



Vincotech

10-FY07NPA150SM02-L365F08

datasheet

flowNPC 1

1200 V / 150 A

Features

- NPC inverter topology
- Optimized for full rated bi-directional usage (4quadrant)
- Optimized for 1200 Vdc applications
- High-speed IGBT in all switch positions
- Integrated NTC
- Low inductive design with integrated DC capacitor
- flow 1 12mm package

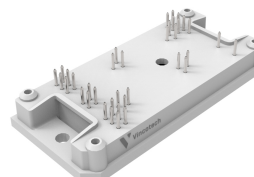
Target applications

- Energy Storage Systems
- Solar Inverters
- UPS

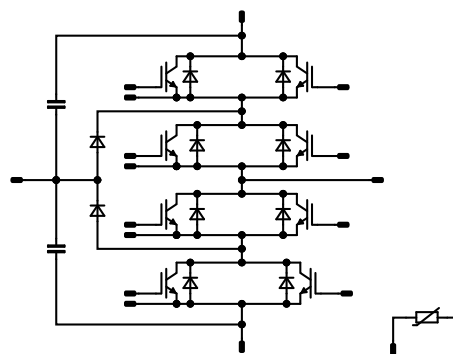
Types

- 10-FY07NPA150SM02-L365F08

flow 1 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 (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	83	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	128	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
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	86	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	113	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Switch

Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	83	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	450	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	128	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
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	86	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	113	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Sw. Inv. Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	108	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	300	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	149	W
Maximum junction temperature	T_{jmax}		175	°C

Capacitor (DC)

Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55 ... 125	°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			8,07	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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0015	25	3,3	4	4,7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		150	25 125 150		1,7 1,89 1,94	2,22 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			80	μA
Gate-emitter leakage current	I_{GES}		20	0		25			240	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		8600		pF
Output capacitance	C_{oes}							150		pF
Reverse transfer capacitance	C_{res}							32		pF
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		150	25		332		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,74		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 2 \Omega$ $R_{goff} = 2 \Omega$	-5/15	350	90	25 125 150		47,6 46,2 45,6		ns
Rise time	t_r					25 125 150		10,6 12,2 13,2		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		133,4 151,8 156,2		ns
Fall time	t_f					25 125 150		7,04 7,09 7,7		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		0,737 1,12 1,21		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,367 0,706 0,798		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				150	25 125 150		1,67 1,66 1,66	1,92 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 650$ V				25			7,6	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,84		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=7000$ A/µs $di/dt=7124$ A/µs $di/dt=6971$ A/µs	-5/15	350	90	25 125 150		110,05 143,32 151,37		A
Reverse recovery time	t_{rr}					25 125 150		52,28 84,92 95,83		ns
Recovered charge	Q_r					25 125 150		3,8 7,08 8,09		µC
Reverse recovered energy	E_{rec}					25 125 150		0,853 1,61 1,85		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		2642 2119 2131		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	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0015	25	3,3	4	4,7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		150	25 125 150		1,7 1,89 1,94	2,22 ⁽¹⁾	V
Collector-emitter cut-off current	I_{CES}		0	650		25			80	µA
Gate-emitter leakage current	I_{GES}		20	0		25			240	nA
Internal gate resistance	r_g							None		Ω
Input capacitance	C_{ies}	$f = 1 \text{ Mhz}$	0	25		25		8600		pF
Output capacitance	C_{oes}							150		pF
Reverse transfer capacitance	C_{res}							32		pF
Gate charge	Q_g	$V_{CC} = 520 \text{ V}$	15		150	25		332		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4 \text{ W/mK}$ (PSX)						0,74		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$	$R_{gon} = 2 \text{ } \Omega$ $R_{goff} = 2 \text{ } \Omega$	-5/15	350	90	25 125 150		50,2 50,6 50		ns
Rise time	t_r					25 125 150		11,2 13,4 14		ns
Turn-off delay time	$t_{d(off)}$					25 125 150		114,2 134,4 138,6		ns
Fall time	t_f					25 125 150		5,07 7,41 8,47		ns
Turn-on energy (per pulse)	E_{on}					25 125 150		1,1 1,77 1,92		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,243 0,621 0,719		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				150	25 125 150		1,67 1,66 1,66	1,92 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 650$ V				25			7,6	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,84		K/W
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Dynamic

Peak recovery current	I_{RRM}	$di/dt=5600$ A/µs $di/dt=6000$ A/µs $di/dt=5796$ A/µs	-5/15	350	90	25 125 150		89,81 116,5 121,4		A
Reverse recovery time	t_{rr}					25 125 150		60,9 97,24 109,23		ns
Recovered charge	Q_r					25 125 150		3,6 6,94 7,94		µC
Reverse recovered energy	E_{rec}					25 125 150		0,692 1,33 1,53		mWs
Peak rate of fall of recovery current	$(di_{rr}/dt)_{max}$					25 125 150		1618 1020 864,39		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			150	25 125 150		1,18	1,66 1,61 1,59	1,82 ⁽¹⁾	V
Reverse leakage current	I_R	$V_i = 650$ V			25				1,8	μA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						0,64		K/W
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Capacitor (DC)

Static

Capacitance	C	DC bias voltage = 0 V			25			300		nF
Tolerance							-10		10	%
Dissipation factor		$f = 1$ kHz			25			2,5		%

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	

⁽¹⁾ Value at chip level

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



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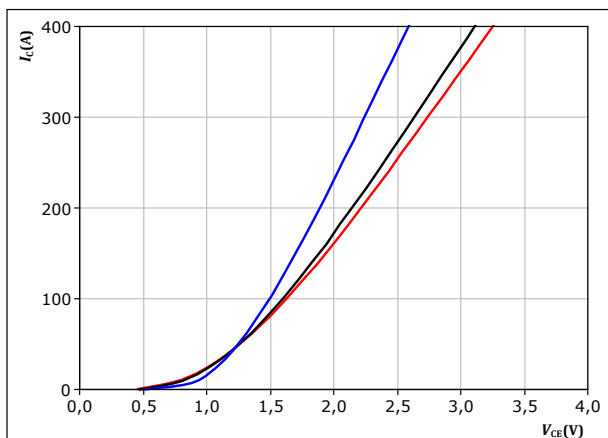
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Buck Switch Characteristics

figure 1. IGBT

Typical output characteristics

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



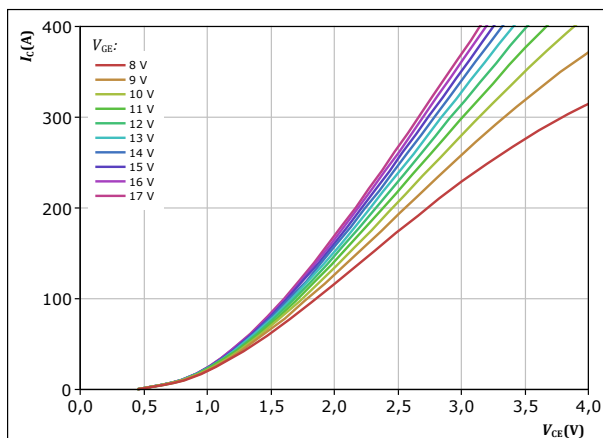
$t_p = 250 \mu s$
 $V_{GE} = 15 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 2. IGBT

Typical output characteristics

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

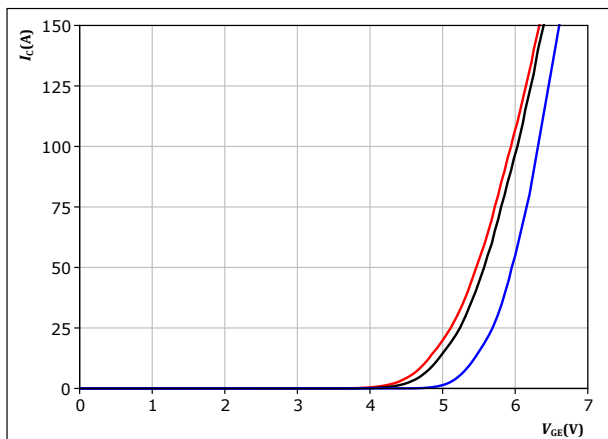


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 8 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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



