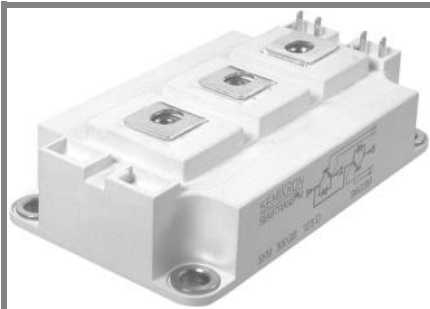


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SPT IGBT Modules

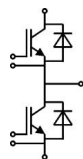
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Features

- SPT = Soft punch-through technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

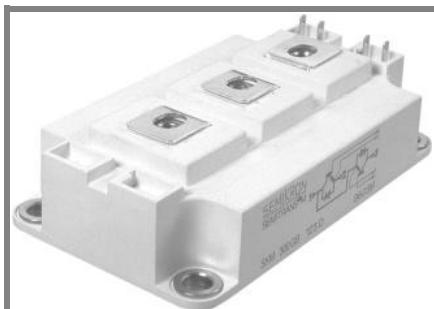
- AC inverter drives
- UPS
- Electronic welders at f_{sw} up to 20 kHz



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Absolute Maximum Ratings		$T_C = 25\text{ }^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values			Units
IGBT					
V_{CES}	$T_J = 25\text{ }^\circ\text{C}$	1200			V
I_C	$T_J = 150\text{ }^\circ\text{C}$	$T_C = 25\text{ }^\circ\text{C}$	200		A
		$T_C = 80\text{ }^\circ\text{C}$	140		A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	200			A
V_{GES}		± 20			V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_J = 125\text{ }^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10			μs
Inverse Diode					
I_F	$T_J = 150\text{ }^\circ\text{C}$	$T_{case} = 25\text{ }^\circ\text{C}$	150		A
		$T_{case} = 80\text{ }^\circ\text{C}$	100		A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200			A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_J = 150\text{ }^\circ\text{C}$	1100		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		$T_C = 25\text{ }^\circ\text{C}$, unless otherwise specified				
Symbol	Conditions	min.	typ.	max.	Units	
IGBT						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 4\text{ mA}$	4,5	5,5	6,5	V	
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_J = 25\text{ }^\circ\text{C}$	0,2		0,6	mA
		$T_J = 125\text{ }^\circ\text{C}$	0,9		1,05	V
V_{CE0}			1	1,15	V	
r_{CE}	$V_{GE} = 15\text{ V}$	$T_J = 25\text{ }^\circ\text{C}$	9		12	m Ω
		$T_J = 125\text{ }^\circ\text{C}$	12		15	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 100\text{ A}, V_{GE} = 15\text{ V}$	$T_J = 25\text{ }^\circ\text{C}_{chiplev.}$	1,9		2,35	V
		$T_J = 125\text{ }^\circ\text{C}_{chiplev.}$	2,1		2,55	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	8,1		nF	
C_{oes}			1,2		nF	
C_{res}			1,1		nF	
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$	1200			nC	
R_{Gint}	$T_J = 25\text{ }^\circ\text{C}$	2,5			Ω	
$t_{d(on)}$	$R_{Gon} = 8\text{ }^\circ\Omega$	$V_{CC} = 600\text{ V}$ $I_C = 100\text{ A}$	80		ns	
t_r			40		ns	
E_{on}	$R_{Goff} = 8\text{ }^\circ\Omega$	$T_J = 125\text{ }^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	10		mJ	
$t_{d(off)}$			460		ns	
t_f			65		ns	
E_{off}			9		mJ	
$R_{th(j-c)}$	per IGBT	0,15			K/W	



SEMITRANS® 3

SPT IGBT Modules

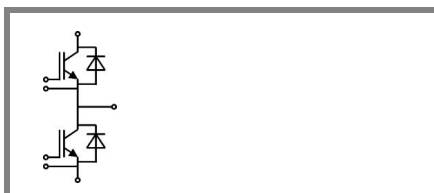
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Features

- SPT = Soft punch-through technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_c$

