout



Identification

ID	Component	Voltage	Current	Function	Comment
T1, T2	IGBT	650 V	50 A	Buck Switch	
D5, D6	FWD	650 V	50 A	Buck Diode	
T3, T4	IGBT	650 V	50 A	Boost Switch	
D2, D1	FWD	650 V	50 A	Boost Diode	
D4, D3	FWD	650 V	50 A	Boost Sw. Inv. Diode	
NTC	Thermistor			Thermistor	



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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.

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-FZ07NIA050SM-P925F58-D1-14	21 May. 2020		

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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.