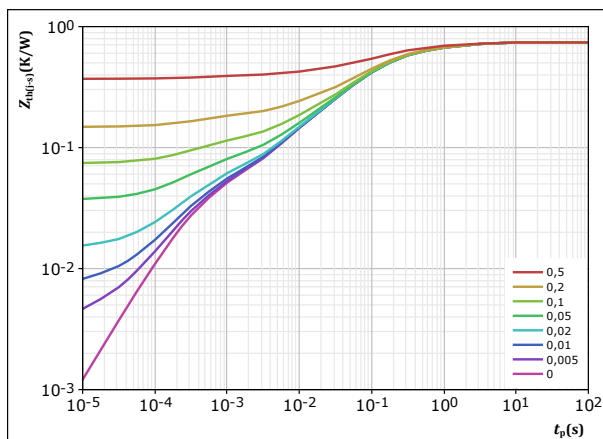
$t_p = 250 \mu s$
 $V_{CE} = 10 V$

T_j :
— 25 °C
— 125 °C
— 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,74 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
1,09E-01	1,94E+00
2,21E-01	2,60E-01
2,87E-01	6,98E-02
8,43E-02	8,29E-03
3,94E-02	3,67E-04



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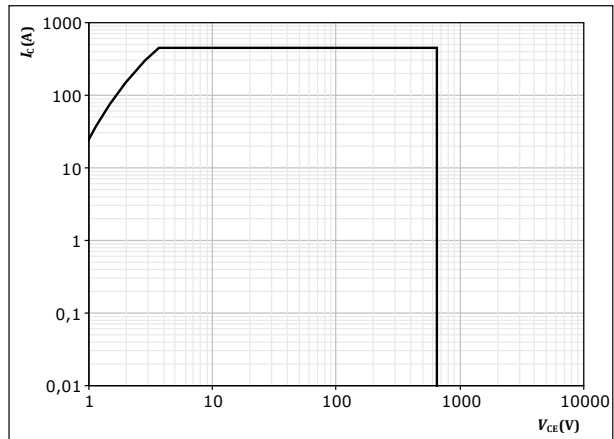
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Buck Switch Characteristics

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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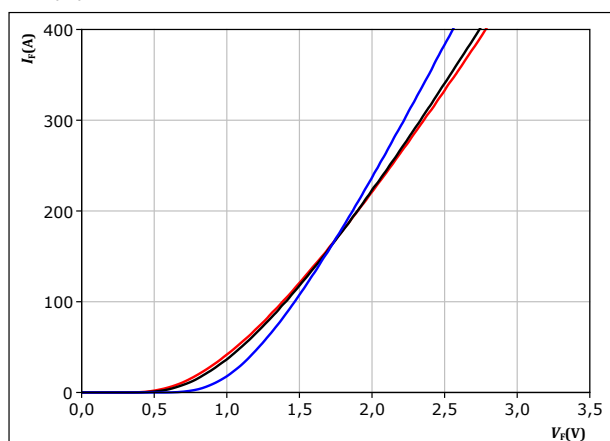
Buck Diode Characteristics

figure 6.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

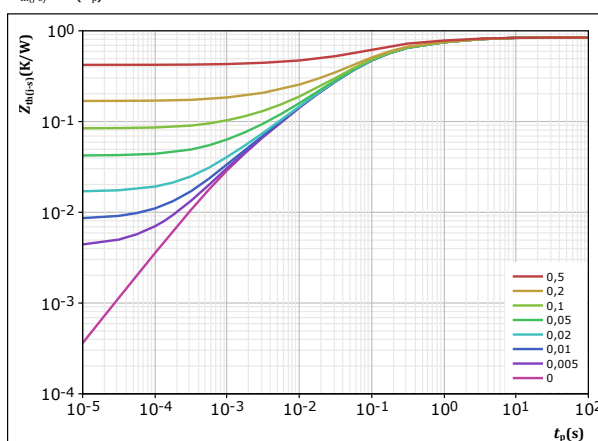
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 7.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T	
$R_{th(j-s)} =$	0,843	K/W
FWD thermal model values		
R (K/W)	τ (s)	
6,09E-02	4,33E+00	
1,45E-01	8,74E-01	
3,25E-01	1,39E-01	
2,06E-01	4,67E-02	
8,27E-02	9,15E-03	
2,35E-02	1,16E-03	



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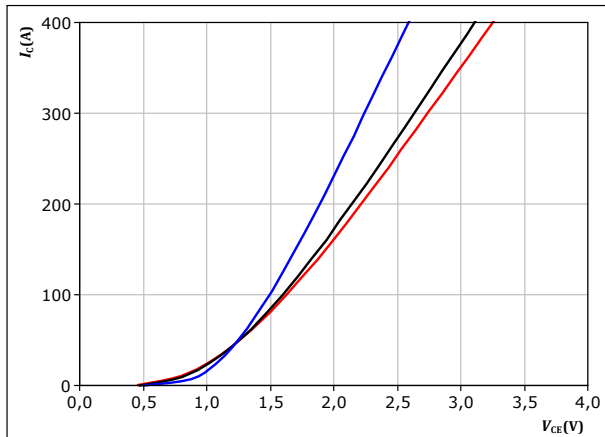
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Boost Switch Characteristics

figure 8. IGBT

Typical output characteristics

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

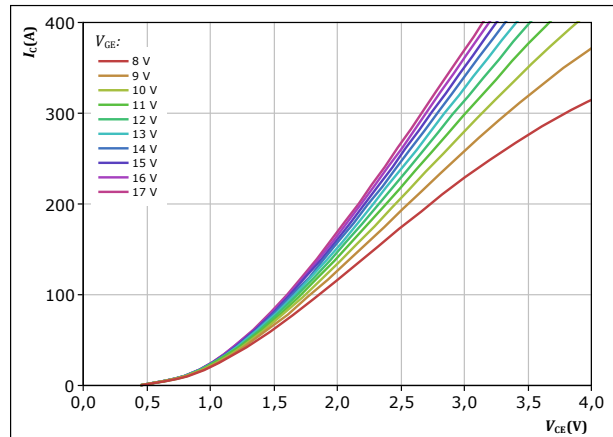


$t_p = 250 \mu s$
 $V_{GE} = 15 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 9. IGBT

Typical output characteristics

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

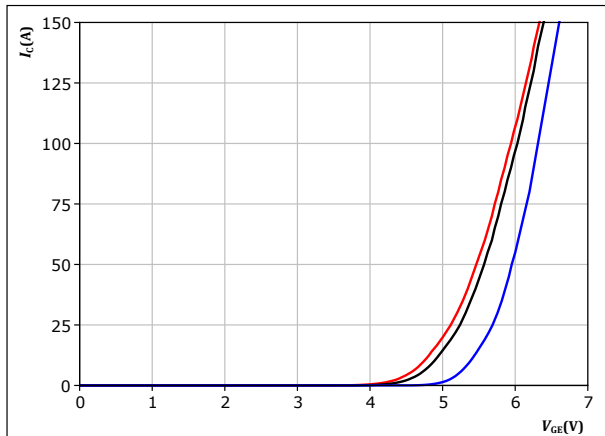


$t_p = 250 \mu s$
 $T_j = 150 ^\circ C$
 V_{GE} from 8 V to 17 V in steps of 1 V

figure 10. IGBT

Typical transfer characteristics

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

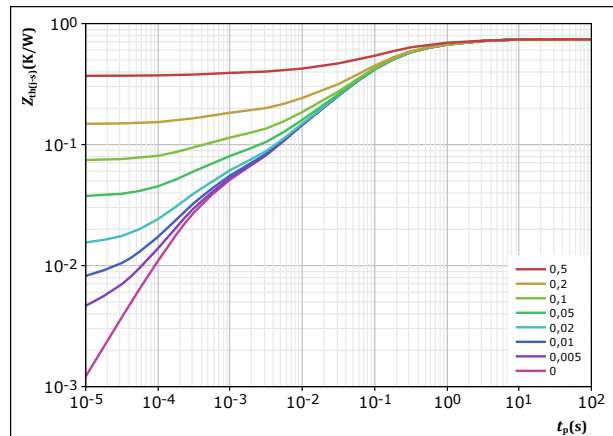


$t_p = 250 \mu s$
 $V_{CE} = 10 V$
 $T_j:$ 25 °C, 125 °C, 150 °C

figure 11. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 0,74 K/W$
IGBT thermal model values

