

SKM 100GB125DN



SEMITRANS® 2N

Ultra Fast IGBT Module

SKM 100GB125DN

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 (10 mm) and creepage distances (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

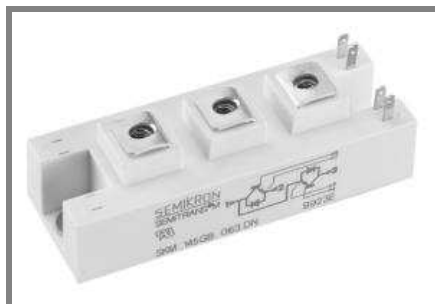


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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values			Units
IGBT					
V_{CES}	$T_j = 25^\circ\text{C}$	1200			V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	100		A
		$T_{case} = 85^\circ\text{C}$	80		A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	150			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	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	95		A
		$T_{case} = 80^\circ\text{C}$	65		A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	150			A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	720		A
Module					
$I_{t(RMS)}$		200			A
T_{vj}		- 40 ... + 150			$^\circ\text{C}$
T_{stg}		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					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 2\text{ mA}$	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		mA
		$T_j = 125^\circ\text{C}$	0,45		mA
V_{CE0}		$T_j = 25^\circ\text{C}$			V
		$T_j = 125^\circ\text{C}$			V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$			m Ω
		$T_j = 125^\circ\text{C}$			m Ω
$V_{CE(sat)}$	$I_{Cnom} = 75\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 125^\circ\text{C}$	3,3	3,85	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	5		nF
C_{oes}			0,72		nF
C_{res}			0,38		nF
Q_G	$V_{GE} = 0 - +20\text{V}$		650		nC
R_{Gint}	$T_j = 125^\circ\text{C}$		5		Ω
$t_{d(on)}$	$R_{Gon} = 8\ \Omega$	$V_{CC} = 600\text{V}$ $I_C = 75\text{A}$	80		ns
t_r			40		ns
E_{on}			9		mJ
$t_{d(off)}$	$R_{Goff} = 8\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$	360		ns
t_f			20		ns
E_{off}			3,5		mJ
$R_{th(j-c)}$	per IGBT		0,18		K/W

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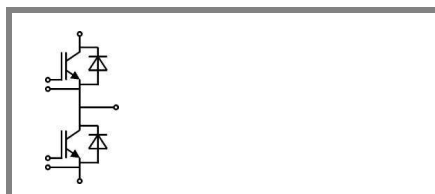
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Characteristics			min.	typ.	max.	Units
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 75$ A; $V_{GE} = 0$ V	$T_j = 25$ °C _{chiplev.} $T_j = 125$ °C _{chiplev.}		2 1,8	2,5	V V
V_{F0}		$T_j = 25$ °C $T_j = 125$ °C		1,1	1,2	V V
r_F		$T_j = 25$ °C $T_j = 125$ °C		12	17,3	mΩ mΩ
I_{RRM}	$I_F = 75$ A	$T_j = 125$ °C		50		A
Q_{rr}	$di/dt = 800$ A/μs			11,5		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V			4		mJ
$R_{th(j-c)D}$	per diode				0,5	K/W
Module						
L_{CE}				20	25	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25$ °C $T_{case} = 125$ °C		0,75		mΩ mΩ
$R_{th(c-s)}$	per module				0,05	K/W
M_s	to heat sink M6			3	5	Nm
M_t	to terminals M5			2,5	5	Nm
w					160	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 staff.



