

SKM 200GB125D



SEMITRANS[®] 3

Ultra Fast IGBT Modules

SKM 200GB125D

SKM 200GAL125D

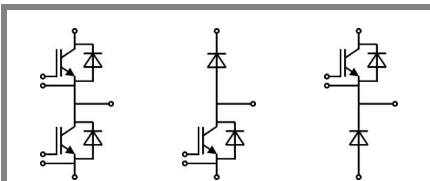
SKM 200GAR125D

Features

- N channel , homogeneous Si
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (13 mm) and creepage distance (20 mm)

Typical Applications*

- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at $f_{sw} > 20$ kHz



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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200		V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	200	A
		$T_{case} = 80^\circ\text{C}$	160	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	300		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		μs
Inverse Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	200	A
		$T_{case} = 80^\circ\text{C}$	130	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	300		A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	1440	A
Freewheeling Diode				
I_F	$T_j = ^\circ\text{C}$	$T_c = 25^\circ\text{C}$	200	A
		$T_c = 80^\circ\text{C}$	130	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	300		A
I_{FSM}	$t_p = 10\text{ ms};$	$T_j = 150^\circ\text{C}$	1440	A
Module				
$I_{t(RMS)}$		500		A
T_{vj}		- 40...+ 150		$^\circ\text{C}$
T_{stg}		- 40...+ 125		$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000		V

Characteristics		$T_c = 25^\circ\text{C}$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	4,5	5,5	6,5	V	
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		$T_j = 25^\circ\text{C}$ 0,15	$T_j = 25^\circ\text{C}$ 0,45	mA	
V_{CE0}			$T_j = 25^\circ\text{C}$	1,5	1,75	V
			$T_j = 125^\circ\text{C}$			V
r_{CE}	$V_{GE} = 15\text{ V}$		$T_j = 25^\circ\text{C}$	12	14	$\text{m}\Omega$
			$T_j = 125^\circ\text{C}$			$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 150\text{ A}, V_{GE} = 15\text{ V}$		$T_j = ^\circ\text{C}_{chiplev.}$ 3,3	3,85	V	
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	10		13	nF
C_{oes}			1,5		2	nF
C_{res}			0,8		1,2	nF
Q_G	$V_{GE} = 0\text{ V} - +20\text{ V}$			1300	nC	
R_{Gint}	$T_j = ^\circ\text{C}$			2,5	Ω	
$t_{d(on)}$	$R_{Gon} = 4\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 150\text{ A}$	75		ns	
			36		ns	
E_{on}	$R_{Goff} = 4\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	14		mJ	
			420		ns	
$t_{d(off)}$			25		ns	
					mJ	
$R_{th(j-c)}$	per IGBT			0,09	K/W	



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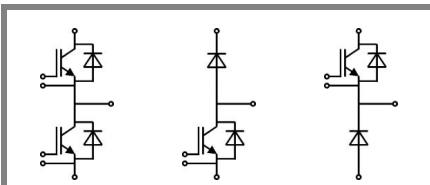
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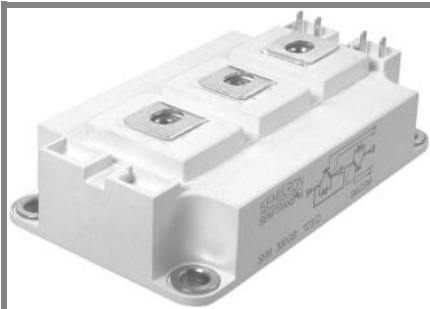
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Characteristics							
Symbol	Conditions			min.	typ.	max.	Units
Inverse Diode							
$V_F = V_{EC}$	$I_{Fnom} = 150$ A; $V_{GE} = 0$ V	$T_j = 25$ °C _{chiplev.}			2	2,5	V
		$T_j = 125$ °C _{chiplev.}			1,8		V
V_{F0}		$T_j = 25$ °C			1,1	1,2	V
		$T_j = 125$ °C					V
r_F		$T_j = 25$ °C			6	8,7	mΩ
		$T_j = 125$ °C					mΩ
I_{RRM}	$I_F = 150$ A	$T_j = 125$ °C			230		A
Q_{rr}	$di/dt = 5500$ A/μs				24		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V						mJ
$R_{th(j-c)D}$	per diode					0,25	K/W
Freewheeling Diode							
$V_F = V_{EC}$	$I_{Fnom} = 150$ A; $V_{GE} = 0$ V	$T_j = 25$ °C _{chiplev.}			2	2,5	V
		$T_j = 125$ °C _{chiplev.}			1,8		V
V_{F0}		$T_j = 25$ °C			1,1	1,2	V
		$T_j = 125$ °C					V
r_F		$T_j = 25$ °C			6	8,7	V
		$T_j = 125$ °C					V
I_{RRM}	$I_F = 150$ A	$T_j = 125$ °C			230		A
Q_{rr}	$di/dt = 5500$ A/μs				24		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V						mJ
$R_{th(j-c)FD}$	per diode					0,25	K/W
Module							
L_{CE}					15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25$ °C			0,35		mΩ
		$T_{case} = 125$ °C			0,5		mΩ
$R_{th(c-s)}$	per module					0,038	K/W
M_s	to heat sink M6				3	5	Nm
M_t	to terminals M6				2,5	5	Nm
w						325	g