$R (K/W)$	$\tau (s)$
1,09E-01	1,94E+00
2,21E-01	2,60E-01
2,87E-01	6,98E-02
8,43E-02	8,29E-03
3,94E-02	3,67E-04



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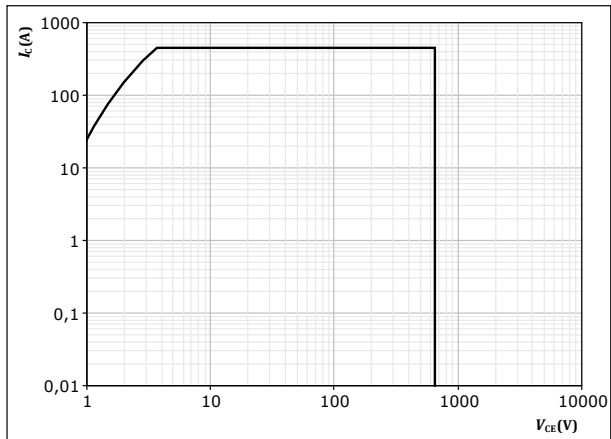
Boost Switch Characteristics

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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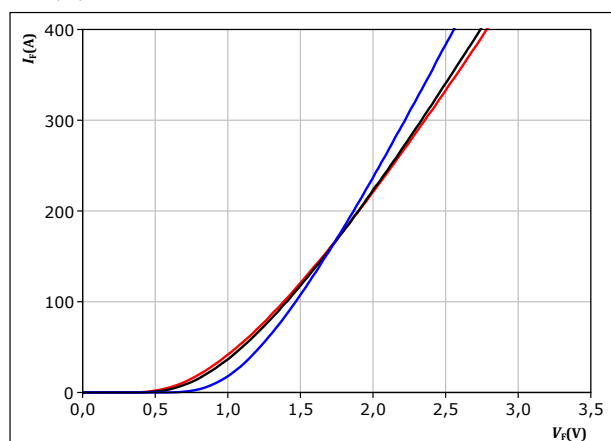
Boost Diode Characteristics

figure 13.

FWD

Typical forward characteristics

$$I_F = f(V_F)$$



$t_p = 250 \mu s$

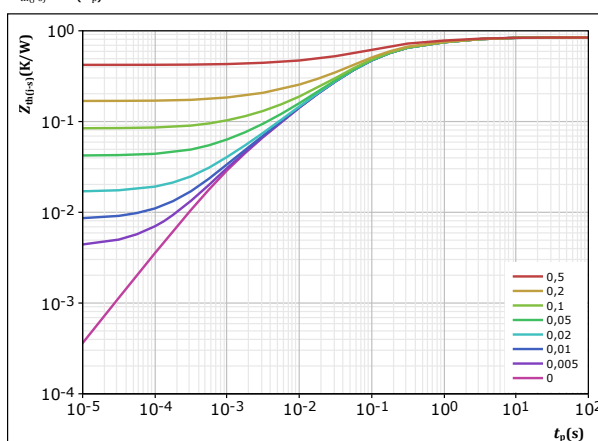
T_j :
— 25 °C
— 125 °C
— 150 °C

figure 14.

FWD

Transient thermal impedance as a function of pulse width

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



$D =$	t_p / T
$R_{th(j-s)} =$	0,843 K/W
FWD thermal model values	
R (K/W)	τ (s)
6,09E-02	4,33E+00
1,45E-01	8,74E-01
3,25E-01	1,39E-01
2,06E-01	4,67E-02
8,27E-02	9,15E-03
2,35E-02	1,16E-03



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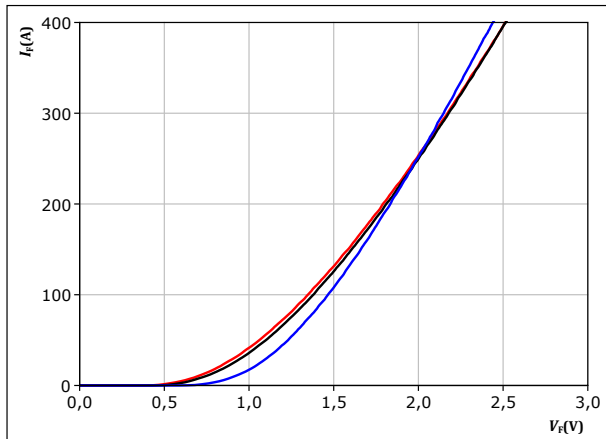
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Boost Sw. Inv. Diode Characteristics

figure 15. FWD

Typical forward characteristics

$$I_F = f(V_F)$$



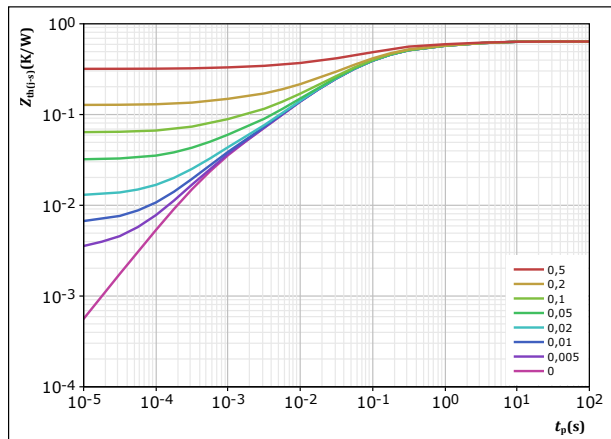
$t_p = 250 \mu s$

T_j : 25 °C, 125 °C, 150 °C

figure 16. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$

$R_{th(j-s)} = 0,638 \text{ K/W}$

FWD thermal model values

$R \text{ (K/W)}$	$\tau \text{ (s)}$
6,14E-02	3,48E+00
1,03E-01	5,85E-01
2,81E-01	9,46E-02
1,21E-01	2,14E-02
4,83E-02	5,07E-03
2,26E-02	5,92E-04



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Thermistor Characteristics

figure 17.

Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$





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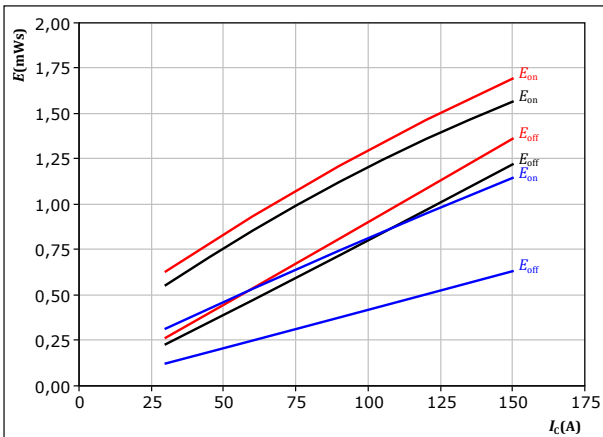
Buck Switching Characteristics

figure 18.

IGBT

Typical switching energy losses as a function of collector current

$$E = f(I_C)$$



With an inductive load at

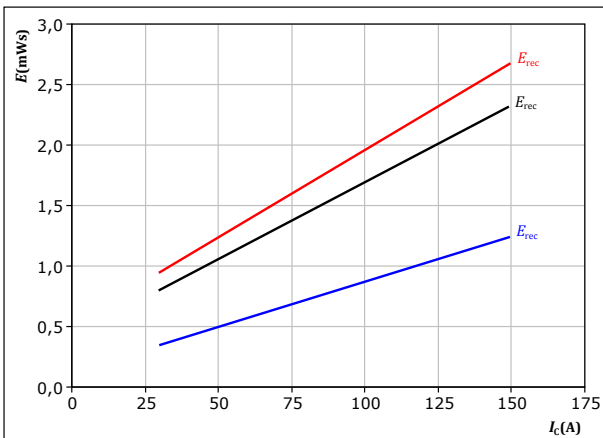
$V_{CE} =$	350	V	$T_j:$	25 °C
$V_{GE} =$	-5/15	V		125 °C
$R_{gon} =$	2	Ω		150 °C
$R_{goff} =$	2	Ω		

figure 20.