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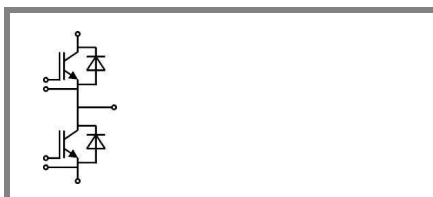
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Z_{th}		Conditions	Values	Units
Symbol				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		95	mk/W
$R_{\theta j-c}$	$i = 2$		65	mk/W
$R_{\theta j-c}$	$i = 3$		17,5	mk/W
$R_{\theta j-c}$	$i = 4$		2,5	mk/W
$\tau_{th(j-c)I}$	$i = 1$		0,0327	s
$\tau_{th(j-c)I}$	$i = 2$		0,008	s
$\tau_{th(j-c)I}$	$i = 3$		0,0017	s
$\tau_{th(j-c)I}$	$i = 4$		0,008	s
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		300	mk/W
$R_{\theta j-c}$	$i = 2$		160	mk/W
$R_{\theta j-c}$	$i = 3$		36	mk/W
$R_{\theta j-c}$	$i = 4$		4	mk/W
$\tau_{th(j-c)D}$	$i = 1$		0,054	s
$\tau_{th(j-c)D}$	$i = 2$		0,001	s
$\tau_{th(j-c)D}$	$i = 3$		0,0015	s
$\tau_{th(j-c)D}$	$i = 4$		0,1	s

