



flowBOOST 0 dual

650 V / 30 A

Topology features

- Dual Booster
- Integrated DC capacitor
- Kelvin Emitter for improved switching performance
- Temperature sensor

Component features

- High efficiency in hard switching and resonant topologies
- High speed switching
- Low gate charge

Housing features

- Base isolation: Al₂O₃
- Clip-in, reliable mechanical connection, qualified for wave soldering
- Convex shaped substrate for superior thermal contact
- Thermo-mechanical push-and-pull force relief
- Solder pin

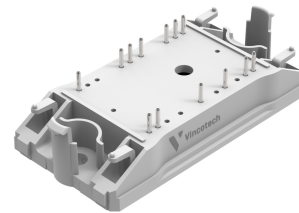
Target applications

- Charging Stations
- Power Supply
- Solar Inverters
- UPS

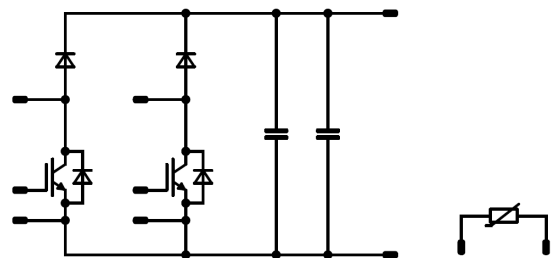
Types

- 10-FZ07B2A030SM08-M575L408

flow 0 12 mm housing



Schematic





Vincotech

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Boost Switch				
Collector-emitter voltage	V_{CES}		650	V
Collector current (DC current)	I_C	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	32	A
Repetitive peak collector current	I_{CRM}	t_p limited by T_{jmax}	90	A
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	60	W
Gate-emitter voltage	V_{GES}		± 20	V
Maximum junction temperature	T_{jmax}		175	°C

Boost Diode

Peak repetitive reverse voltage	V_{RRM}		650	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	24	A
Repetitive peak forward current	I_{FRM}	t_p limited by T_{jmax}	75	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 25\text{ °C}$	142	A
Surge current capability	I^2t		100	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	62	W
Maximum junction temperature	T_{jmax}		175	°C

Boost Sw. Protection Diode

Peak repetitive reverse voltage	V_{RRM}		1600	V
Forward current (DC current)	I_F	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	38	A
Surge (non-repetitive) forward current	I_{FSM}	Single Half Sine Wave, $t_p = 10\text{ ms}$ $T_j = 150\text{ °C}$	200	A
Surge current capability	I^2t		200	A ² s
Total power dissipation	P_{tot}	$T_j = T_{jmax}$ $T_s = 80\text{ °C}$	46	W
Maximum junction temperature	T_{jmax}		150	°C



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10-FZ07B2A030SM08-M575L408
datasheet

Maximum Ratings

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

Parameter	Symbol	Conditions	Value	Unit
Capacitor (DC)				
Maximum DC voltage	V_{MAX}		630	V
Operation Temperature	T_{op}		-55 ... 150	°C

Module Properties

Thermal Properties

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

Isolation Properties

Isolation voltage	V_{isol}	DC Test Voltage* $t_p = 2\text{ s}$	6000	V
Isolation voltage	V_{isol}	AC Voltage $t_p = 1\text{ min}$	2500	V
Creepage distance			>12,7	mm
Clearance			>12,7	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		

Boost Switch

Static

Gate-emitter threshold voltage	$V_{GE(th)}$	$V_{CE} = V_{GE}$			0,0003	25	3,3	4	4,7	V
Collector-emitter saturation voltage	$V_{CE(sat)}$		15		30	25 125 150		1,67 1,8 1,84	2,22 ⁽¹⁾	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}							1800		pF
Output capacitance	C_{oes}	$f = 1$ Mhz	0	25		25		45		pF
Reverse transfer capacitance	C_{res}							7		pF
Gate charge	Q_g	$V_{CC} = 520$ V	15		30	25		70		nC

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,57		K/W
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Dynamic

Turn-on delay time	$t_{d(on)}$					25 125 150		21,12 20,48 20,16		ns
Rise time	t_r					25 125 150		9,28 10,24 10,56		ns
Turn-off delay time	$t_{d(off)}$		0/15	400	30	25 125 150		134,4 151,68 156,8		ns
Fall time	t_f					25 125 150		4,96 10,39 12,31		ns
Turn-on energy (per pulse)	E_{on}	$Q_{tFWD} = 0,051$ μC $Q_{tFWD} = 0,049$ μC $Q_{tFWD} = 0,05$ μC				25 125 150		0,335 0,34 0,347		mWs
Turn-off energy (per pulse)	E_{off}					25 125 150		0,148 0,262 0,292		mWs



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10-FZ07B2A030SM08-M575L408
datasheet

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			16	25 125 150		1,49 1,75 1,87	1,8 ⁽¹⁾		V
Reverse leakage current	I_R	$V_r = 650$ V			25		20	102		μA
Thermal										
Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)					1,54			K/W
Dynamic										
Peak recovery current	I_{RM}	$di/dt=3122$ A/μs $di/dt=2852$ A/μs $di/dt=2764$ A/μs	0/15	400	30	25		9,5		A
						125		9,2		
						150		9,07		
Reverse recovery time	t_{rr}					25		8,4		ns
						125		8,68		
						150		8,8		
Recovered charge	Q_r					25		0,051		μC
						125		0,049		
						150		0,05		
Reverse recovered energy	E_{rec}					25		$9,153 \times 10^{-3}$		mWs
						125		$8,946 \times 10^{-3}$		
						150		$9,178 \times 10^{-3}$		
Peak rate of fall of recovery current	$(di_r/dt)_{max}$					25		2953		A/μs
						125		2573		
						150		2532		



Characteristic Values

Parameter	Symbol	Conditions					Values			Unit
		V_{GS} [V]	V_{GE} [V]	V_{DS} [V]	V_{CE} [V]	T_j [°C]	Min	Typ	Max	

Boost Sw. Protection Diode

Static

Forward voltage	V_F				18	25 125 150		1,06 0,994 0,973	1,5 ⁽¹⁾	V
Reverse leakage current	I_R	$V_r = 1600$ V				25 150			100 1000	µA

Thermal

Thermal resistance junction to sink ⁽²⁾	$R_{th(j-s)}$	$\lambda_{paste} = 3,4$ W/mK (PSX)						1,54		K/W
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Capacitor (DC)

Static

Capacitance	C	DC bias voltage = 0 V				25		33		nF
Tolerance							-5		5	%

Thermistor

Static

Rated resistance	R					25		22		kΩ
Deviation of R_{100}	$A_{R/R}$	$R_{100} = 1484$ Ω				100	-5		5	%
Power dissipation	P					25		130		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.