This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

* 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 personal.

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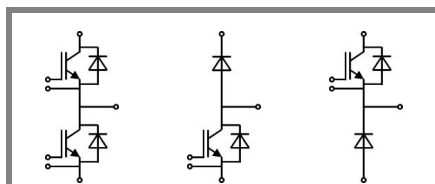
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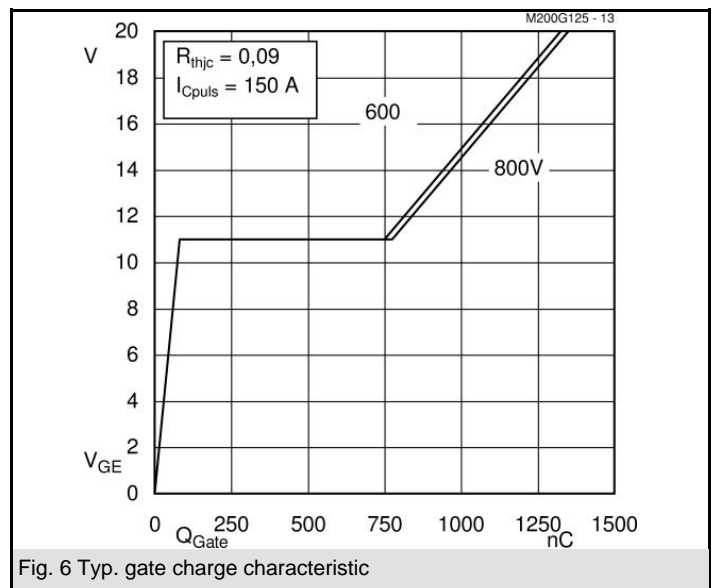
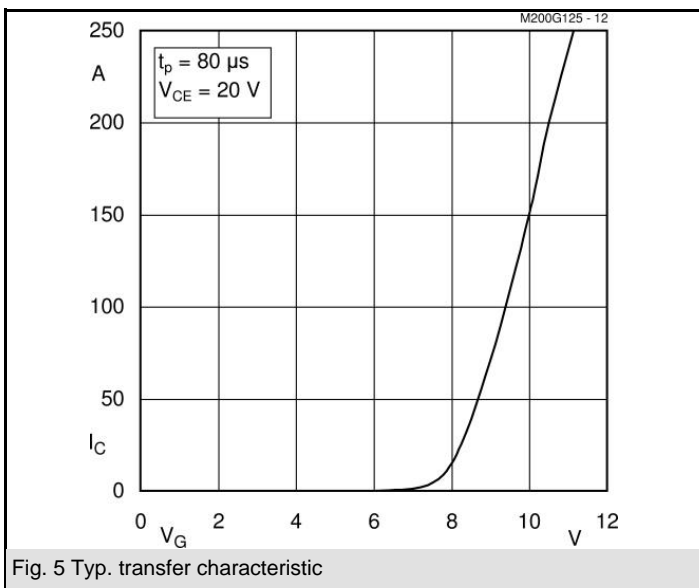
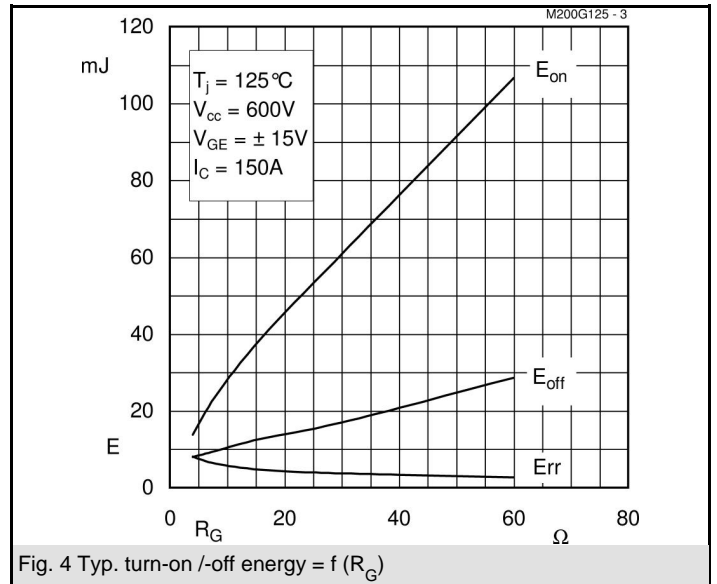
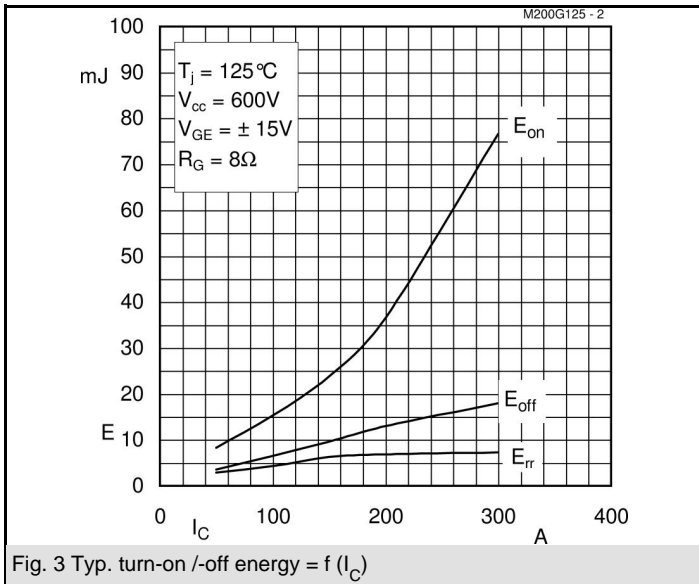
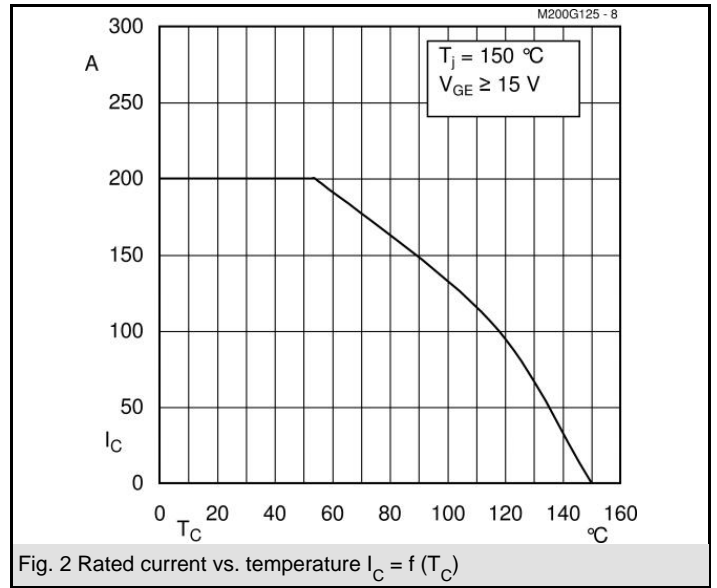
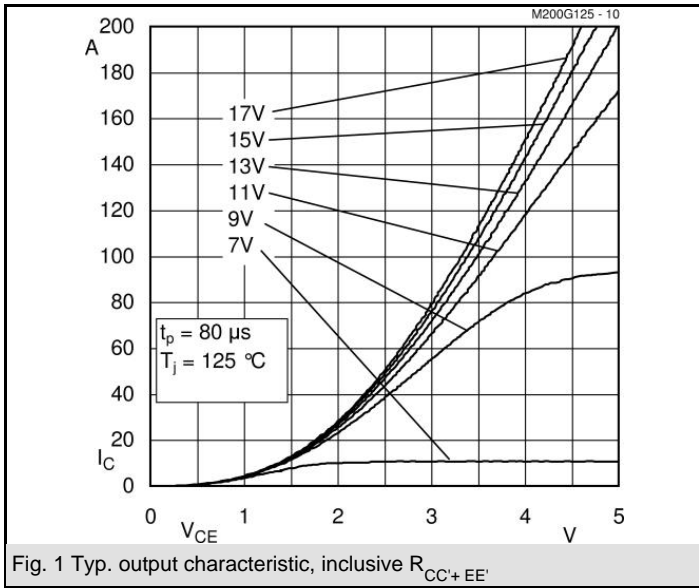