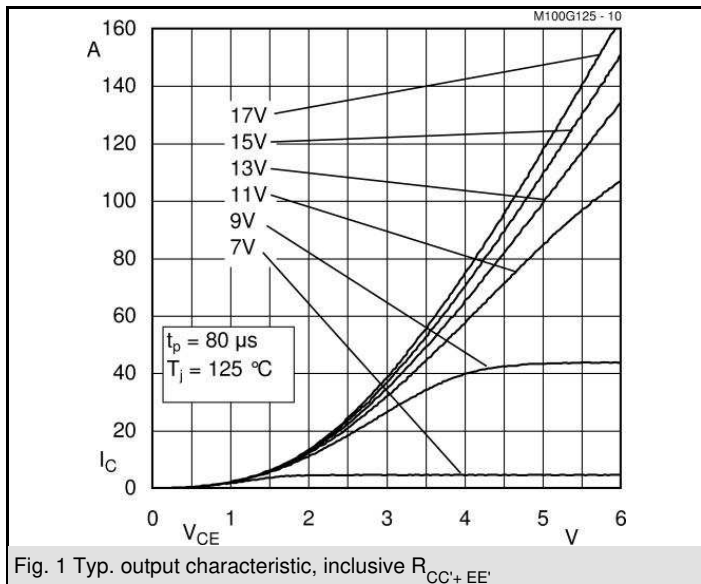


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

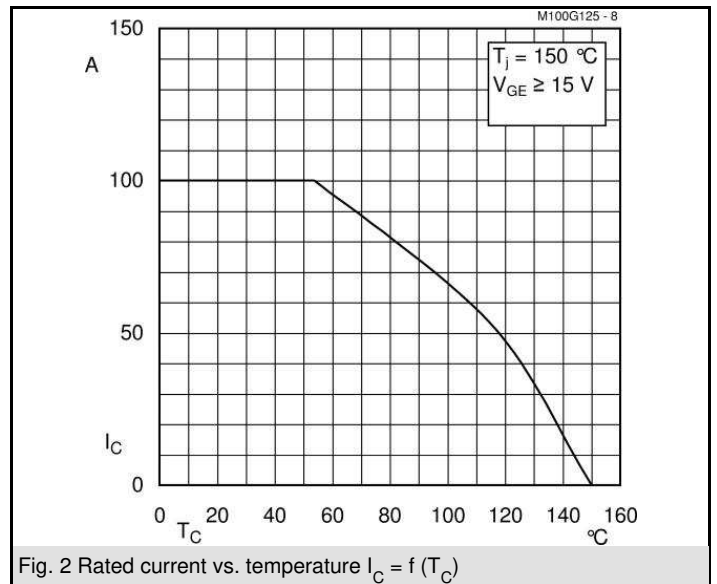


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

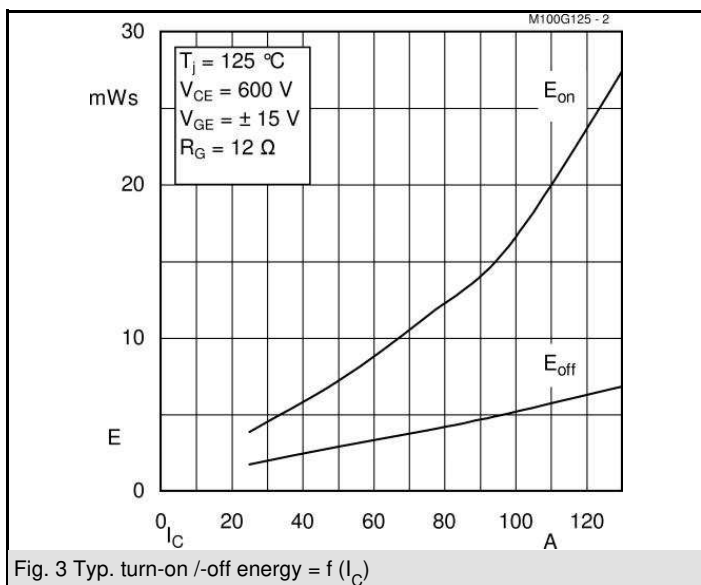