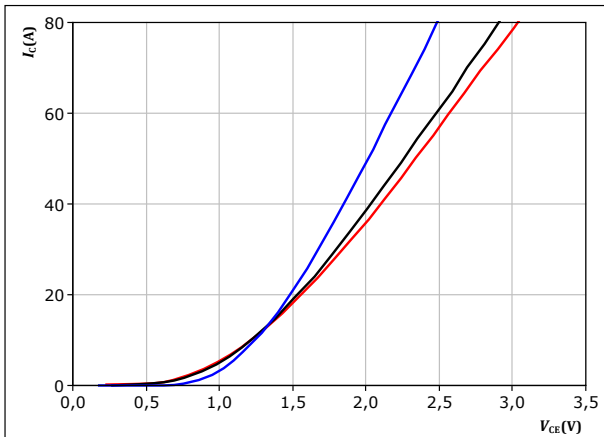


Boost Switch Characteristics

figure 1. IGBT

Typical output characteristics

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



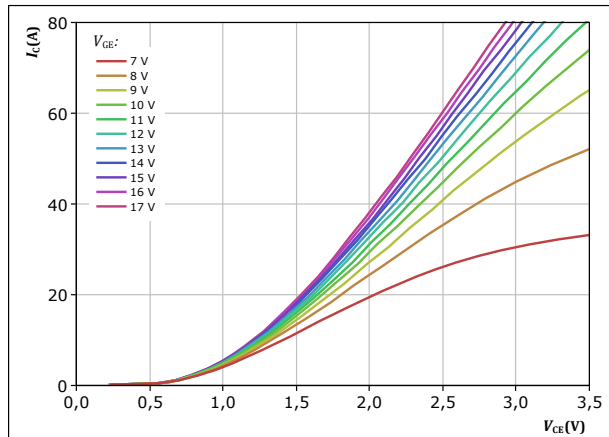
$t_p = 250 \mu s$
 $V_{GE} = 15 V$

$T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 2. IGBT

Typical output characteristics

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

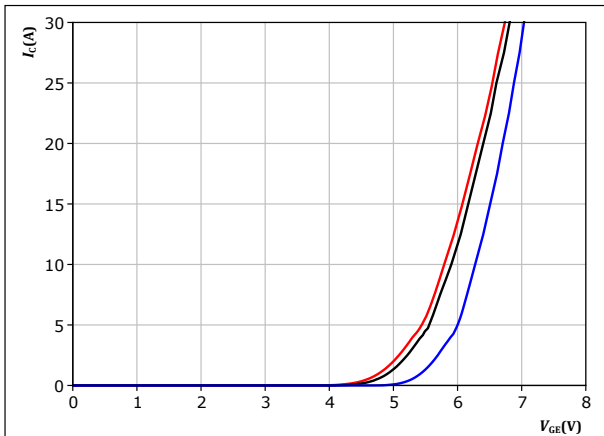


$t_p = 250 \mu s$
 $T_j = 150 \text{ °C}$
 V_{GE} from 7 V to 17 V in steps of 1 V

figure 3. IGBT

Typical transfer characteristics

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



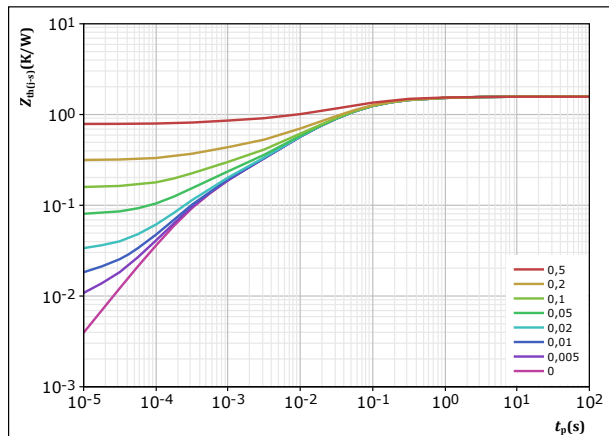
$t_p = 250 \mu s$
 $V_{CE} = 10 V$

$T_j:$ — 25 °C
— 125 °C
— 150 °C

figure 4. IGBT

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,572 \text{ K/W}$

IGBT thermal model values

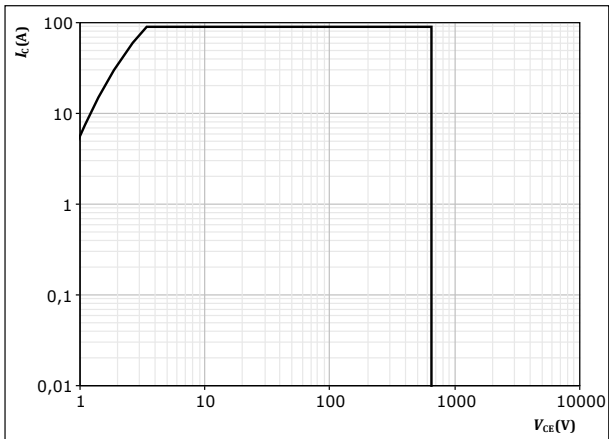
R (K/W)	τ (s)
7,66E-02	1,73E+00
2,00E-01	2,58E-01
6,54E-01	5,93E-02
3,77E-01	1,31E-02
1,51E-01	2,99E-03
1,13E-01	3,69E-04