FWD

Typical reverse recovered energy loss as a function of collector current

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



With an inductive load at

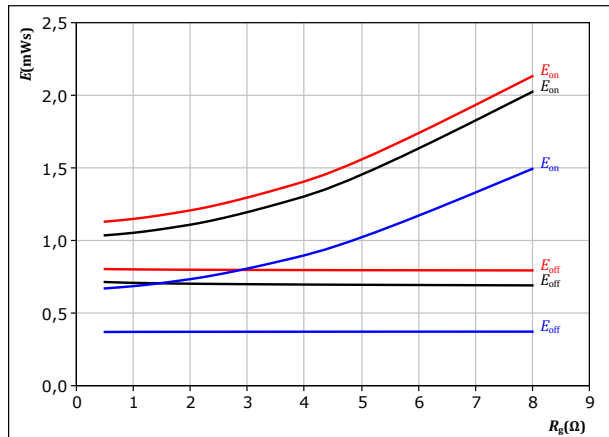
$V_{CE} =$	350	V	$T_j:$	25 °C
$V_{GE} =$	-5/15	V		125 °C
$R_{gon} =$	2	Ω		150 °C

figure 19.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

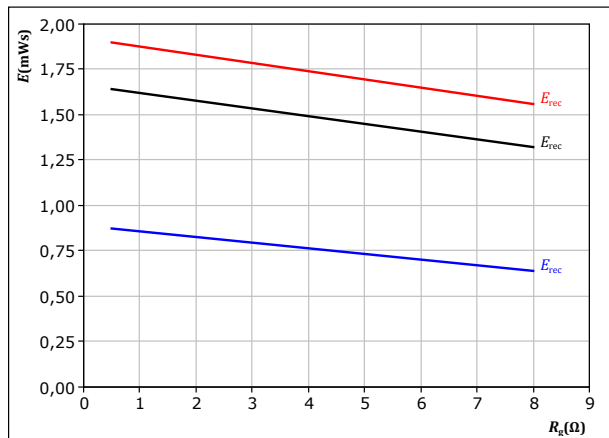
$V_{CE} =$	350	V	$T_j:$	25 °C
$V_{GE} =$	-5/15	V		125 °C
$I_C =$	90	A		150 °C

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	$T_j:$	25 °C
$V_{GE} =$	-5/15	V		125 °C
$I_C =$	90	A		150 °C



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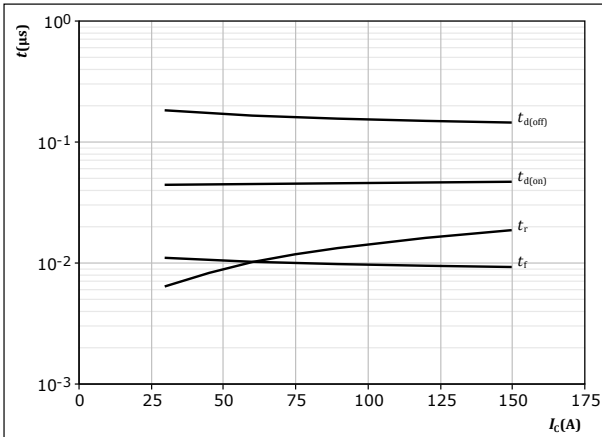
10-FY07NPA150SM02-L365F08 datasheet

Buck Switching Characteristics

figure 22.

IGBT

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



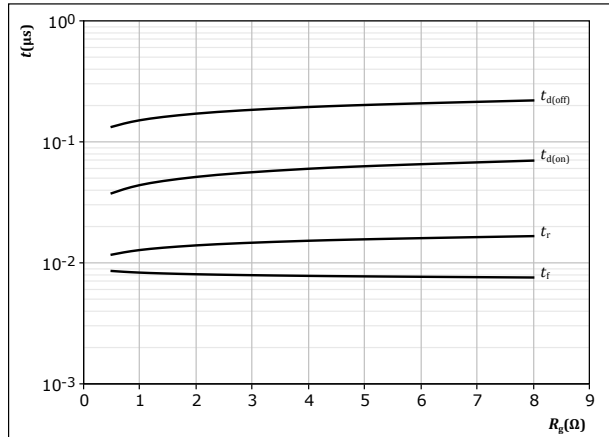
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω

figure 23.

IGBT

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



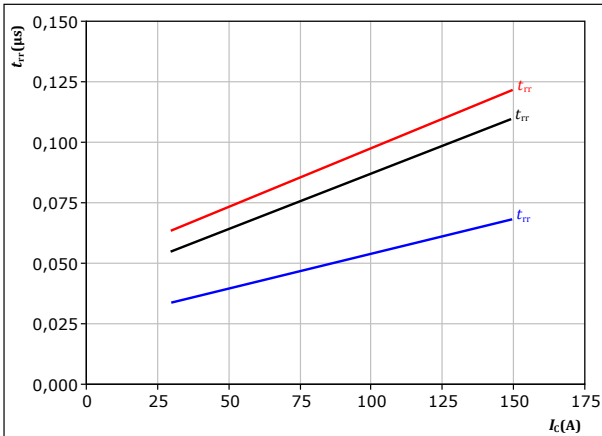
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 90$ A

figure 24.

FWD

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



With an inductive load at

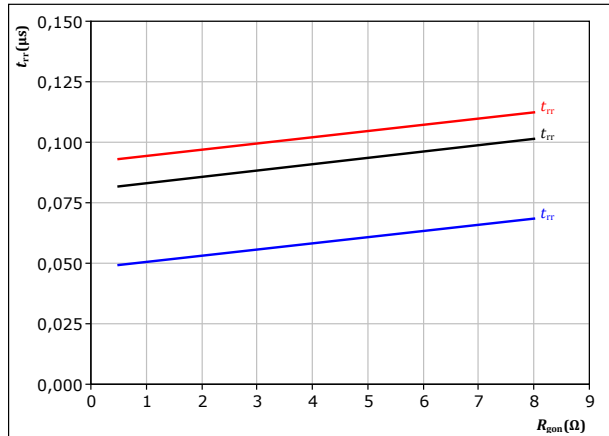
$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω

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
 $I_C = 90$ A

T_j :
— 25 °C
— 125 °C
— 150 °C



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datasheet

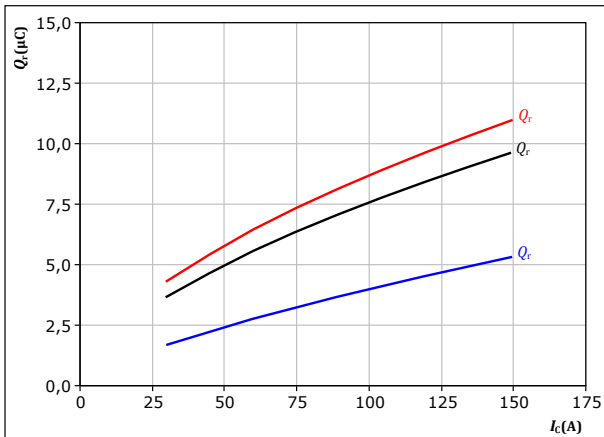
Buck Switching Characteristics

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω

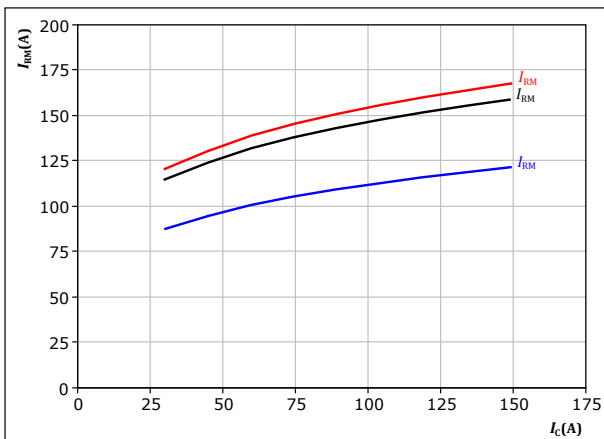
T_j : 25 °C
125 °C
150 °C

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω

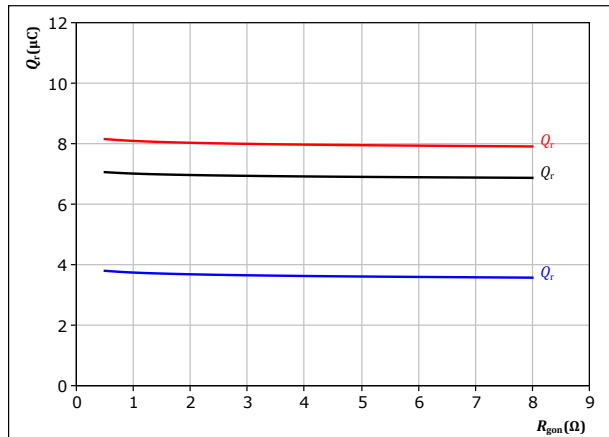
T_j : 25 °C
125 °C
150 °C

figure 27.

FWD

Typical recovered charge as a function of turn on gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_c = 90$ A

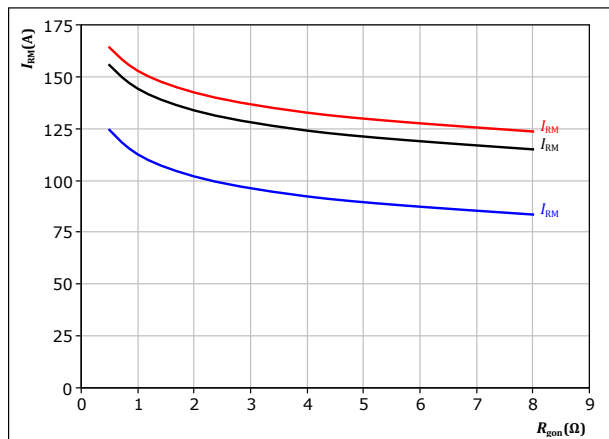
T_j : 25 °C
125 °C
150 °C

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

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_c = 90$ A

T_j : 25 °C
125 °C
150 °C



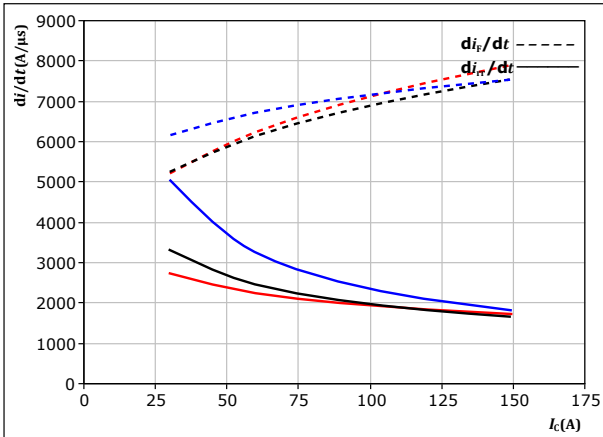
Vincotech

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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
 $di_f/dt, di_r/dt = f(I_C)$



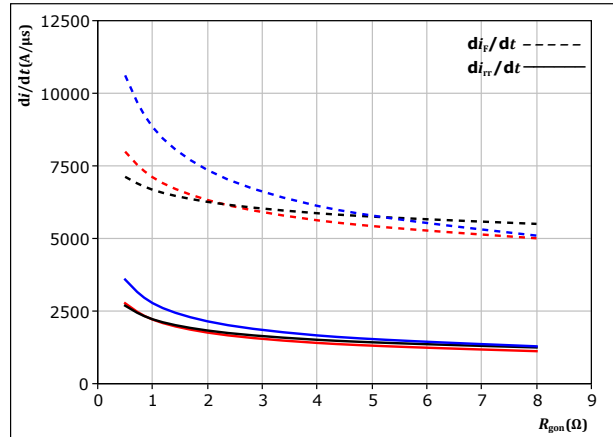
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω
 $T_j = 25$ °C
 $T_j = 125$ °C
 $T_j = 150$ °C

figure 31. FWD

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

$di_f/dt, di_r/dt = f(R_{gon})$



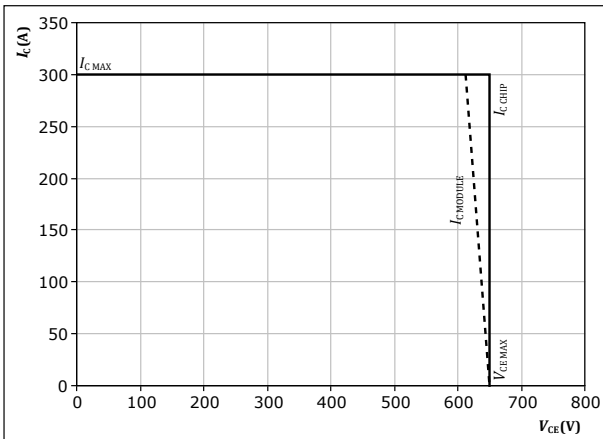
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 90$ A
 $T_j = 25$ °C
 $T_j = 125$ °C
 $T_j = 150$ °C

figure 32. IGBT

Reverse bias safe operating area

$I_C = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω



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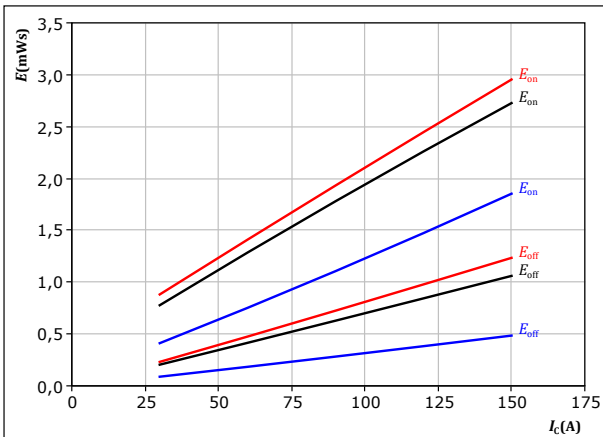
Boost Switching Characteristics

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω

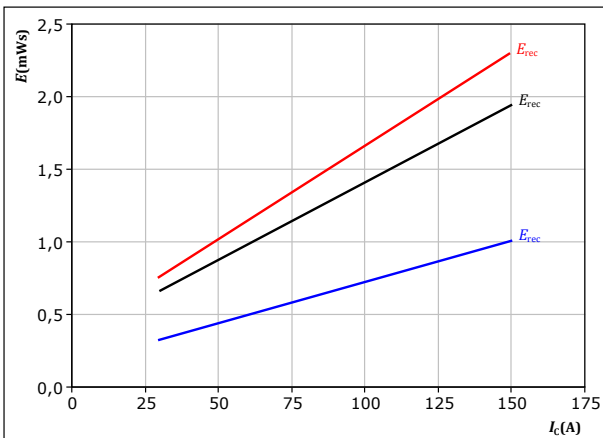
T_j : 25 °C
125 °C
150 °C

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
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω

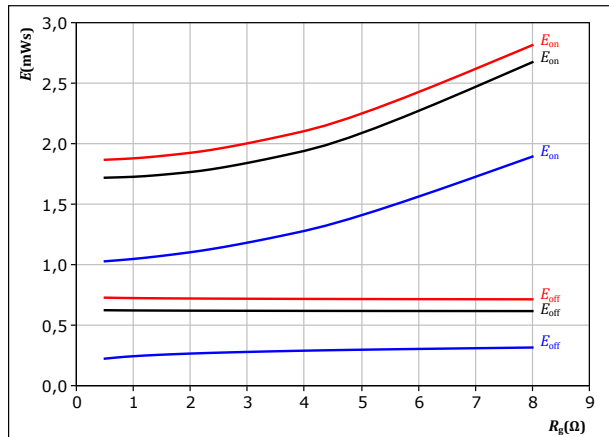
T_j : 25 °C
125 °C
150 °C

figure 34.