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Z_{th}		Conditions	Values	Units
Symbol				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		60	mk/W
$R_{\theta j-c}$	$i = 2$		23	mk/W
$R_{\theta j-c}$	$i = 3$		5,9	mk/W
$R_{\theta j-c}$	$i = 4$		1,1	mk/W
$\tau_{th(j-c)I}$	$i = 1$		0,0744	s
$\tau_{th(j-c)I}$	$i = 2$		0,0087	s
$\tau_{th(j-c)I}$	$i = 3$		0,002	s
$\tau_{th(j-c)I}$	$i = 4$		0,0015	s
Symbol				
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		160	mk/W
$R_{\theta j-c}$	$i = 2$		67	mk/W
$R_{\theta j-c}$	$i = 3$		20	mk/W
$R_{\theta j-c}$	$i = 4$		3	mk/W
$\tau_{th(j-c)D}$	$i = 1$		0,0536	s
$\tau_{th(j-c)D}$	$i = 2$		0,0034	s
$\tau_{th(j-c)D}$	$i = 3$		0,077	s
$\tau_{th(j-c)D}$	$i = 4$		0,0003	s



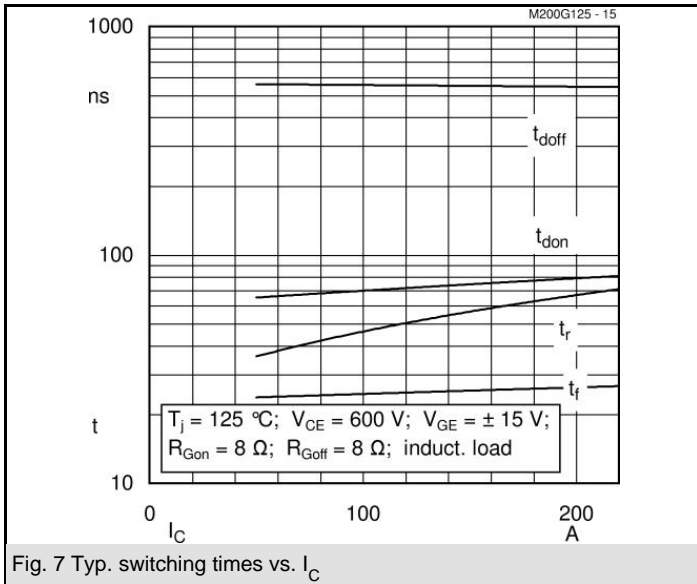


Fig. 7 Typ. switching times vs. I_C

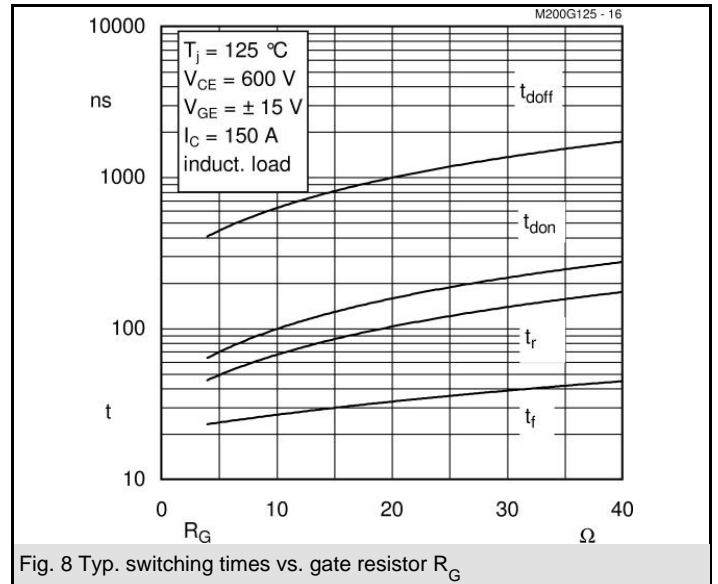


Fig. 8 Typ. switching times vs. gate resistor R_G

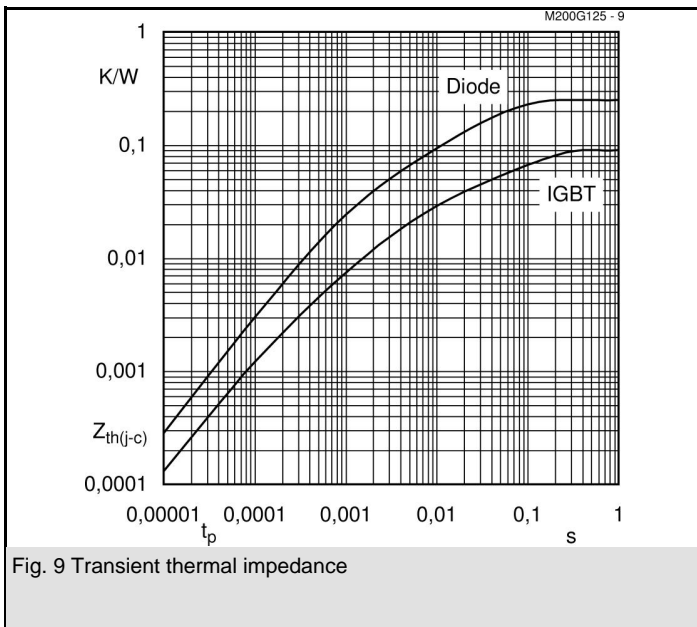


Fig. 9 Transient thermal impedance

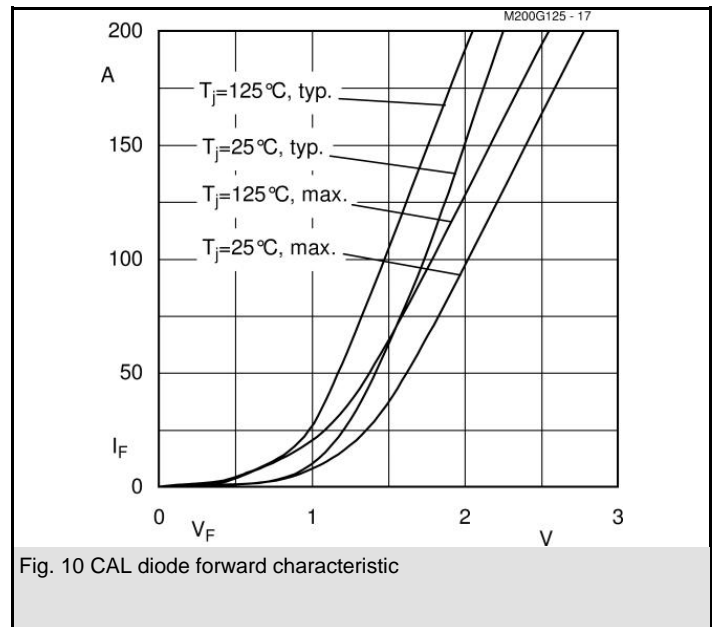


Fig. 10 CAL diode forward characteristic

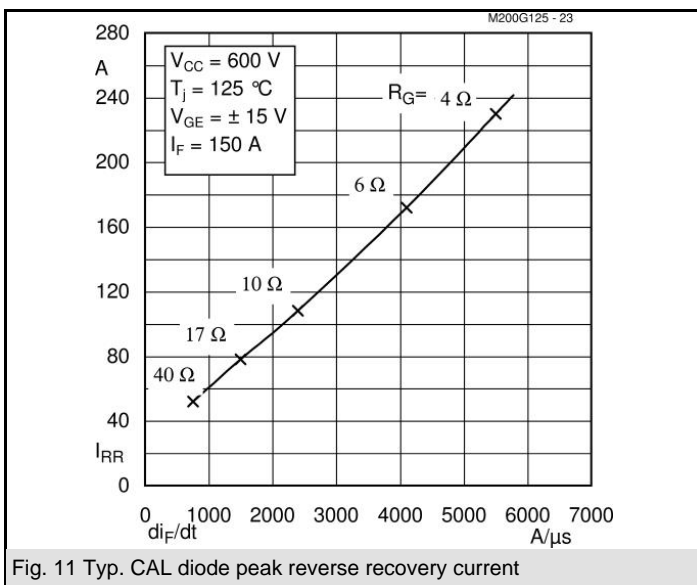


