

SEMITRANS® 3

Superfast IGBT Modules

SKM 300GB063D

SKM 300GAR063D

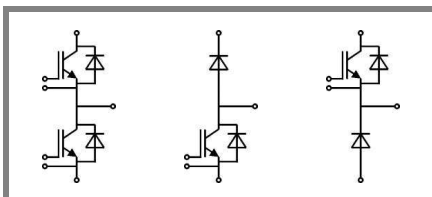
SKM 300GAL063D

Features

- NPT- Non punch-through IGBT
- Low tail current with low temperature dependence
- High short circuit capability, self limiting if term. G is clamped to E
- Pos. temp.-coeff. of V_{CEsat}
- 50 % less turn off losses
- 30 % less short circuit current
- Very low C_{ies} , C_{oes} , C_{res}
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology without hard mould
- Large clearance (13 mm) and creepage distances (20 mm)

Typical Applications*

- Switching (not for linear use)
- Switched mode power supplies
- AC inverter servo drives
- UPS uninterruptable power supplies
- Welding inverters



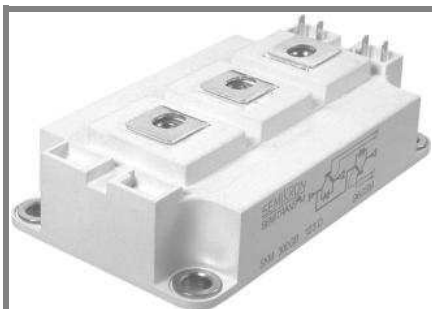
GB

GAL

GAR

Absolute Maximum Ratings		$T_c = 25\text{ °C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ °C}$	600		V
I_C	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	400	A
		$T_{case} = 70\text{ °C}$	300	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	600		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 300\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 600\text{ V}$	10		µs
Inverse Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	250	A
		$T_{case} = 80\text{ °C}$	170	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	600		A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ °C}$	1600	A
Freewheeling Diode				
I_F	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	400	A
		$T_c = 80\text{ °C}$	270	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	800		A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ °C}$	2800	A
Module				
$I_{t(RMS)}$		500		A
T_{vj}		- 40 ... + 150		°C
T_{stg}		- 40 ... + 125		°C
V_{isol}	AC, 1 min.	2500		V

Characteristics		$T_c = 25\text{ °C}$, 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}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$				
V_{CE0}		$T_j = 25\text{ °C}$	0,2	0,6	mA
		$T_j = 125\text{ °C}$			
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	3,2		mΩ
		$T_j = 125\text{ °C}$	4,7		mΩ
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}_{chiplev.}$	2,1	2,5	V
		$T_j = 125\text{ °C}_{chiplev.}$	2,4	2,8	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$ $f = 1\text{ MHz}$		17		nF
C_{oes}		2		nF	
C_{res}		1,2		nF	
Q_G	$V_{GE} = 0\text{ V} \dots +15\text{ V}$		720		nC
R_{Gint}	$T_j = \text{°C}$		1,2		Ω
$t_{d(on)}$	$R_{Gon} = 6\text{ Ω}$	$V_{CC} = 300\text{ V}$ $I_C = 300\text{ A}$	160		ns
t_r			80		ns
E_{on}	$R_{Goff} = 6\text{ Ω}$	$T_j = 125\text{ °C}$ $V_{GE} = \pm 15\text{ V}$	14		mJ
$t_{d(off)}$			550		ns
t_f			50		ns
E_{off}			13		mJ
$R_{th(j-c)}$	per IGBT			0,09	K/W



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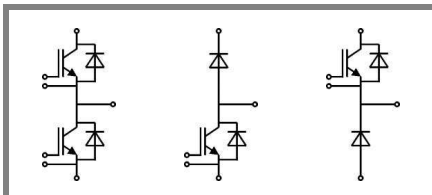
SKM 300GAL063D