Boost Switch Characteristics

figure 5. IGBT

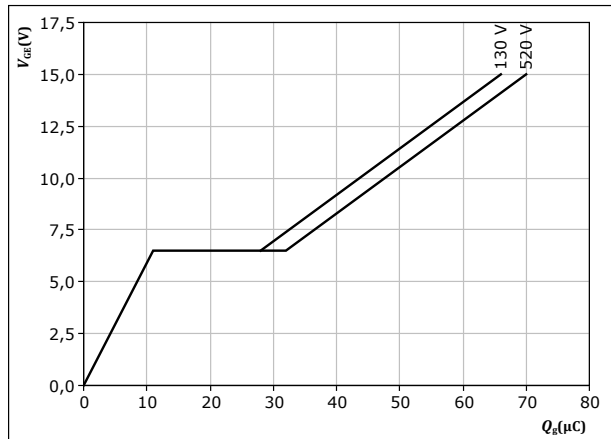
Safe operating area
 $I_C = f(V_{CE})$



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

figure 6. IGBT

Gate voltage vs gate charge
 $V_{GE} = f(Q_g)$



$I_C = 30$ A
 $T_j = 25$ °C



Boost Diode Characteristics

figure 7. FWD

Typical forward characteristics

$$I_F = f(V_F)$$

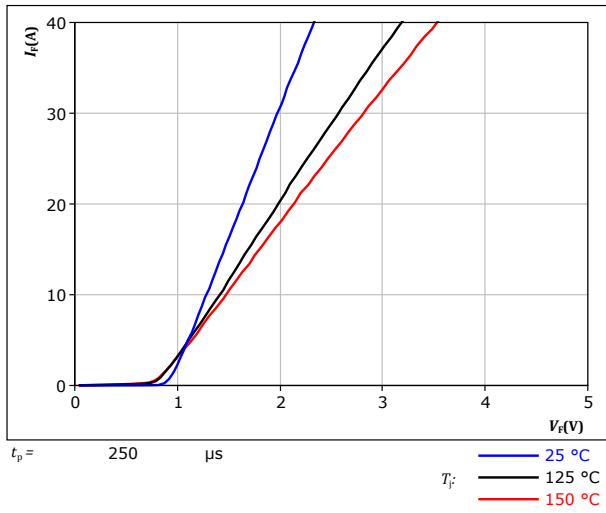
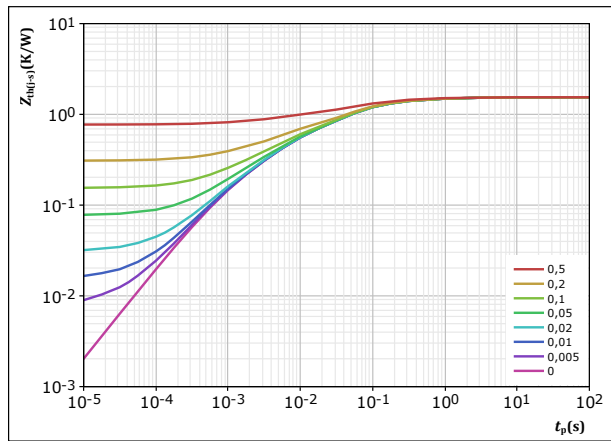


figure 8. FWD

Transient thermal impedance as a function of pulse width

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



$D = t_p / T$
 $R_{th(j-s)} = 1,543 \text{ K/W}$
 FWD thermal model values

R (K/W)	τ (s)
8,00E-02	2,02E+00
2,86E-01	2,25E-01
7,15E-01	4,66E-02
3,66E-01	5,33E-03
9,56E-02	8,10E-04



Boost Sw. Protection Diode Characteristics

figure 9. Rectifier

Typical forward characteristics

$$I_F = f(V_F)$$

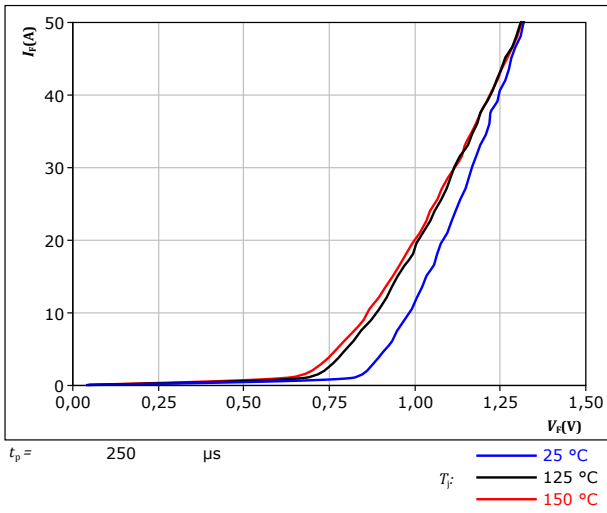
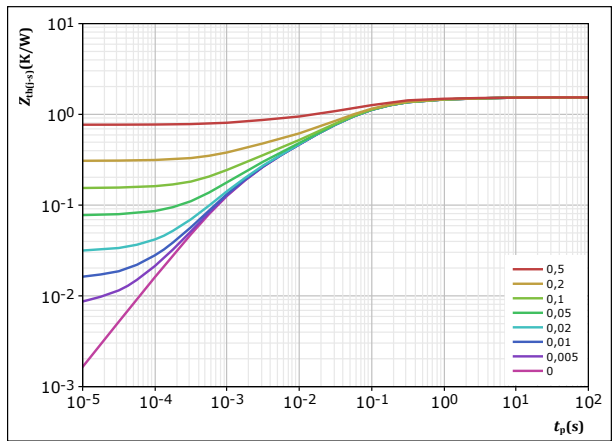