IGBT

Typical switching energy losses as a function of gate resistor

$$E = f(R_g)$$



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 90$ A

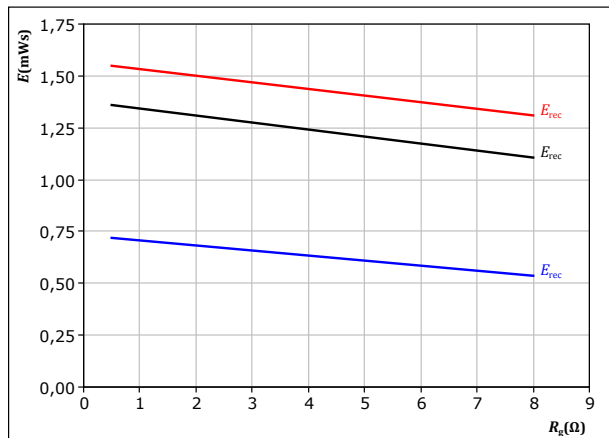
T_j : 25 °C
125 °C
150 °C

figure 36.

FWD

Typical reverse recovered energy loss as a function of gate resistor

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



With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 90$ A

T_j : 25 °C
125 °C
150 °C



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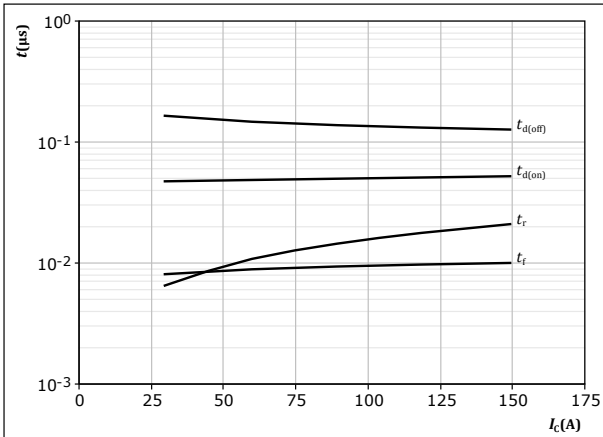
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Boost Switching Characteristics

figure 37.

IGBT

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



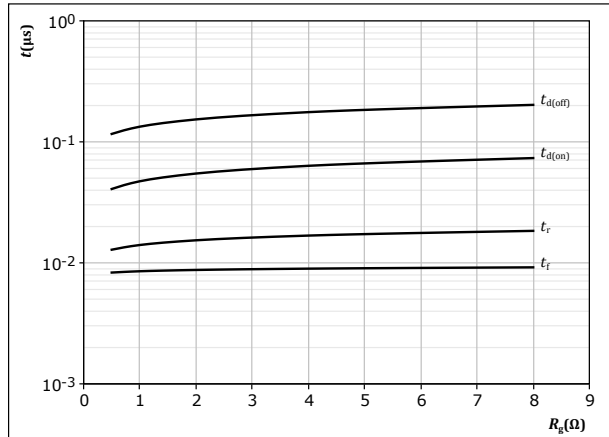
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω

figure 38.

IGBT

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



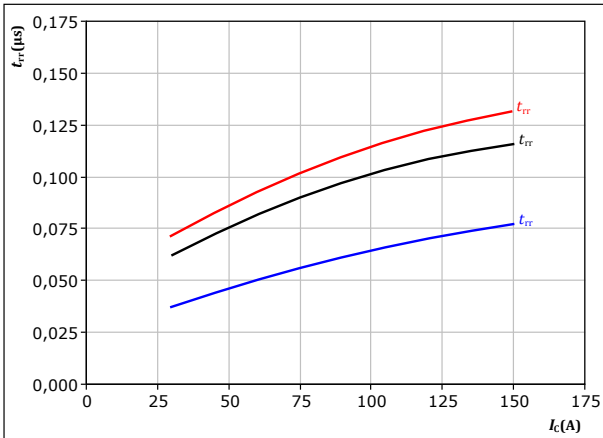
With an inductive load at

$T_j = 150$ °C
 $V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_c = 90$ A

figure 39.

FWD

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



With an inductive load at

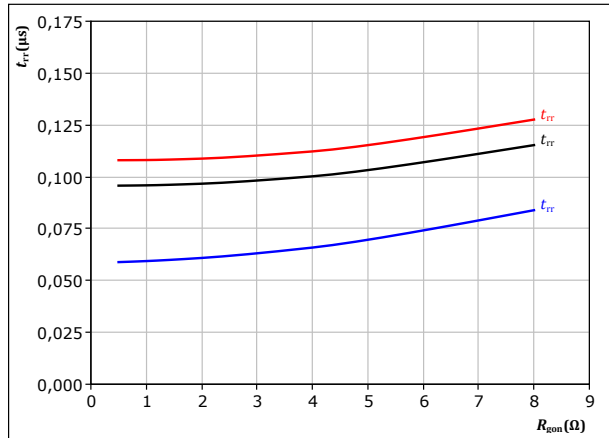
$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ Ω

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

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_c = 90$ A

T_j : — 25 °C
— 125 °C
— 150 °C



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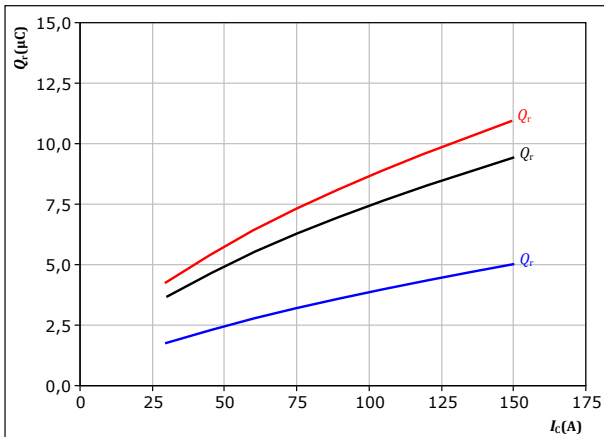
Boost Switching Characteristics