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

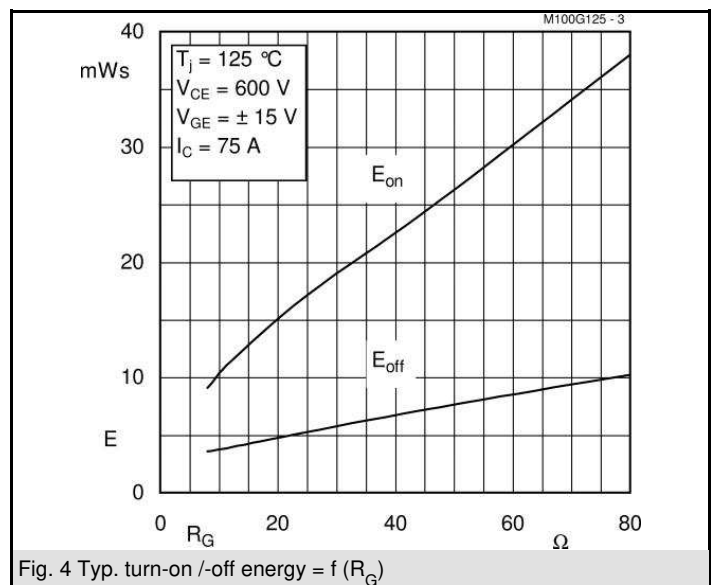


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

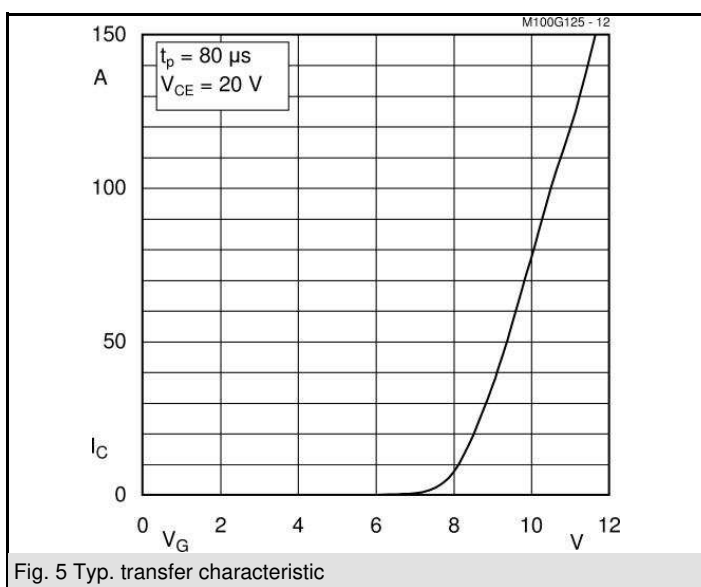


Fig. 5 Typ. transfer characteristic

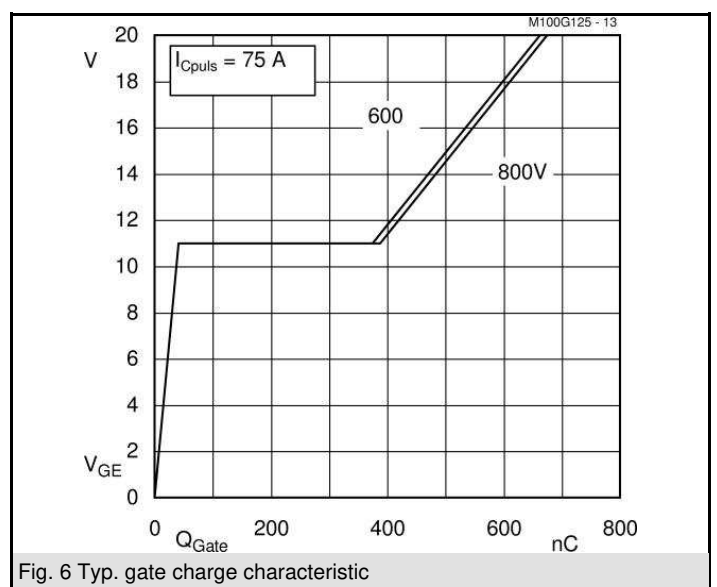