figure 10. Rectifier

Transient thermal impedance as a function of pulse width

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



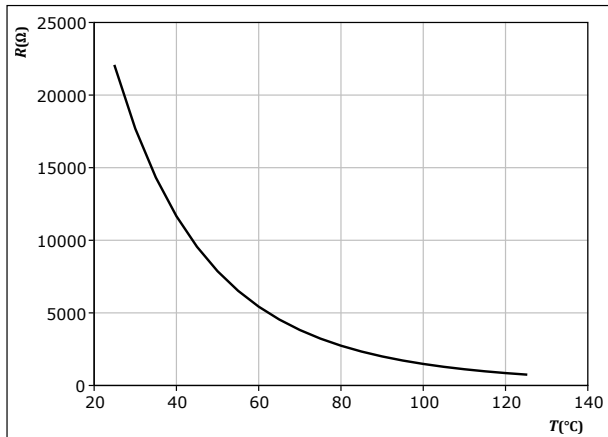


Thermistor Characteristics

figure 11. Thermistor

Typical NTC characteristic as function of temperature

$$R_T = f(T)$$

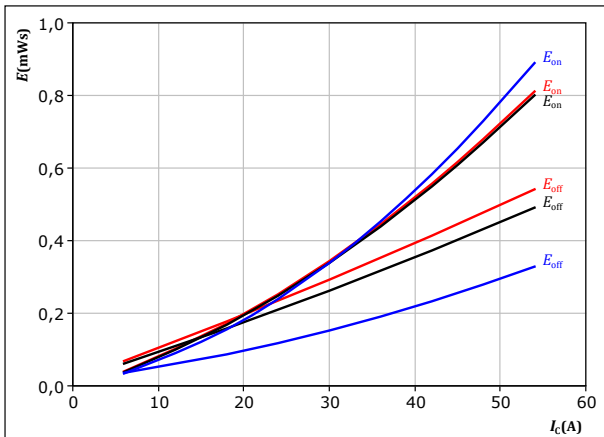




Boost Switching Characteristics

figure 12. IGBT

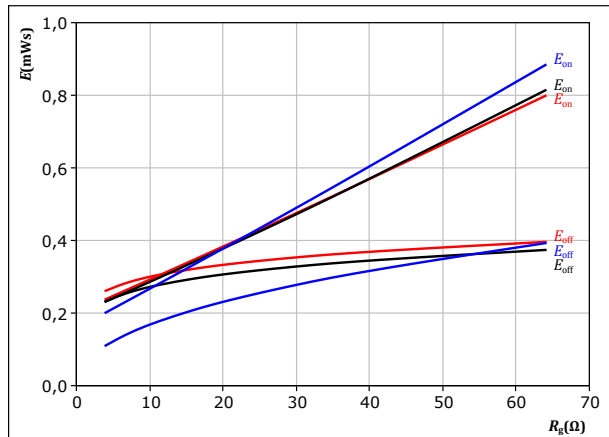
Typical switching energy losses as a function of collector current
 $E = f(I_c)$



With an inductive load at
 $V_{CE} = 400$ V
 $V_{GE} = 0/15$ V
 $R_{g(on)} = 16$ Ω
 $R_{g(off)} = 16$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 13. IGBT

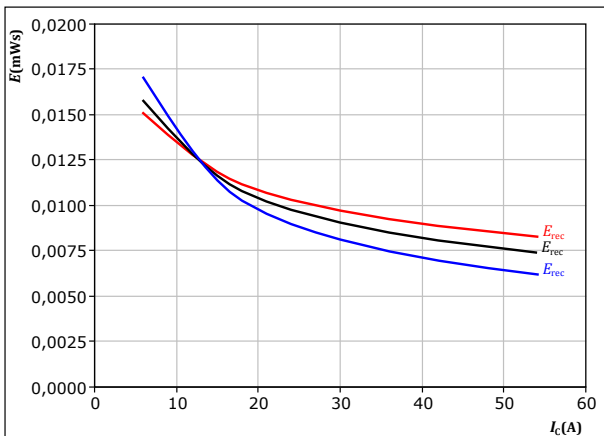
Typical switching energy losses as a function of IGBT turn on gate resistor
 $E = f(R_g)$



With an inductive load at
 $V_{CE} = 400$ V
 $V_{GE} = 0/15$ V
 $I_c = 30$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 14. FWD

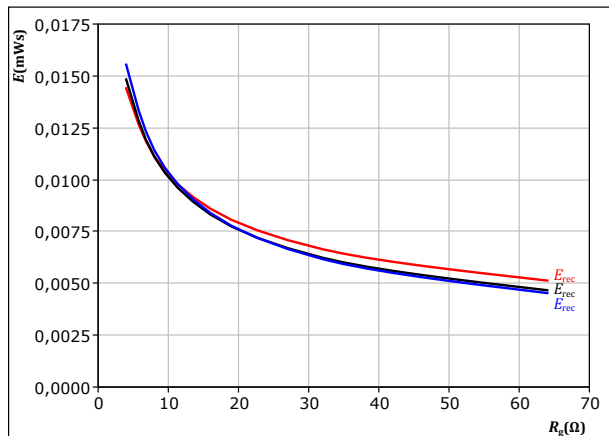
Typical reverse recovered energy loss as a function of collector current
 $E_{rec} = f(I_c)$



With an inductive load at
 $V_{CE} = 400$ V
 $V_{GE} = 0/15$ V
 $R_{g(on)} = 16$ Ω
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)

figure 15. FWD

Typical reverse recovered energy loss as a function of IGBT turn on gate resistor
 $E_{rec} = f(R_g)$