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
 $R_{gon} = 2$ Ω

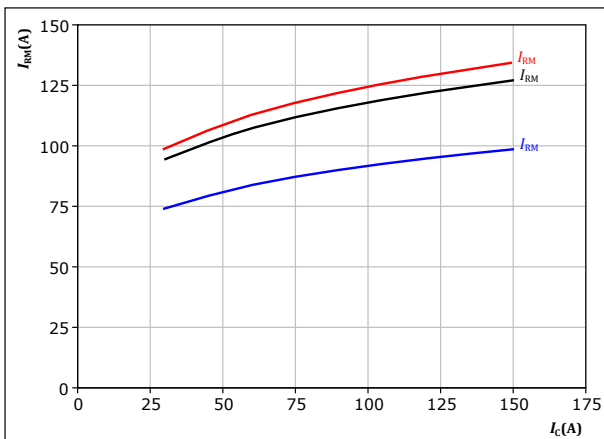
T_j : 25 °C
125 °C
150 °C

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
 $R_{gon} = 2$ Ω

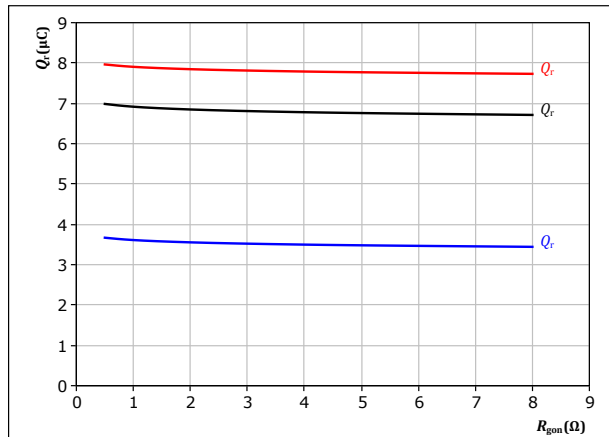
T_j : 25 °C
125 °C
150 °C

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
 $I_c = 90$ A

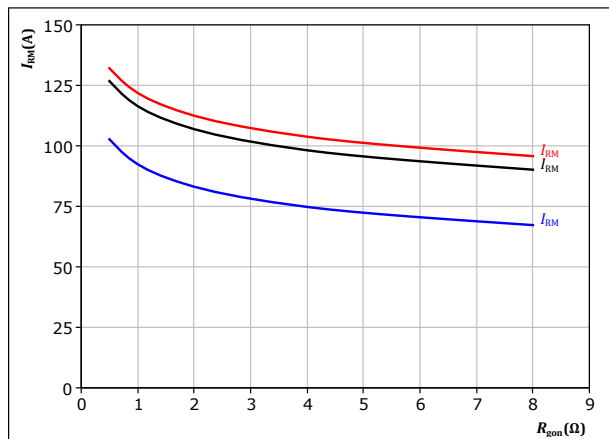
T_j : 25 °C
125 °C
150 °C

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
 $I_c = 90$ A

T_j : 25 °C
125 °C
150 °C



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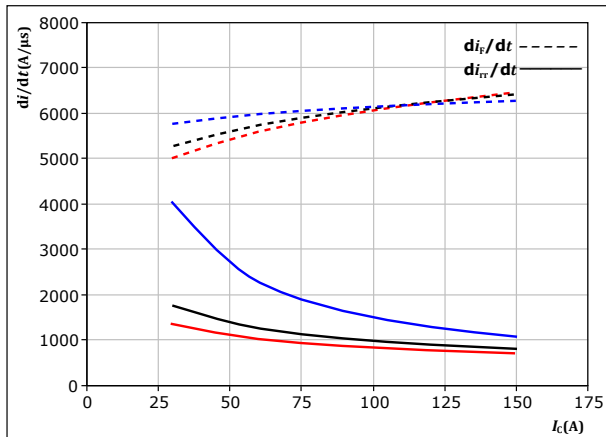
10-FY07NPA150SM02-L365F08

datasheet

Boost Switching Characteristics

figure 45. FWD

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



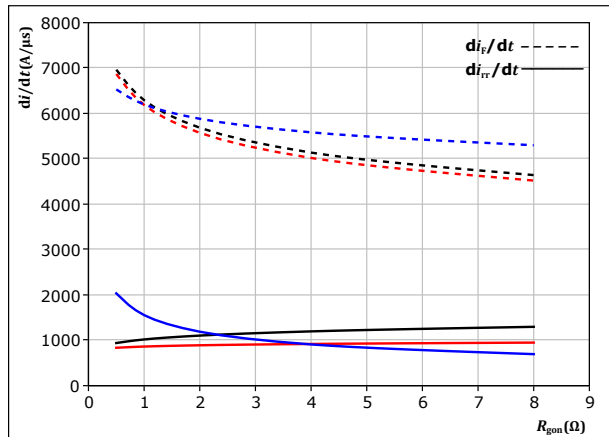
With an inductive load at

$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $R_{gon} = 2$ 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

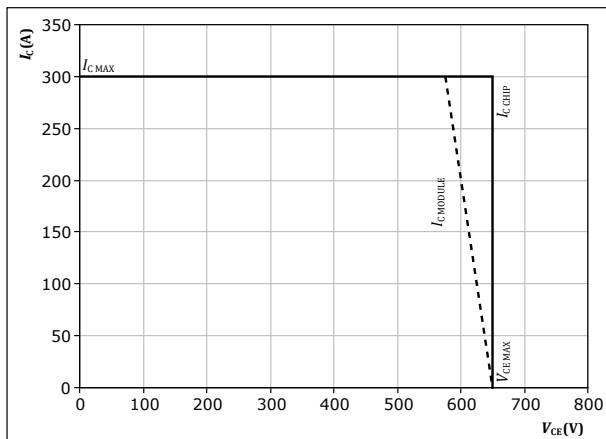
$V_{CE} = 350$ V
 $V_{GE} = -5/15$ V
 $I_C = 90$ A

$T_j = 25$ °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
 $R_{gon} = 2$ Ω
 $R_{goff} = 2$ Ω



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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})

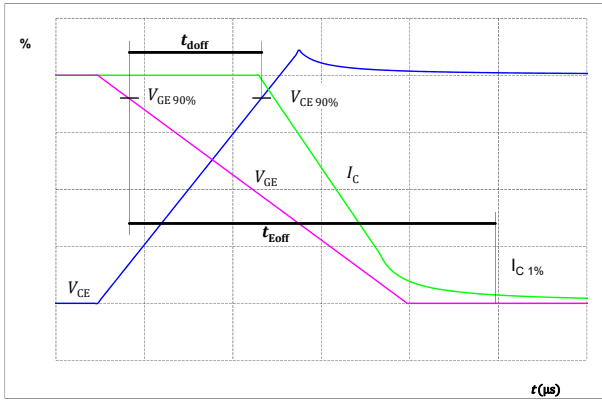


figure 49. IGBT

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

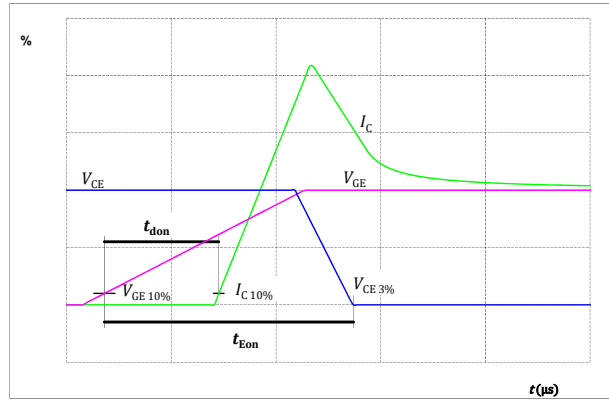


figure 50. IGBT

Turn-off Switching Waveforms & definition of t_f

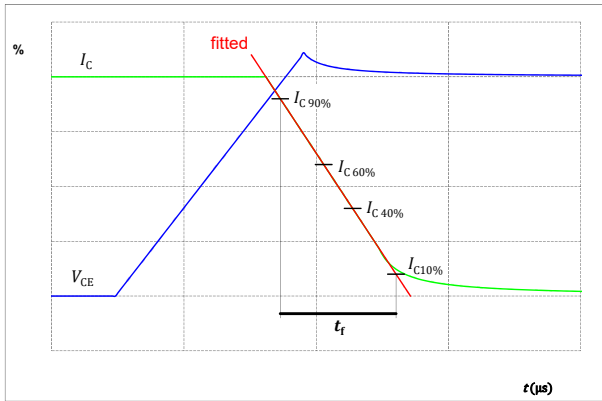
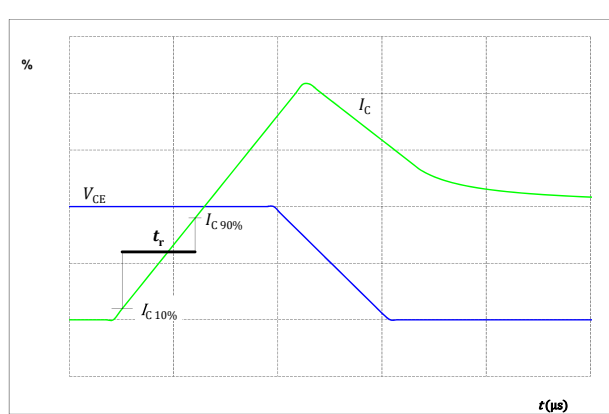


figure 51. IGBT

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}

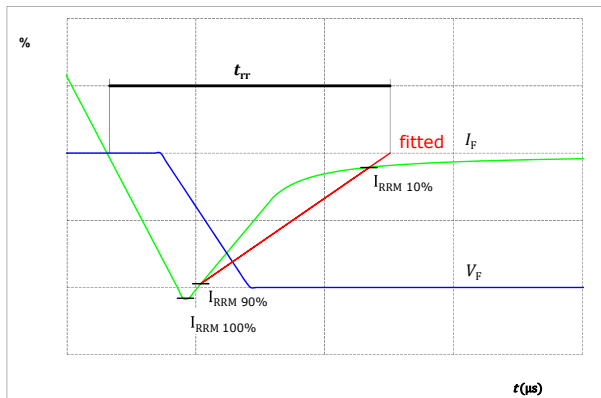
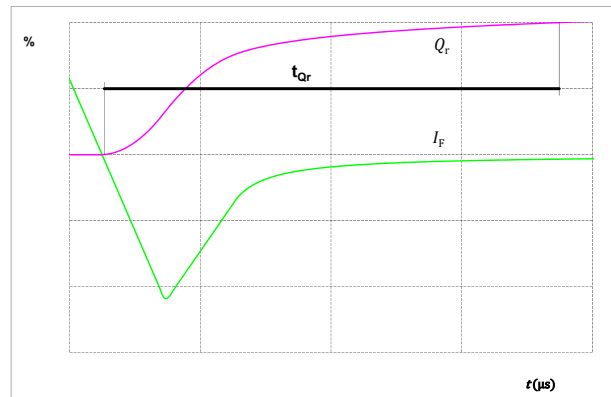


figure 53.