Typical Applications

- AC inverter drives
- UPS
- Electronic welders at f_{sw} up to 20 kHz



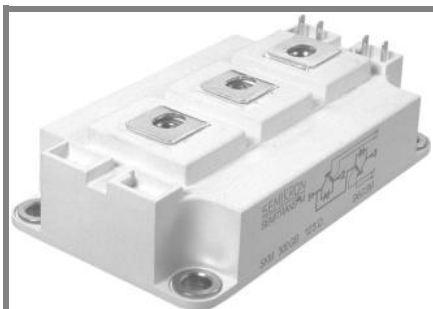
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Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
Inverse Diode							
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}$; $V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		2		2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8		2,3	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$		1,1		1,45	V
		$T_j = 125 \text{ }^\circ\text{C}$				1,25	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$		9		13	m Ω
		$T_j = 125 \text{ }^\circ\text{C}$				11	m Ω
I_{RRM}	$I_F = 100 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		145			A
Q_{rr}	$di/dt = 3600 \text{ A}/\mu\text{s}$			16,5			μC
E_{rr}	$V_{GE} = -15 \text{ V}$; $V_{CC} = 600 \text{ V}$			5,5			mJ
$R_{th(j-c)D}$	per diode					0,3	K/W
Module							
L_{CE}				15		20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		0,35			m Ω
		$T_{case} = 125 \text{ }^\circ\text{C}$		0,5			m Ω
$R_{th(c-s)}$	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.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.

SKM 150GB128D



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SPT IGBT Modules

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Z_{th}		Conditions	Values	Units
Symbol				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$		$i = 1$	116	mk/W
$R_{\theta j-c}$		$i = 2$	28	mk/W
$R_{\theta j-c}$		$i = 3$	5,4	mk/W
$R_{\theta j-c}$		$i = 4$	0,6	mk/W
$\tau_{th(j-c)I}$		$i = 1$	0,0576	s
$\tau_{th(j-c)I}$		$i = 2$	0,0073	s
$\tau_{th(j-c)I}$		$i = 3$	0,023	s
$\tau_{th(j-c)I}$		$i = 4$	0,02	s
$Z_{th(j-c)D}$				
$R_{\theta j-c}$		$i = 1$	190	mk/W
$R_{\theta j-c}$		$i = 2$	85	mk/W
$R_{\theta j-c}$		$i = 3$	21,5	mk/W
$R_{\theta j-c}$		$i = 4$	3,5	mk/W
$\tau_{th(j-c)D}$		$i = 1$	0,0331	s
$\tau_{th(j-c)D}$		$i = 2$	0,0113	s
$\tau_{th(j-c)D}$		$i = 3$	0,0012	s
$\tau_{th(j-c)D}$		$i = 4$	0,001	s