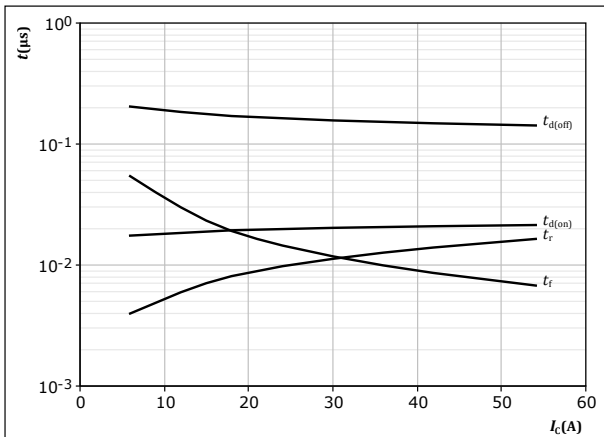
With an inductive load at
 $V_{CE} = 400$ V
 $V_{GE} = 0/15$ V
 $I_c = 30$ A
 T_j : 25 °C (blue), 125 °C (black), 150 °C (red)



Boost Switching Characteristics

figure 16. IGBT

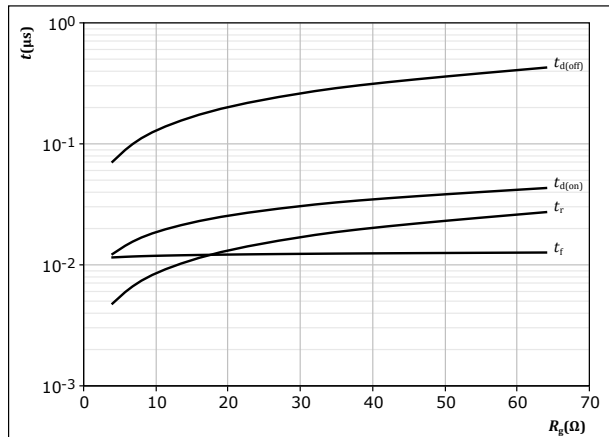
Typical switching times as a function of collector current
 $t = f(I_c)$



With an inductive load at
 $T_j = 150 \text{ }^\circ\text{C}$
 $V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 16 \text{ } \Omega$
 $R_{goff} = 16 \text{ } \Omega$

figure 17. IGBT

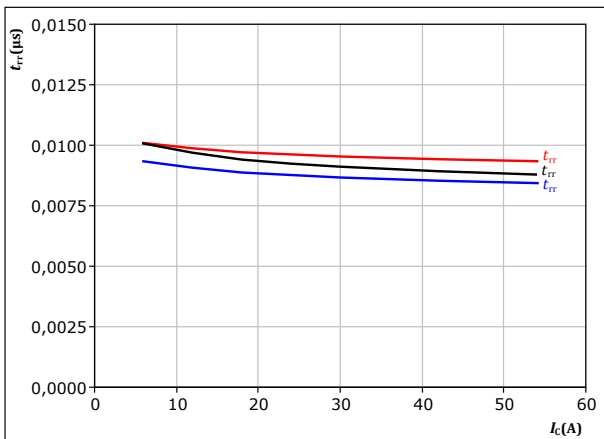
Typical switching times as a function of IGBT turn on gate resistor
 $t = f(R_g)$



With an inductive load at
 $T_j = 150 \text{ }^\circ\text{C}$
 $V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_c = 30 \text{ A}$

figure 18. FWD

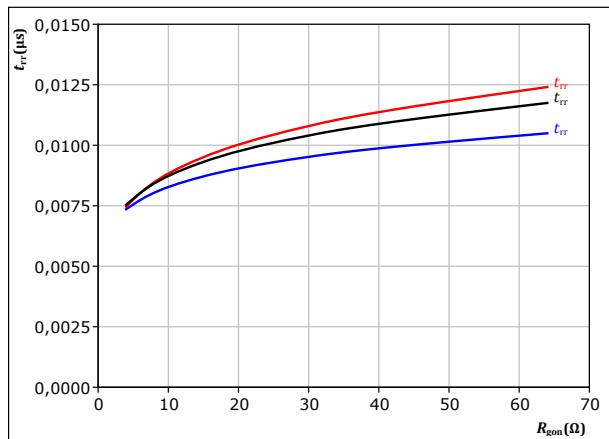
Typical reverse recovery time as a function of collector current
 $t_{rr} = f(I_c)$



With an inductive load at
 $V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 16 \text{ } \Omega$
 $T_j: \text{ } \text{---} 25 \text{ }^\circ\text{C}$
 $\text{---} 125 \text{ }^\circ\text{C}$
 $\text{---} 150 \text{ }^\circ\text{C}$

figure 19. FWD

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



With an inductive load at
 $V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_c = 30 \text{ A}$
 $T_j: \text{ } \text{---} 25 \text{ }^\circ\text{C}$
 $\text{---} 125 \text{ }^\circ\text{C}$
 $\text{---} 150 \text{ }^\circ\text{C}$

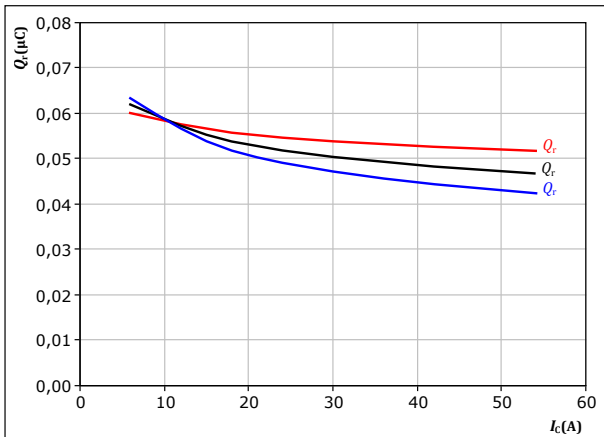


Boost Switching Characteristics

figure 20. FWD

Typical recovered charge as a function of collector current

$$Q_r = f(I_c)$$



With an inductive load at

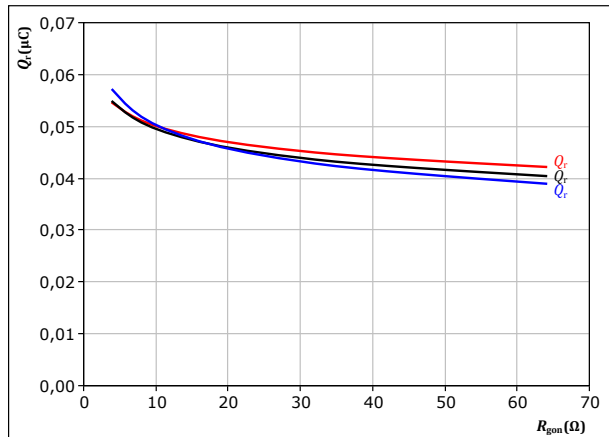
$V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 16 \text{ } \Omega$

