



SEMITRANS® 3

Trench IGBT Modules

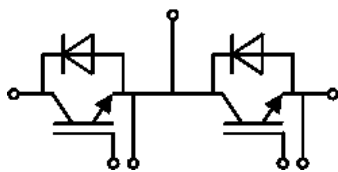
SKM200GB126D

Features

- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$
- UL recognized, file no. E63532

Typical Applications*

- AC inverter drives
- UPS
- Electronic welders



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Absolute Maximum Ratings

Symbol	Conditions	Values	Unit
IGBT			
V_{CES}	$T_j = 25\text{ °C}$	1200	V
I_C	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	260
		$T_c = 80\text{ °C}$	186
I_{Cnom}		150	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	300	A
V_{GES}		-20 ... 20	V
t_{psc}	$V_{CC} = 600\text{ V}$ $V_{GE} \leq 15\text{ V}$ $V_{CES} \leq 1200\text{ V}$	$T_j = 125\text{ °C}$	10
T_j		-40 ... 150	°C
Inverse diode			
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	200
		$T_c = 80\text{ °C}$	140
I_{Fnom}		150	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	300	A
I_{FSM}	$t_p = 10\text{ ms, sin } 180^\circ, T_j = 25\text{ °C}$	1422	A
T_j		-40 ... 150	°C
Module			
$I_{t(RMS)}$		500	A
T_{stg}		-40 ... 125	°C
V_{isol}	AC sinus 50 Hz, $t = 1\text{ min}$	4000	V

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_C = 150\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel		$T_j = 25\text{ °C}$	1.71	2.10
			$T_j = 125\text{ °C}$	2.00	2.45
V_{CE0}	chipelevel		$T_j = 25\text{ °C}$	1	1.2
			$T_j = 125\text{ °C}$	0.9	1.1
r_{CE}	$V_{GE} = 15\text{ V}$ chipelevel		$T_j = 25\text{ °C}$	4.7	6
			$T_j = 125\text{ °C}$	7.3	9
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 1200\text{ V}$		$T_j = 25\text{ °C}$		2
			$T_j = 125\text{ °C}$		
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$		$f = 1\text{ MHz}$	10.7	nF
C_{oes}			$f = 1\text{ MHz}$	0.56	nF
C_{res}			$f = 1\text{ MHz}$	0.48	nF
Q_G	$V_{GE} = -8\text{ V...} + 20\text{ V}$		1530		nC
R_{Gint}	$T_j = 25\text{ °C}$		5		Ω
$t_{d(on)}$	$V_{CC} = 600\text{ V}$	$T_j = 125\text{ °C}$		260	ns
t_r	$I_C = 150\text{ A}$				
E_{on}	$V_{GE} = +15/-15\text{ V}$	$T_j = 125\text{ °C}$		18	mJ
$t_{d(off)}$	$R_{G on} = 1.5\text{ Ω}$				
t_f	$R_{G off} = 1.5\text{ Ω}$	$T_j = 125\text{ °C}$		540	ns
E_{off}					
$R_{th(j-c)}$	per IGBT			0.13	K/W



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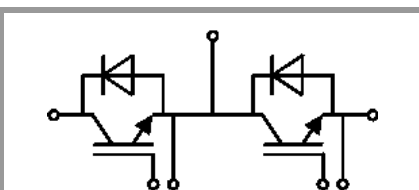
Features

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Typical Applications*

- AC inverter drives
- UPS
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Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 150 A	T _j = 25 °C		1.60	1.80	V
	V _{GE} = 0 V	T _j = 125 °C		1.60	1.80	V
	chiplevel					
V _{F0}	chiplevel	T _j = 25 °C		1	1.1	V
		T _j = 125 °C		0.8	0.9	V
r _F	chiplevel	T _j = 25 °C		4	4.7	mΩ
		T _j = 125 °C		5.3	6	mΩ
I _{RRM}	I _F = 150 A	T _j = 125 °C		240		A
Q _{rr}	di/dt _{off} = 5000 A/μs	T _j = 125 °C		42		μC
E _{rr}	V _{GE} = -15 V	T _j = 125 °C		18		mJ
	V _{CC} = 600 V					
R _{th(j-c)}	per diode				0.3	K/W
Module						
L _{CE}				15		nH
R _{CC'+EE'}	terminal-chip	T _C = 25 °C		0.35		mΩ
		T _C = 125 °C		0.5		mΩ
R _{th(c-s)}	per module			0.02	0.038	K/W
M _s	to heat sink M6		3		5	Nm
M _t		to terminals M6	2.5		5	Nm
						Nm
w					325	g