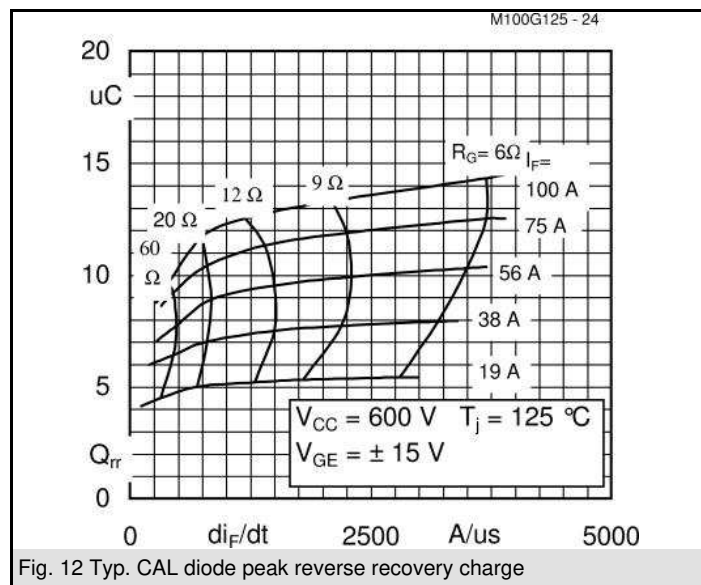
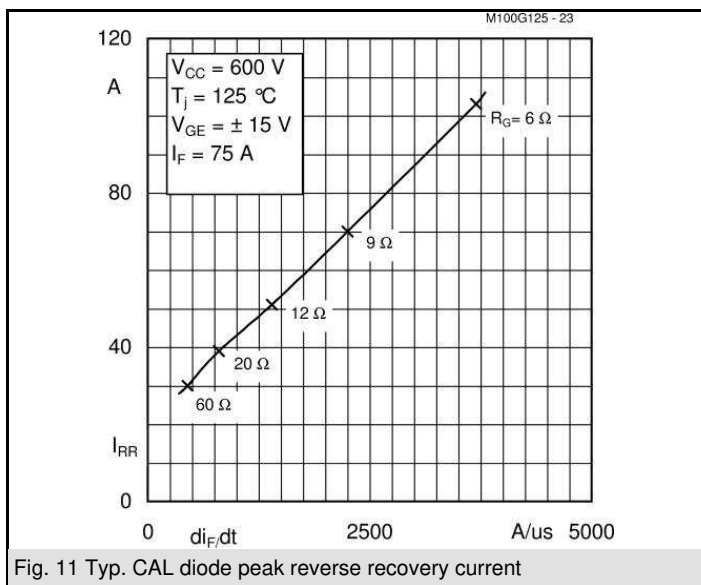
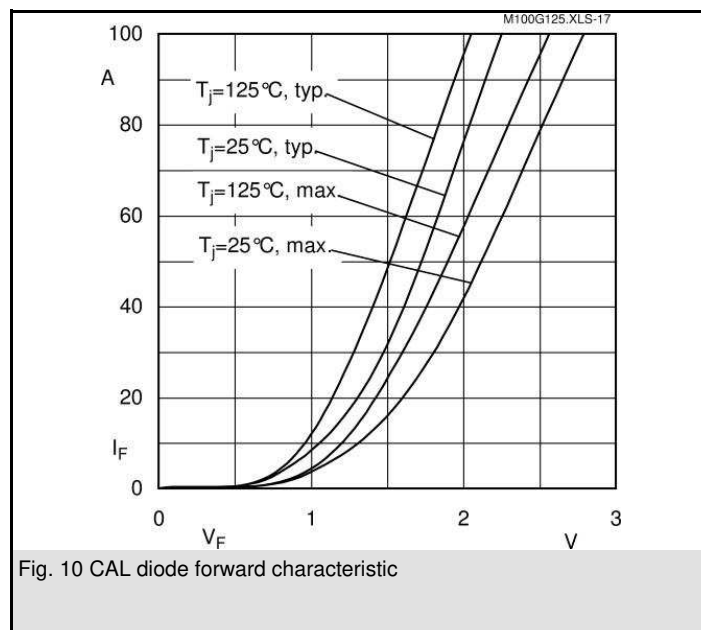
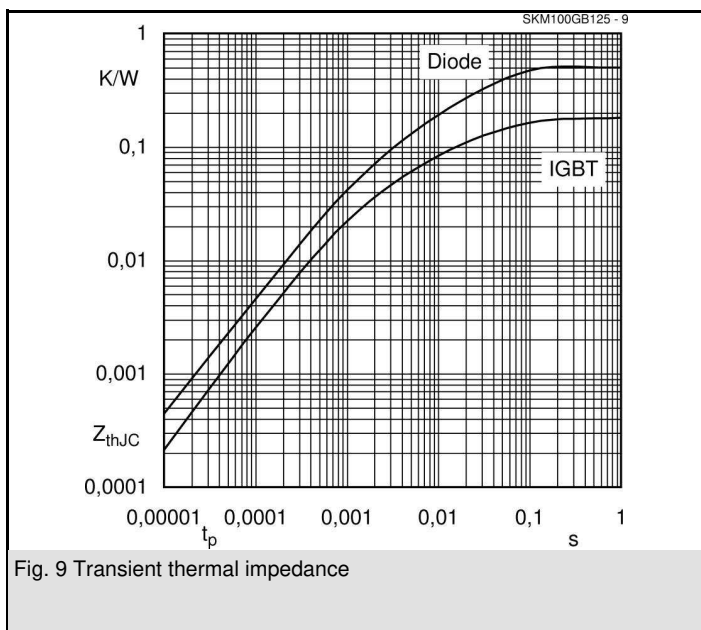
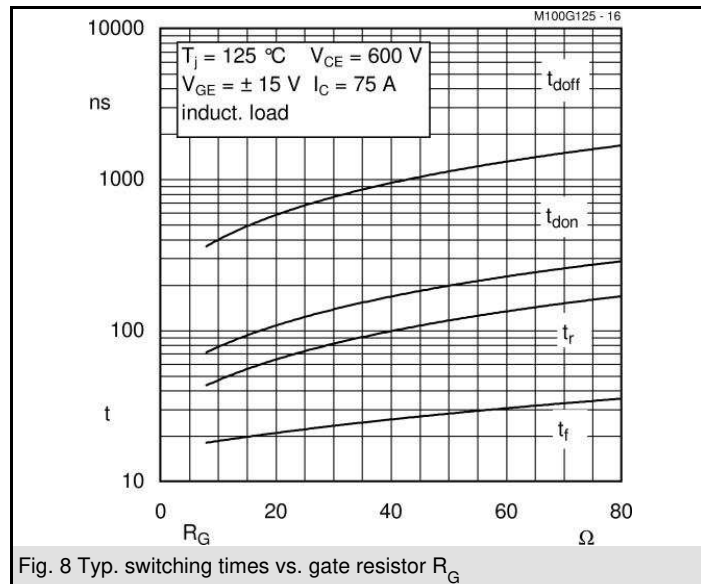
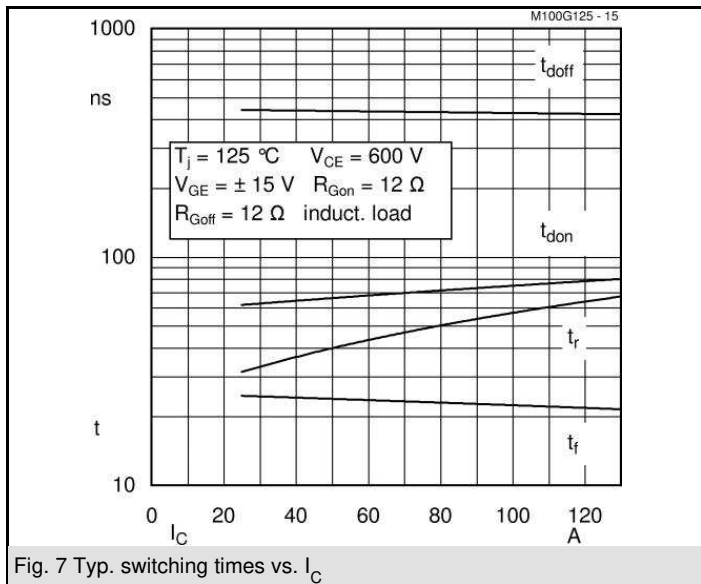