T_j : — 25 °C
— 125 °C
— 150 °C

figure 21. FWD

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

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



With an inductive load at

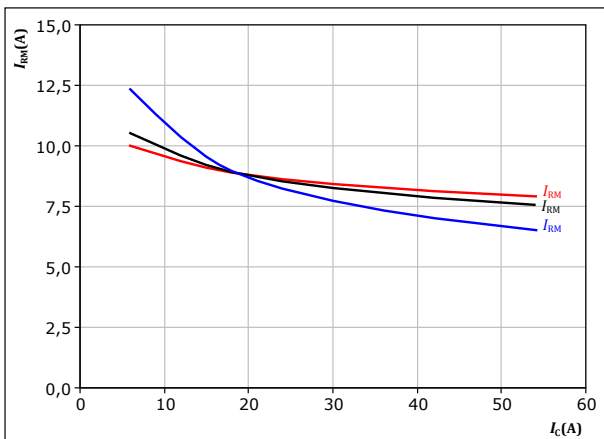
$V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_c = 30 \text{ A}$

T_j : — 25 °C
— 125 °C
— 150 °C

figure 22. FWD

Typical peak reverse recovery current as a function of collector current

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



With an inductive load at

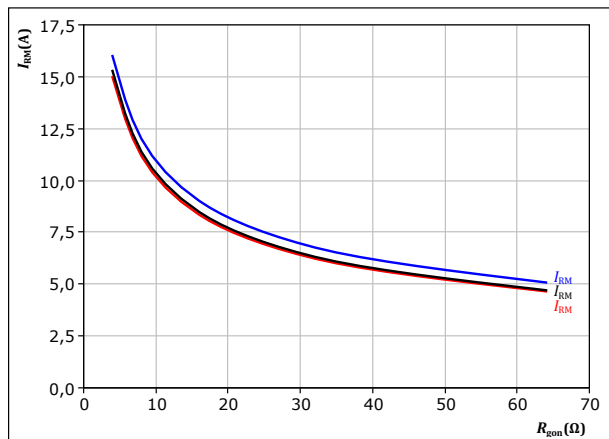
$V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $R_{gon} = 16 \text{ } \Omega$

T_j : — 25 °C
— 125 °C
— 150 °C

figure 23. 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

$V_{CE} = 400 \text{ V}$
 $V_{GE} = 0/15 \text{ V}$
 $I_c = 30 \text{ A}$

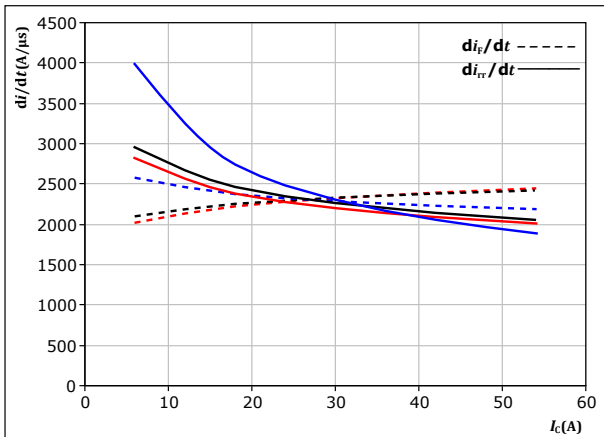
T_j : — 25 °C
— 125 °C
— 150 °C



Boost Switching Characteristics

figure 24. FWD

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



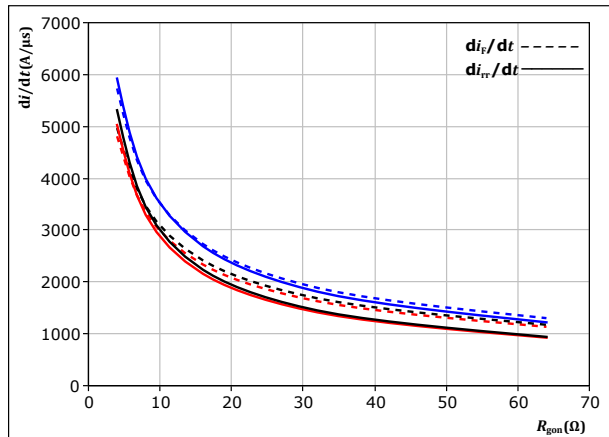
With an inductive load at

$V_{CE} = 400$ V
 $V_{GE} = 0/15$ V
 $R_{gon} = 16$ Ω

T_j : — 25 °C
 — 125 °C
 — 150 °C

figure 25. FWD

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



With an inductive load at

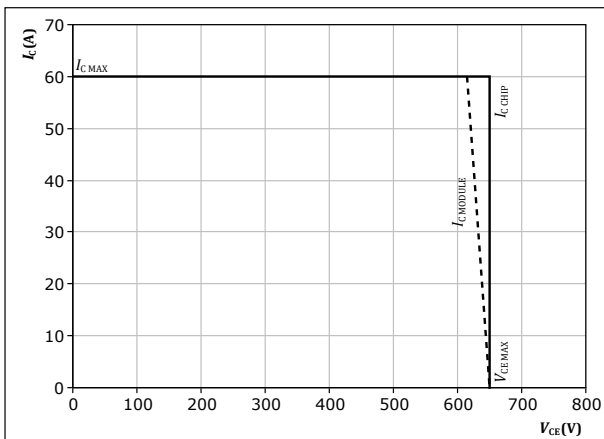
$V_{CE} = 400$ V
 $V_{GE} = 0/15$ V
 $I_c = 30$ A