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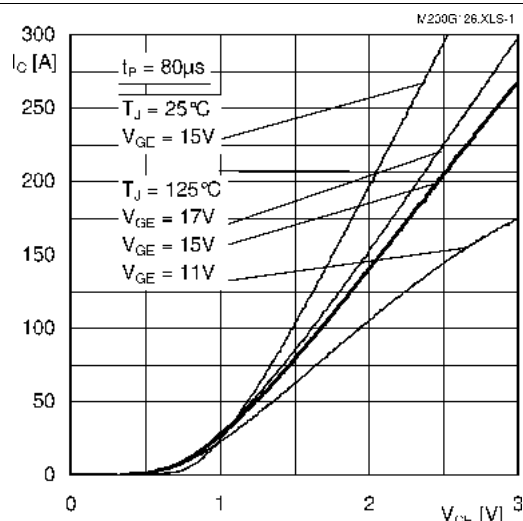


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

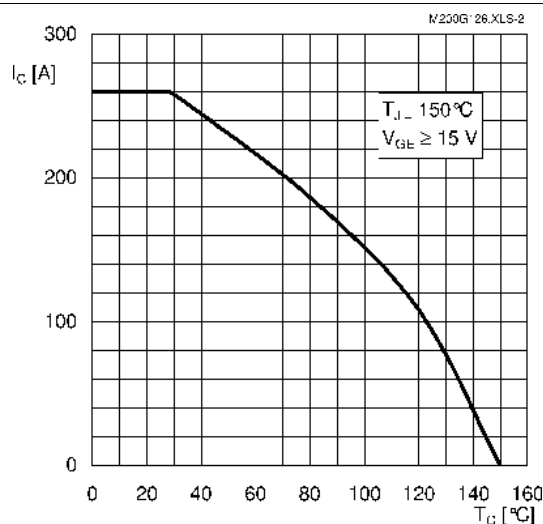


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

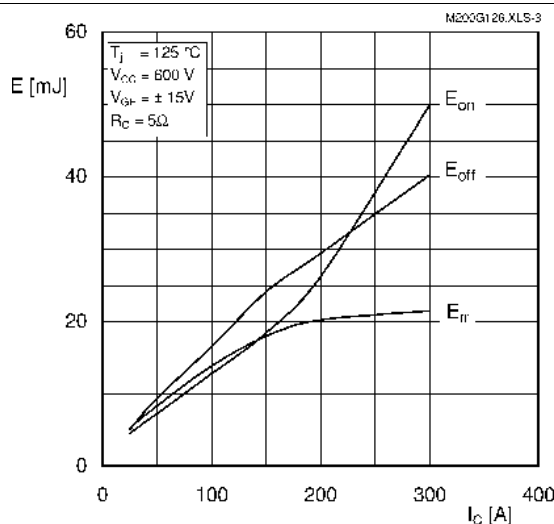


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

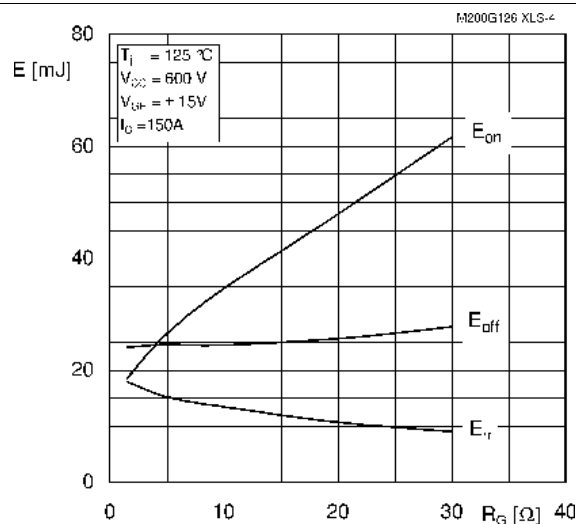


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

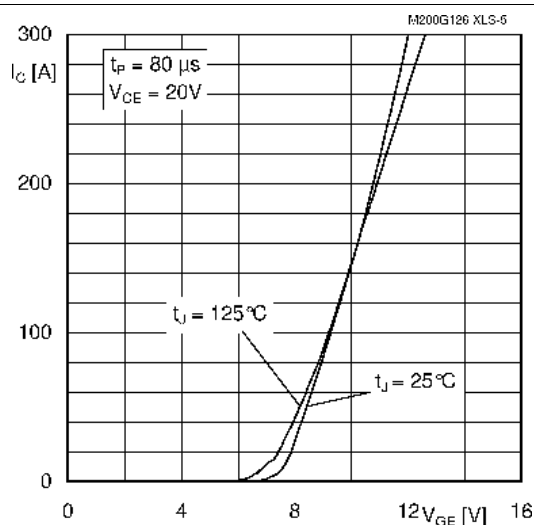


Fig. 5: Typ. transfer characteristic

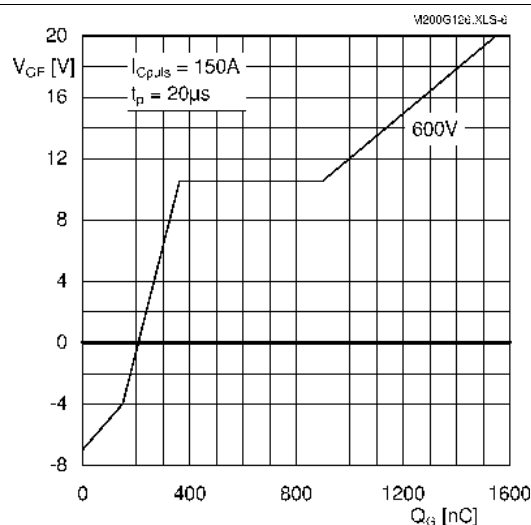


Fig. 6: Typ. gate charge characteristic

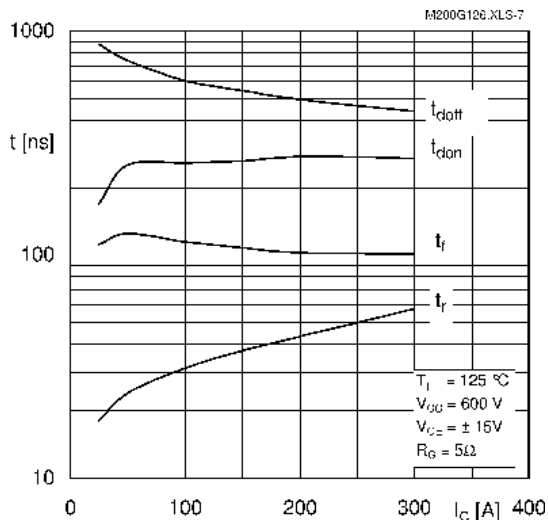


Fig. 7: Typ. switching times vs. I_C

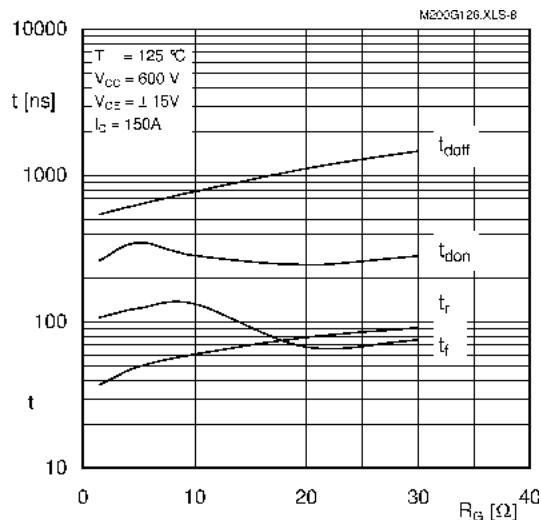


Fig. 8: Typ. switching times vs. gate resistor R_G

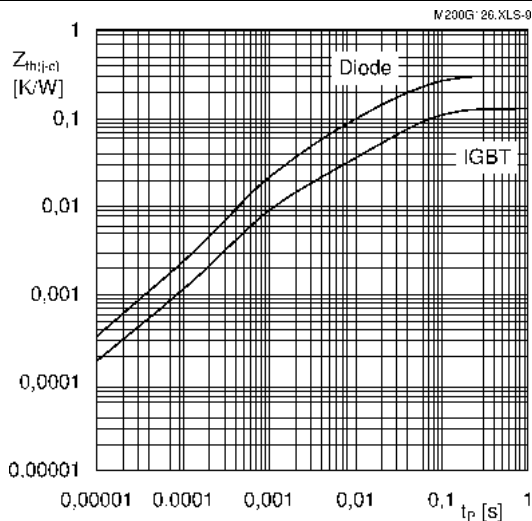


Fig. 9: Transient thermal impedance

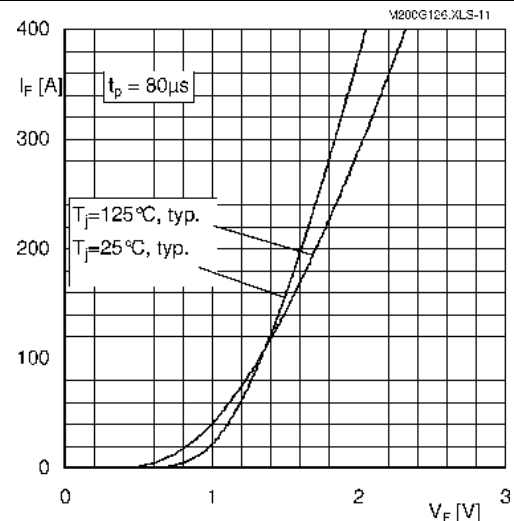


Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'} + EE'$