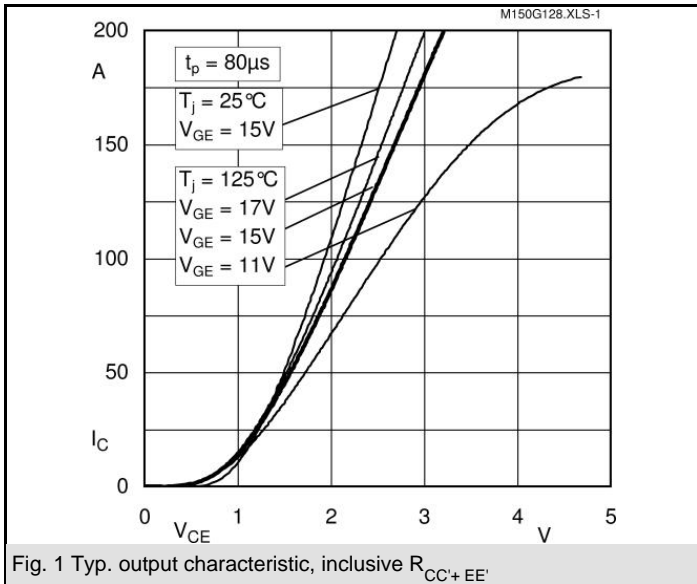


Fig. 1 Typ. output characteristic, inclusive $R_{CC+EE'}$

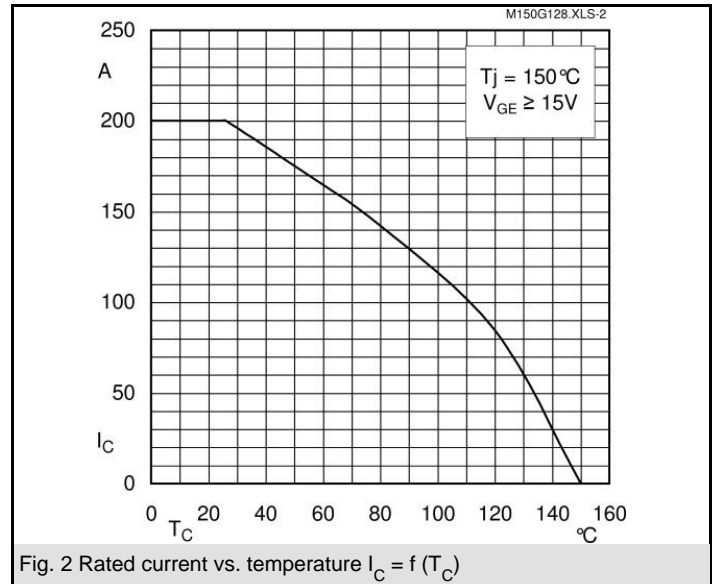


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

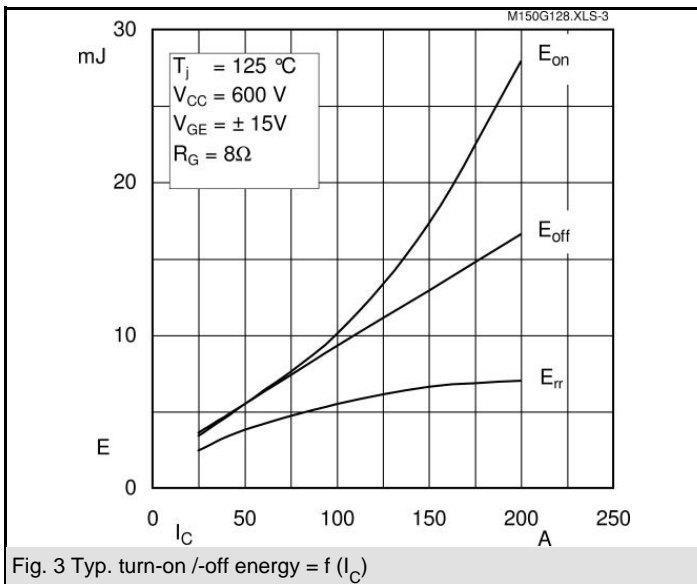