T_j : — 25 °C
 — 125 °C
 — 150 °C

figure 26. IGBT

Reverse bias safe operating area

$I_c = f(V_{CE})$



At $T_j = 150$ °C
 $R_{gon} = 16$ Ω
 $R_{goff} = 16$ Ω



Boost Switching Definitions

figure 27. IGBT

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

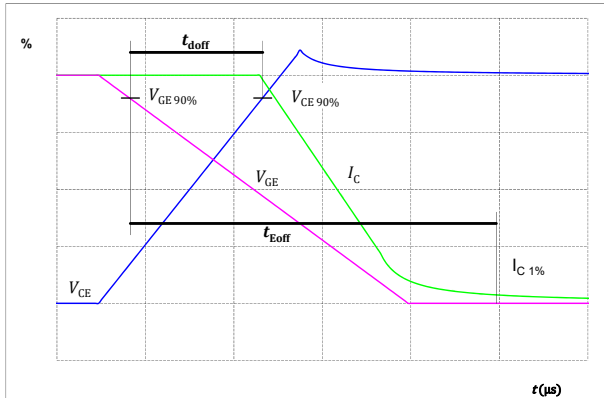


figure 28. IGBT

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

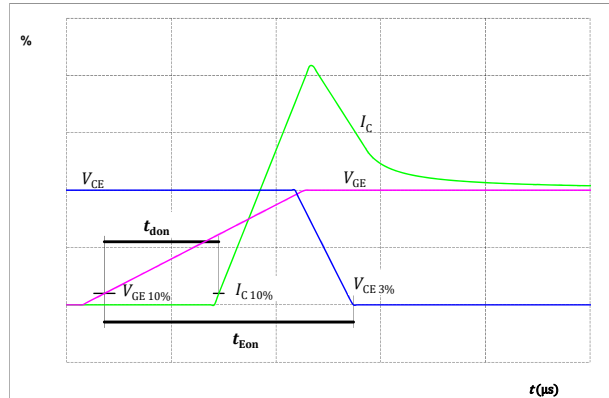


figure 29. IGBT

Turn-off Switching Waveforms & definition of t_f

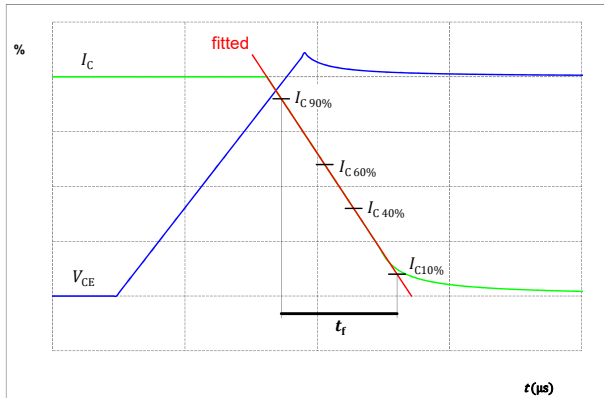
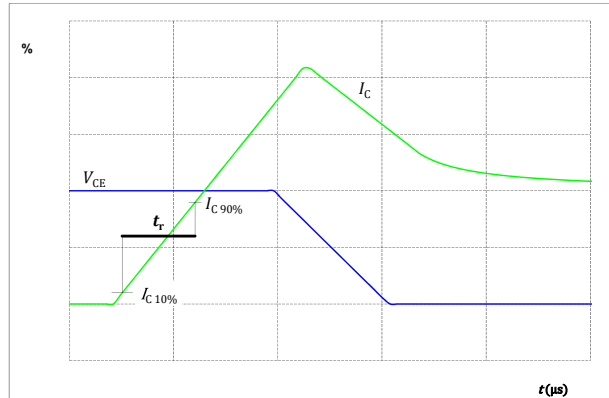


figure 30. IGBT

Turn-on Switching Waveforms & definition of t_r





Boost Switching Definitions

figure 31. FWD

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

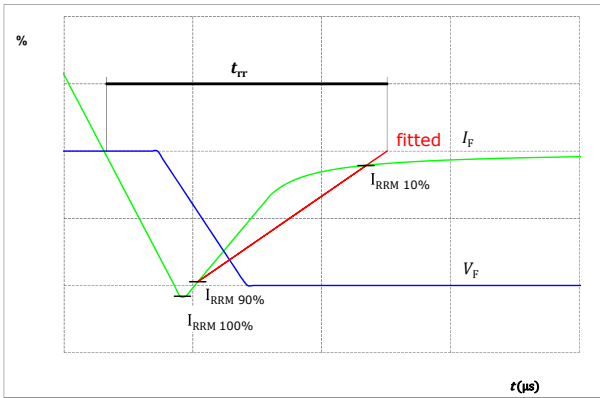
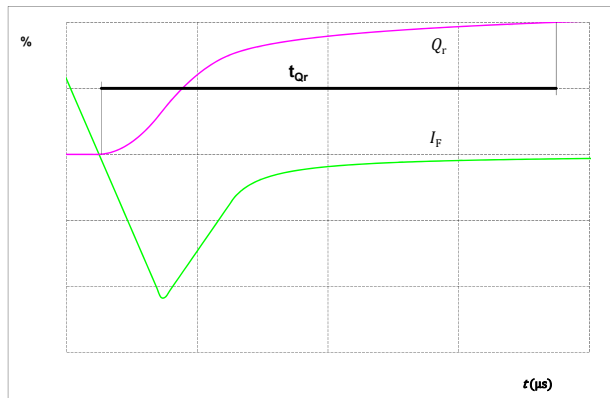


figure 32. FWD

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





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Ordering Code	
Version	Ordering Code
Without thermal paste	10-FZ07B2A030SM08-M575L408
With thermal paste (5,2 W/mK, PTM6000HV)	10-FZ07B2A030SM08-M575L408-/7/
With thermal paste (3,4 W/mK, PSX-P7)	10-FZ07B2A030SM08-M575L408-/3/