FWD


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





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datasheet

Ordering Code	
Version	Ordering Code
Without thermal paste	10-FY07NPA150SM02-L365F08
With thermal paste	10-FY07NPA150SM02-L365F08-/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		
		TTTTTV	LLLLL	SSSS	WWYY		

Outline

Pin table [mm]			
Pin	X	Y	Function
1	52,2	6,9	Therm1
2	52,2	0	Therm2
3	36,2	6,75	S4
4	33,2	7,9	G14
5	33,2	4,9	G18
6	9,2	5,75	S2
7	6,2	6,9	G12
8	6,2	3,9	G16
9	2,7	0	DC-
10	0	0	DC-
11	2,7	2,7	DC-
12	0	2,7	DC-
13	2,7	5,4	DC-
14	0	5,4	DC-
15	2,7	12,75	GND
16	0	12,75	GND
17	2,7	15,45	GND
18	0	15,45	GND
19	2,7	22,8	DC+
20	0	22,8	DC+
21	2,7	25,5	DC+
22	0	25,5	DC+
23	2,7	28,2	DC+
24	0	28,2	DC+
25	18,3	22,45	S1
26	21,3	21,3	G15
27	21,3	24,3	G11
28	43	22,15	S3
29	46	21	G17
30	46	24	G13
31	52,2	20,1	Ph
32	49,5	22,8	Ph
33	52,2	22,8	Ph
34	49,5	25,5	Ph
35	52,2	25,5	Ph
36	49,5	28,2	Ph
37	52,2	28,2	Ph

Side view of the PCB showing the thickness and pin locations. The thickness is indicated as 1.6 ± 0.05 mm. The pins are shown protruding from the top surface.

Top view of the PCB showing pin locations and dimensions. The dimensions are 26.1 mm in width and 18.4 mm in height. The pin locations are marked with numbers 1 through 37. The coordinate system (X, Y) is shown with the origin at the bottom-left corner.

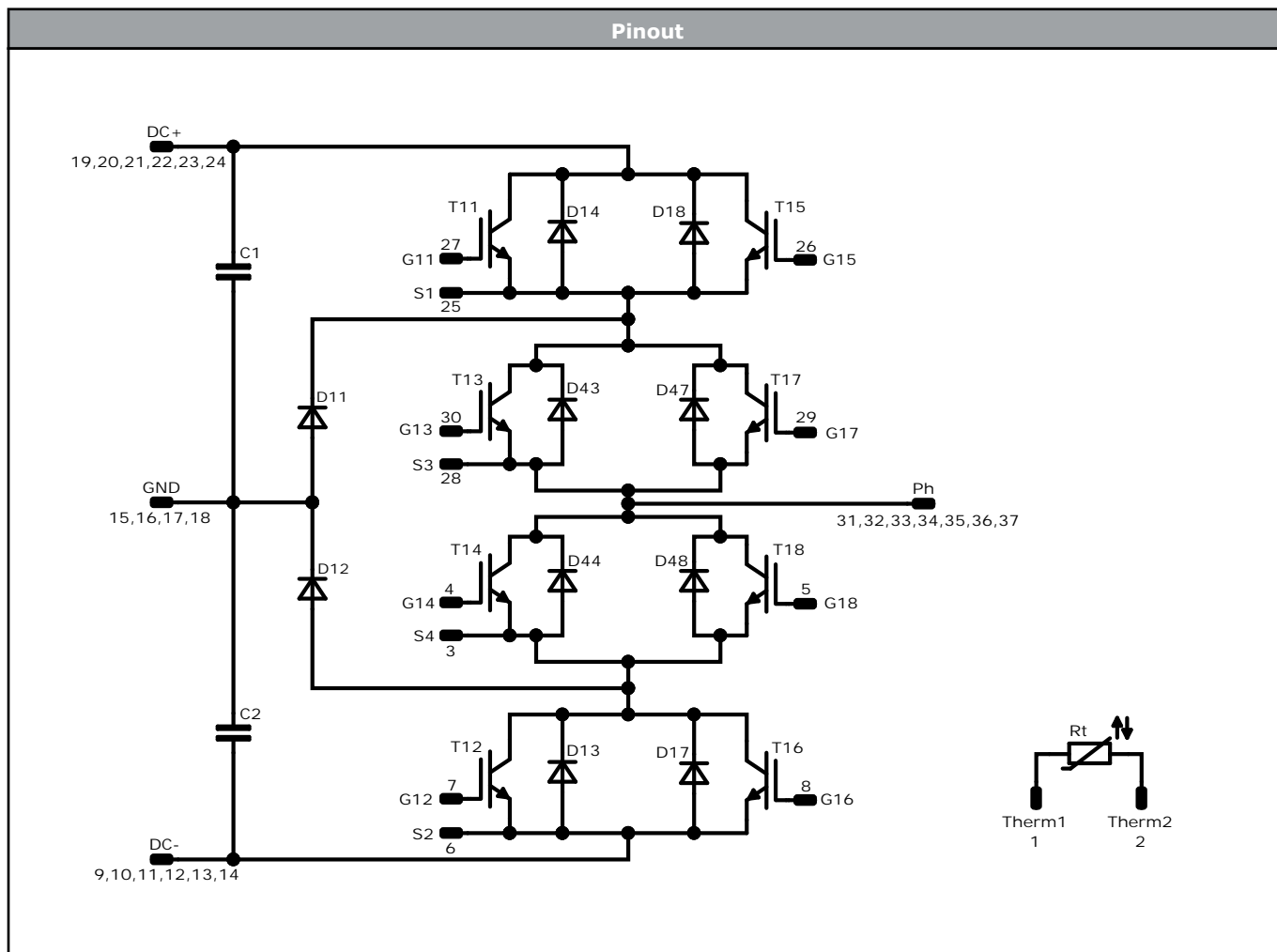
Tolerance of pinpositions: ±0.5mm at the end of pins
Dimension of coordinate axis is only offset without tolerance



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datasheet



Identification					
ID	Component	Voltage	Current	Function	Comment
T11, T15, T12, T16	IGBT	650 V	150 A	Buck Switch	Parallel devices with separate control. Values apply to complete device (T11 T15, T12 T16).
D11, D12	FWD	650 V	150 A	Buck Diode	
T13, T17, T14, T18	IGBT	650 V	150 A	Boost Switch	Parallel devices with separate control. Values apply to complete device (T13 T17, T14 T18).
D13, D17, D14, D18	FWD	650 V	150 A	Boost Diode	Parallel devices. Values apply to complete device (D13 D17, D14 D18).
D44, D48, D43, D47	FWD	650 V	150 A	Boost Sw. Inv. Diode	Parallel devices. Values apply to complete device (D44 D48, D43 D47).
C1, C2	Capacitor	630 V		Capacitor (DC)	
Rt	Thermistor			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.

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-FY07NPA150SM02-L365F08-D8-14	17 Mar. 2021	Correct Vce conditions from 700V to 350V for Buck & Boost Switches and Diodes in all dynamic & switching characteristics	4-7, 17-24

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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.