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

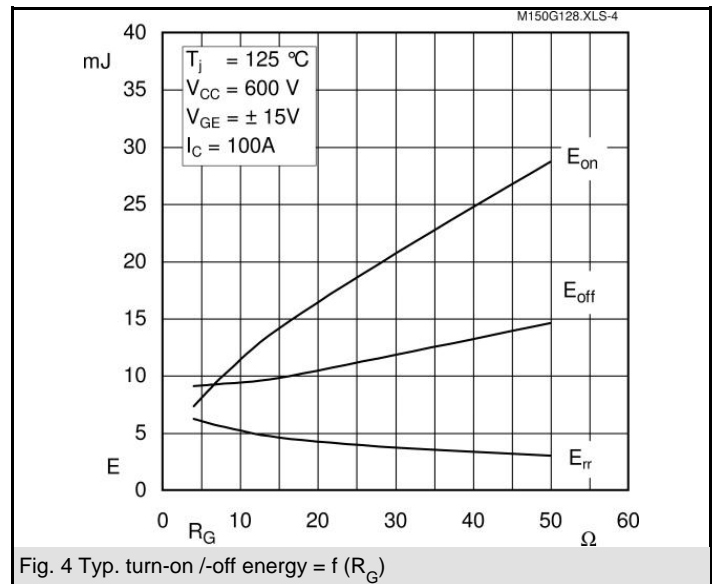


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

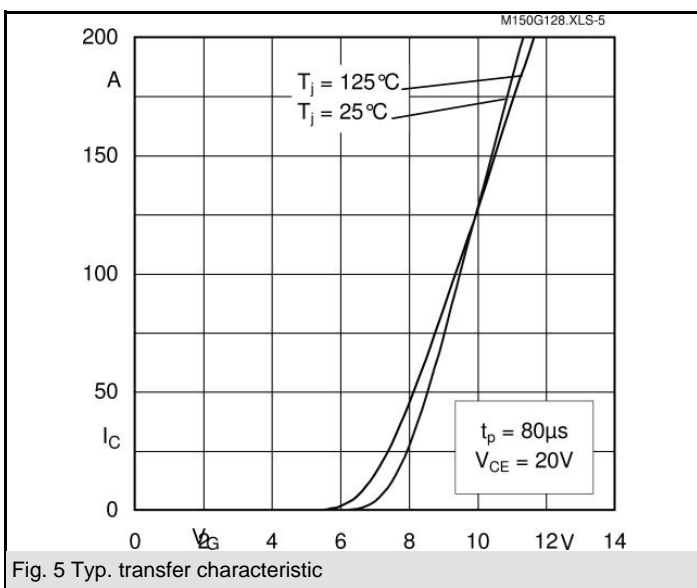


Fig. 5 Typ. transfer characteristic

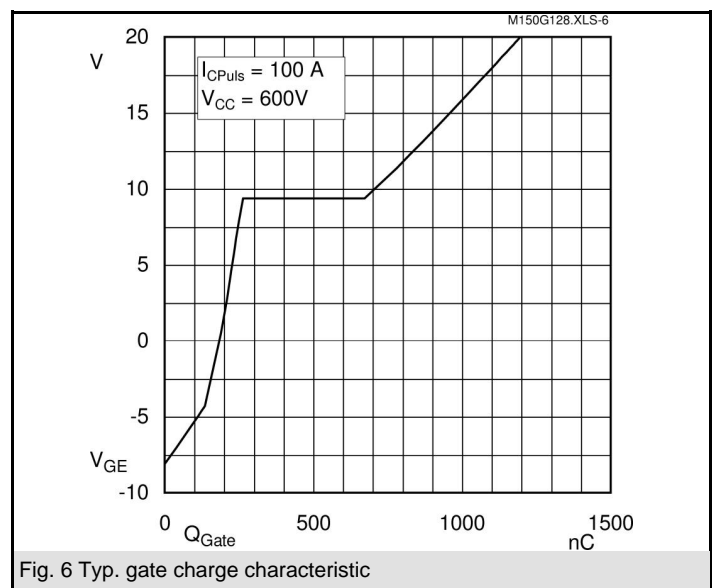