Fig. 11 Typ. CAL diode peak reverse recovery current

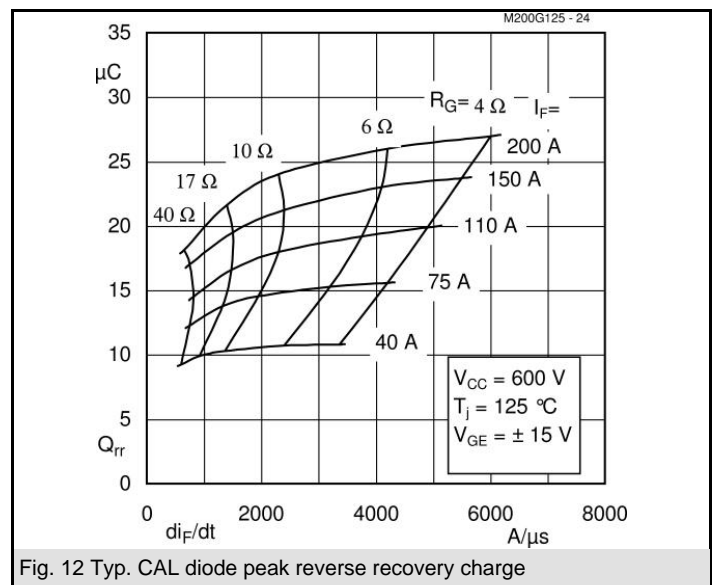


Fig. 12 Typ. CAL diode peak reverse recovery charge

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UL Recognized

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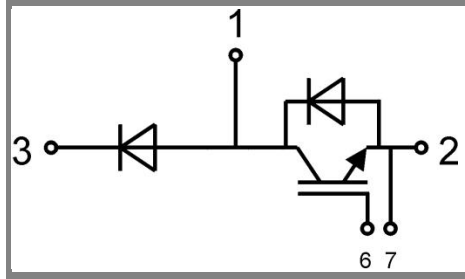


Case D 56



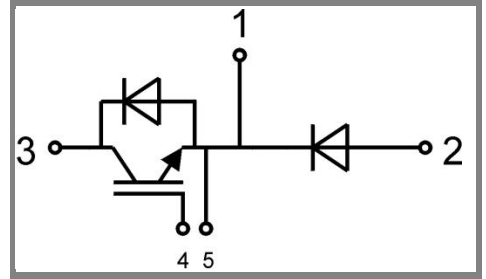
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Case D 56



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Case D 57 (→ D 56)



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Case D 58 (→ D 56)