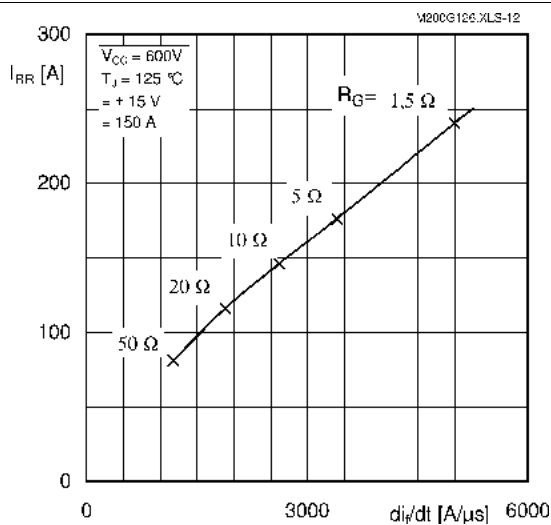


Fig. 11: Typ. CAL diode peak reverse recovery current

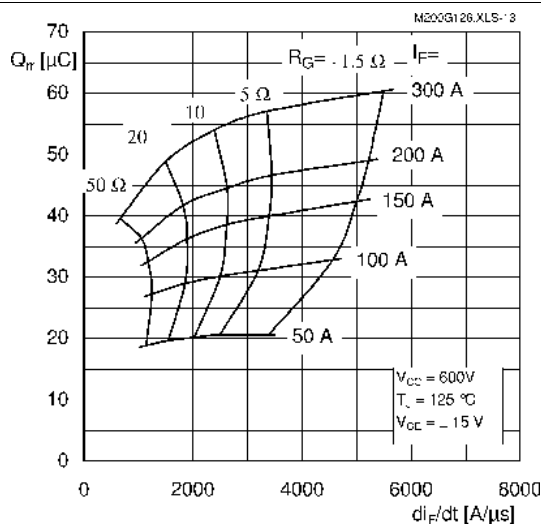


Fig. 12: Typ. CAL diode peak reverse recovery charge

Technical drawing of a mechanical part, showing two views: a side elevation and a top plan view.

Side Elevation View (Top):

- Overall height: 26
- Height of the main body: 23
- Thickness of the base: 5
- Distance between the first two mounting holes: 28
- Distance between the second and third mounting holes: 28
- Distance from the third mounting hole to the right edge: 20
- Mounting hole specification: M6
- Rightmost feature dimensions: 2.8x0.5, 7, 10
- Overall width: 30
- Overall depth: 30.5

Top Plan View (Bottom):

- Overall width: 61.4
- Overall length: 106.4
- Distance from the left edge to the first mounting hole: 48
- Distance between the first and second mounting holes: 14
- Distance between the second and third mounting holes: 22.5
- Distance between the third and fourth mounting holes: 6
- Distance between the fourth and fifth mounting holes: 22
- Distance between the fifth and sixth mounting holes: 6
- Distance from the sixth mounting hole to the right edge: 22.5
- Distance from the right edge to the first corner hole: 16
- Corner hole diameter: 6.4
- Distance from the bottom edge to the first corner hole: 11
- Distance from the bottom edge to the second corner hole: 10
- Distance from the bottom edge to the third corner hole: 8
- Distance from the bottom edge to the fourth corner hole: 9
- Distance from the bottom edge to the fifth corner hole: 7
- Distance from the bottom edge to the sixth corner hole: 6
- Distance from the bottom edge to the seventh corner hole: 15
- Distance from the bottom edge to the eighth corner hole: 27
- Distance from the bottom edge to the ninth corner hole: 30
- Distance from the bottom edge to the tenth corner hole: 93

* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our staff.