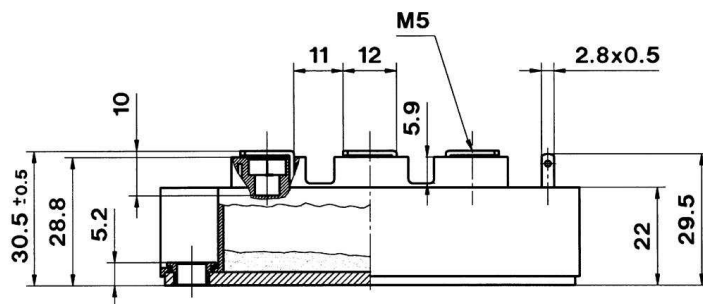
Fig. 6 Typ. gate charge characteristic



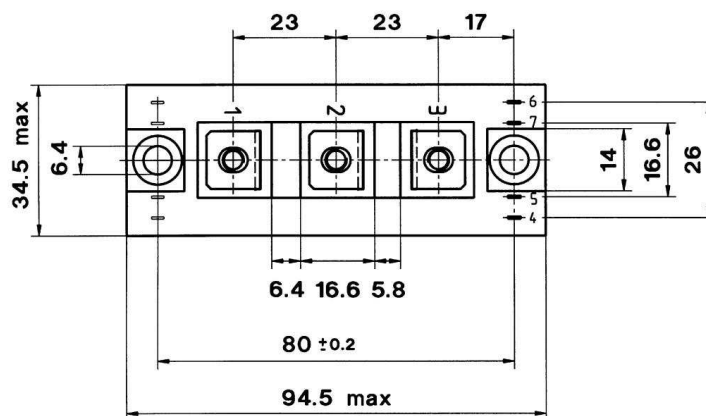
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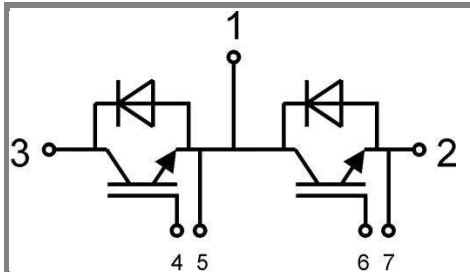
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