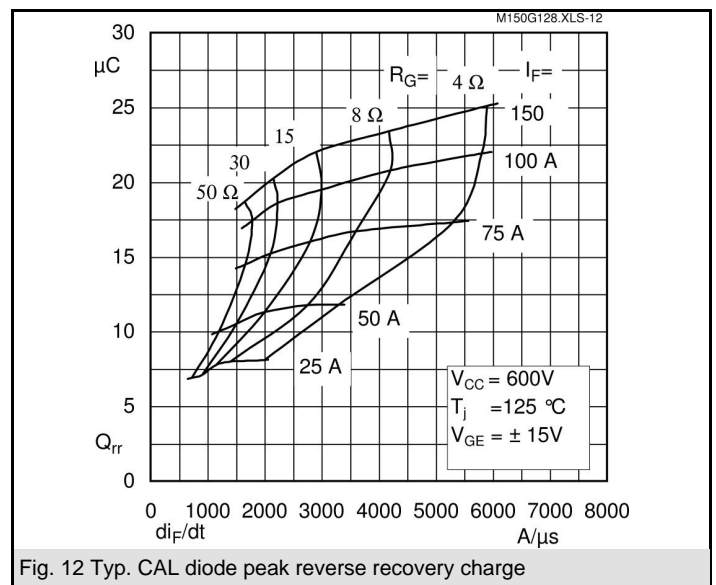
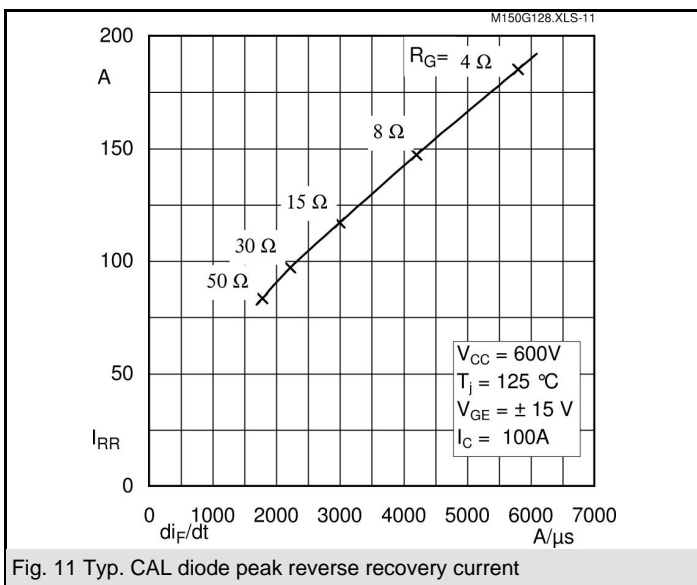
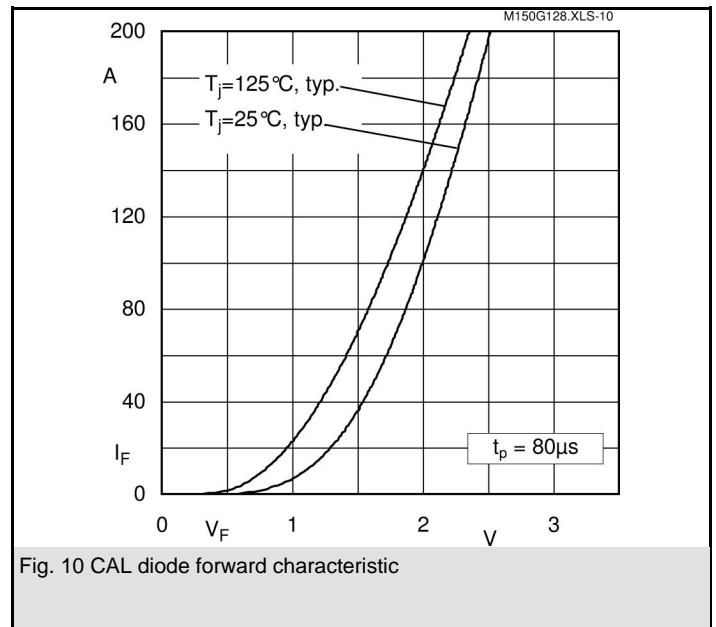
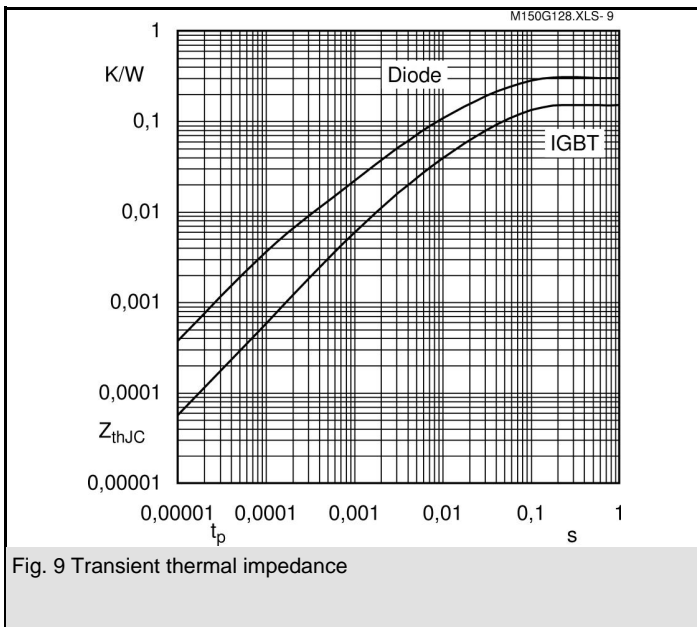
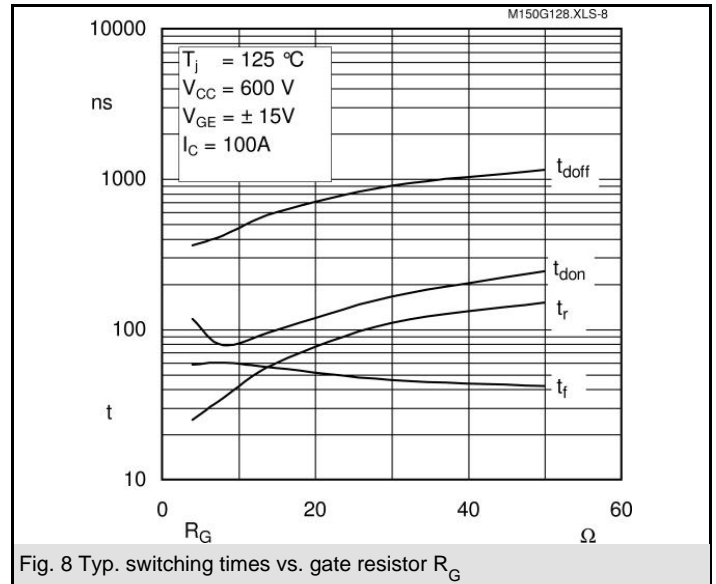
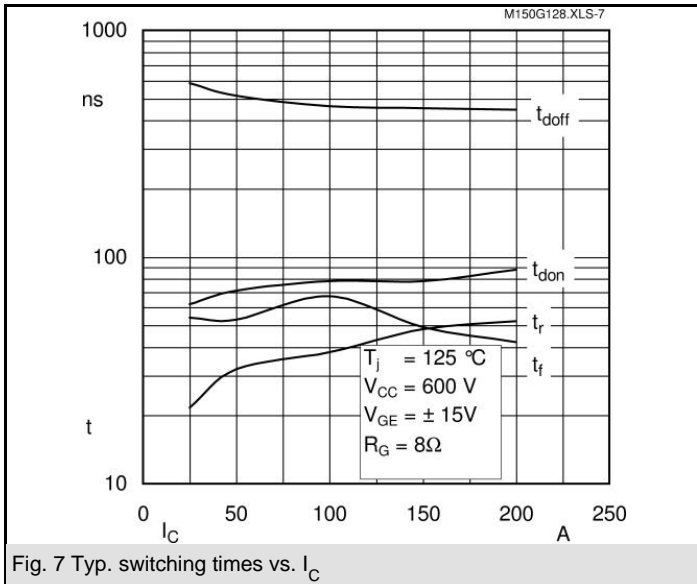