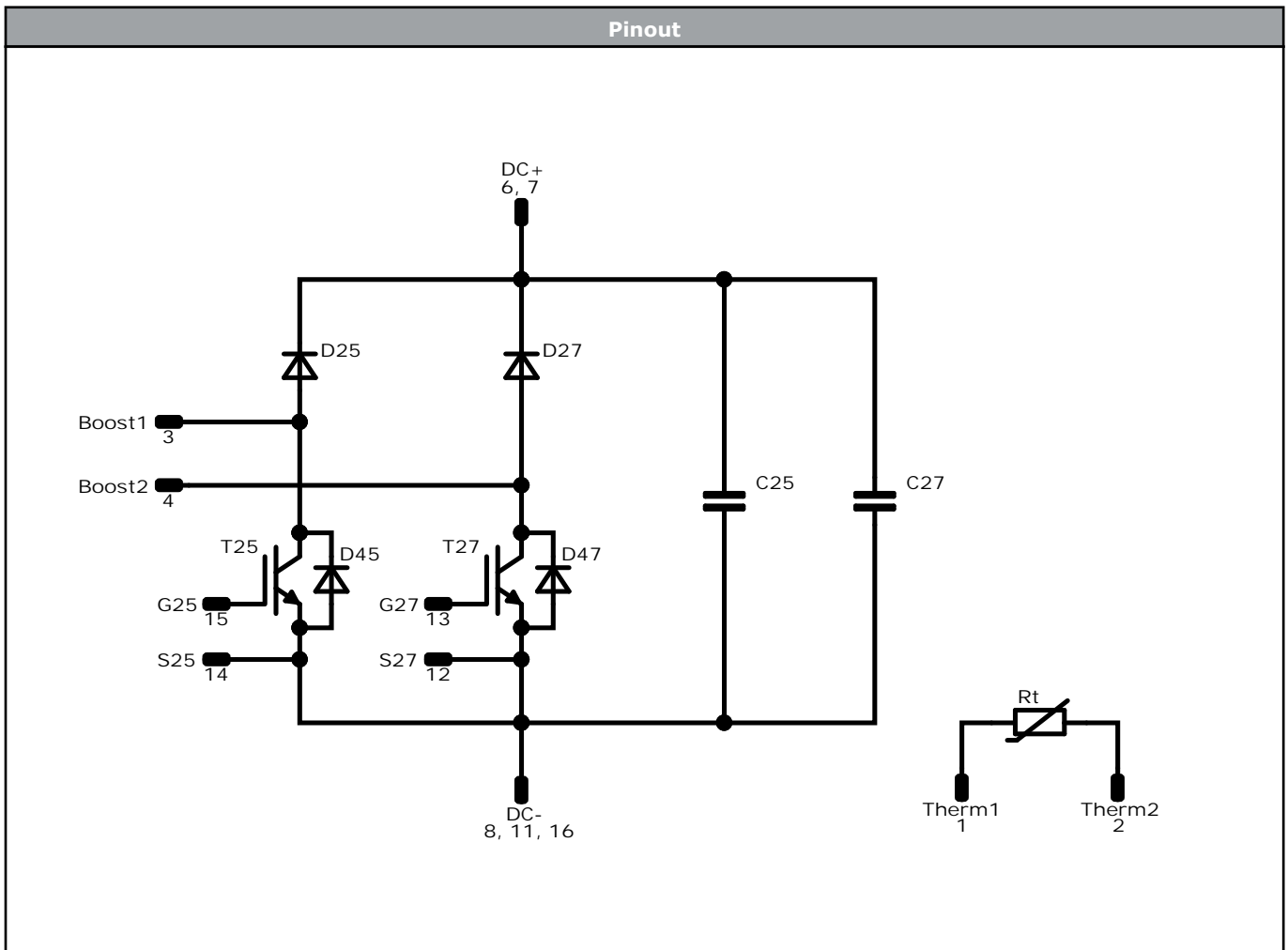
Marking						
	Text	Name NN-NNNNNNNNNNNNNN- TTTTIV	Date code WWYY	UL & VIN UL VIN	Lot LLLLL	Serial SSSS
	Datamatrix	Type&Ver TTTTIV	Lot number LLLLL	Serial SSSS	Date code WWYY	

Pin table [mm]				Outline	
Pin	X	Y	Function		
1	33,3	0	NTC1		
2	30,7	0	NTC2		
3	23,85	0	Boost3		
4	15,95	0	Boost2		
5	not assembled				
6	2,6	0	DC+		
7	0	0	DC+		
8	0	22,3	DC-		
9	not assembled				
10	not assembled				
11	13,1	22,3	DC-		
12	15,9	22,3	S2		
13	19,4	22,3	G2		
14	27,7	22,3	S3		
15	30,7	22,3	G3		
16	33,3	22,3	DC-		

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



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Identification					
ID	Component	Voltage	Current	Function	Comment
T25, T27	IGBT	650 V	30 A	Boost Switch	
D25, D27	FWD	650 V	16 A	Boost Diode	
D45, D47	Rectifier	1600 V	18 A	Boost Sw. Protection Diode	
C25, C27	Capacitor	630 V		Capacitor (DC)	
Rt	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.

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-FZ07B2A030SM08-M575L408-D2-14	13 Jul. 2022	Correct Boost Diode Maximum Ratings according to PCN-31-2022	

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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.