Fig. 6 Typ. gate charge characteristic

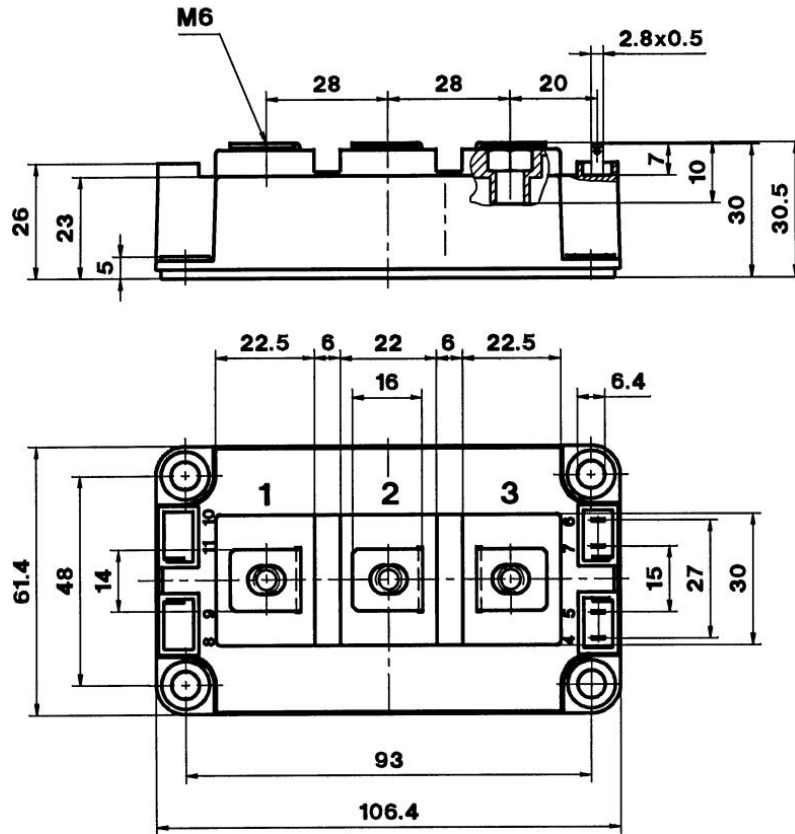


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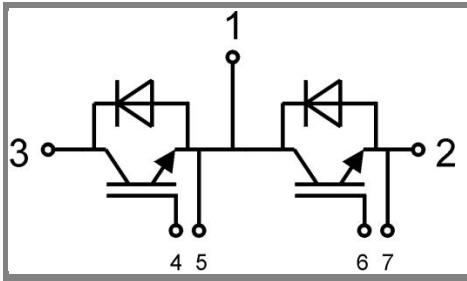
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