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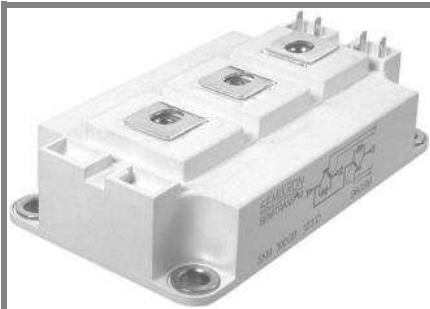
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Characteristics		min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,65	2	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,65	2	V
V_{F0}		$T_j = 125 \text{ }^\circ\text{C}$		0,9	V
r_F		$T_j = 125 \text{ }^\circ\text{C}$	3	3,7	mΩ
I_{RRM}	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	120		A
Q_{rr}			18		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 300 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,25	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,65	2	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,65	2	V
V_{F0}		$T_j = 125 \text{ }^\circ\text{C}$		0,9	V
r_F		$T_j = 125 \text{ }^\circ\text{C}$		3	V
I_{RRM}	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	130		A
Q_{rr}			23		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 300 \text{ V}$				mJ
$R_{th(j-c)FD}$	per diode			0,15	K/W
Module					
L_{CE}			15	20	nH
$R_{CC+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,35		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$	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.

*IMPORTANT INFORMATION AND WARNINGS

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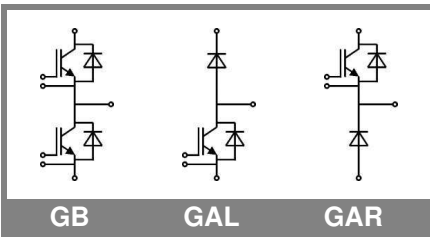
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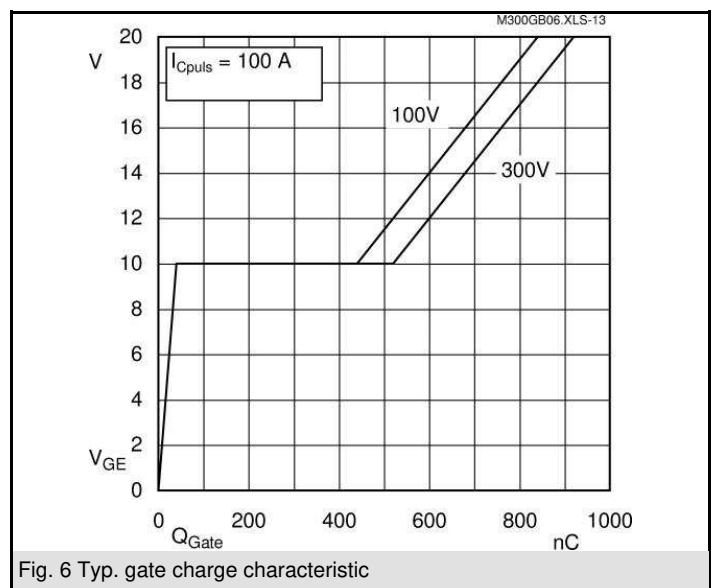
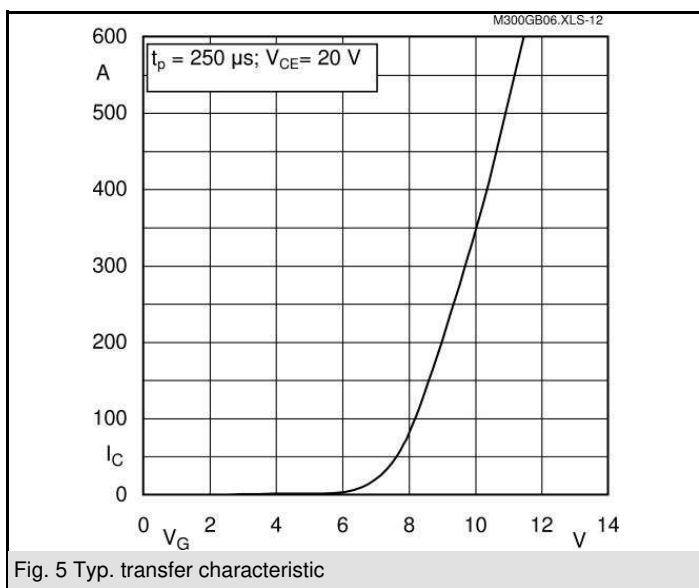
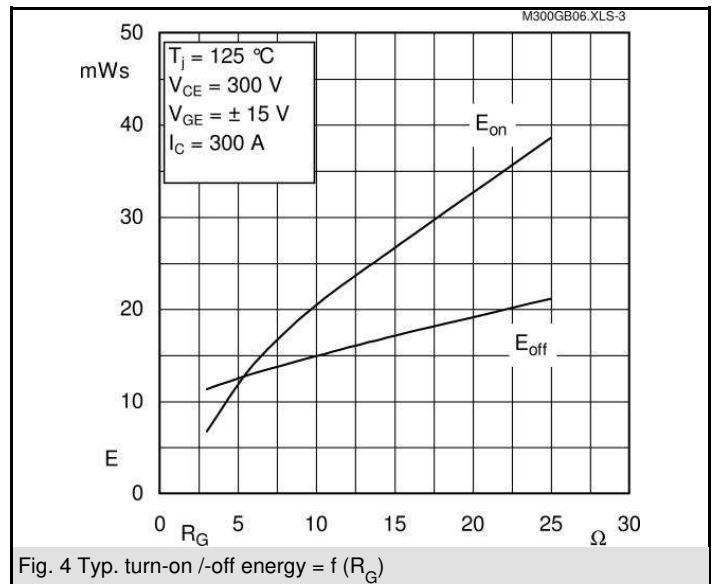
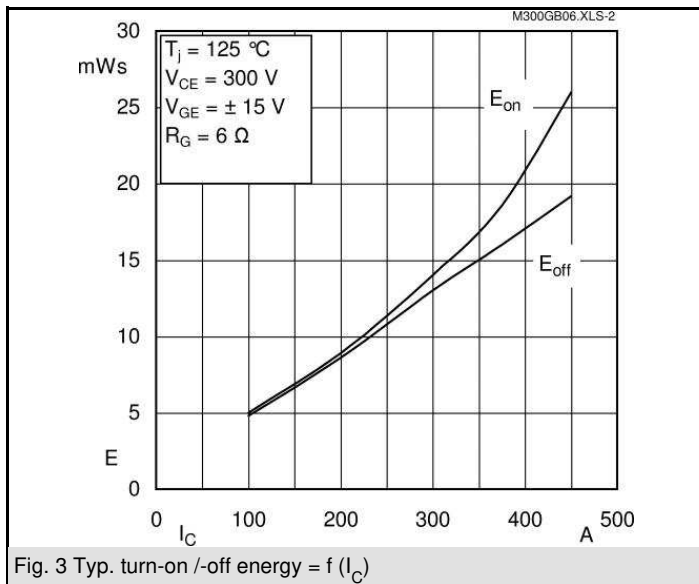
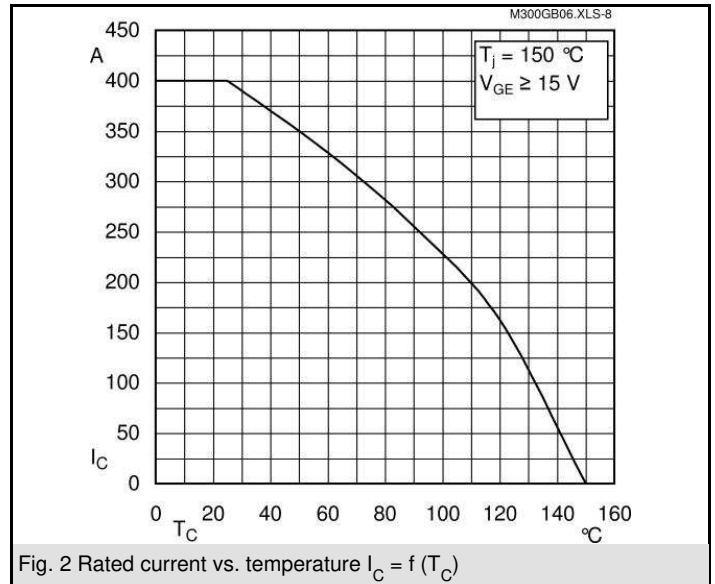
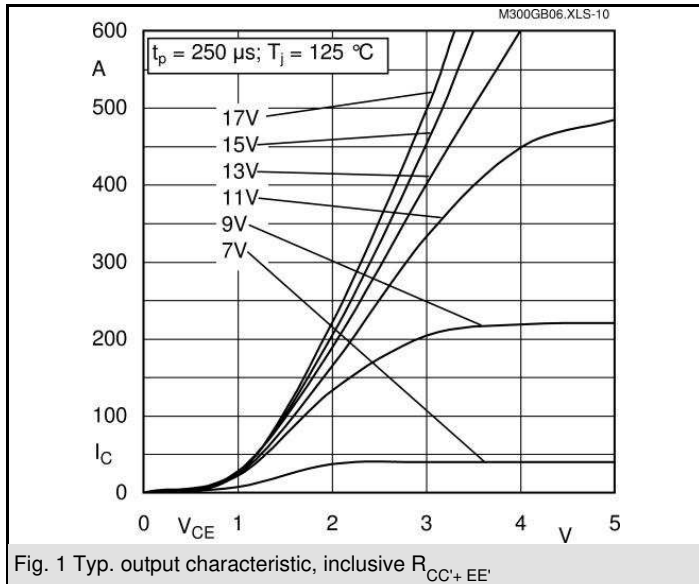
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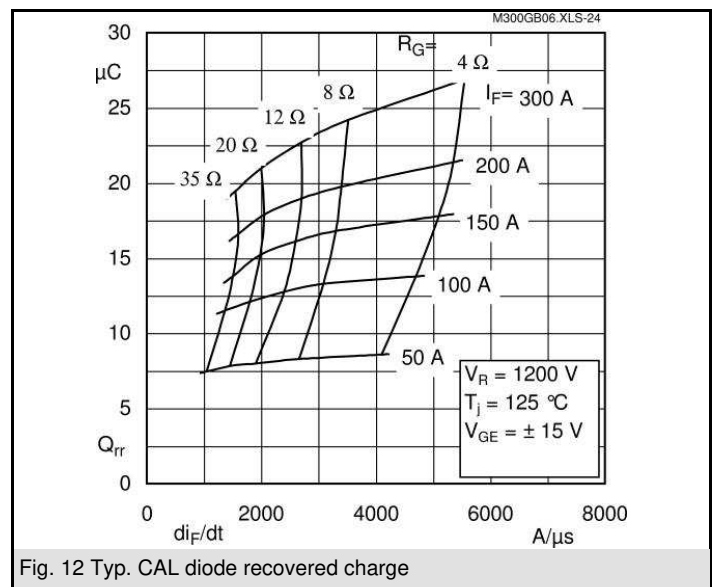
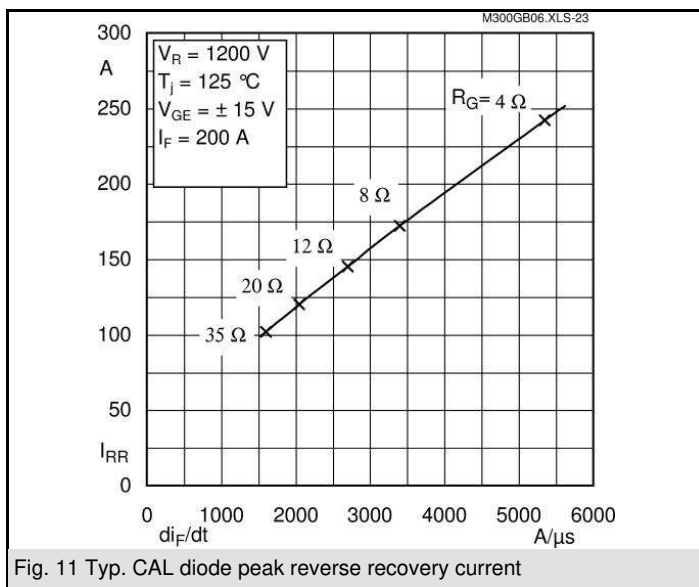
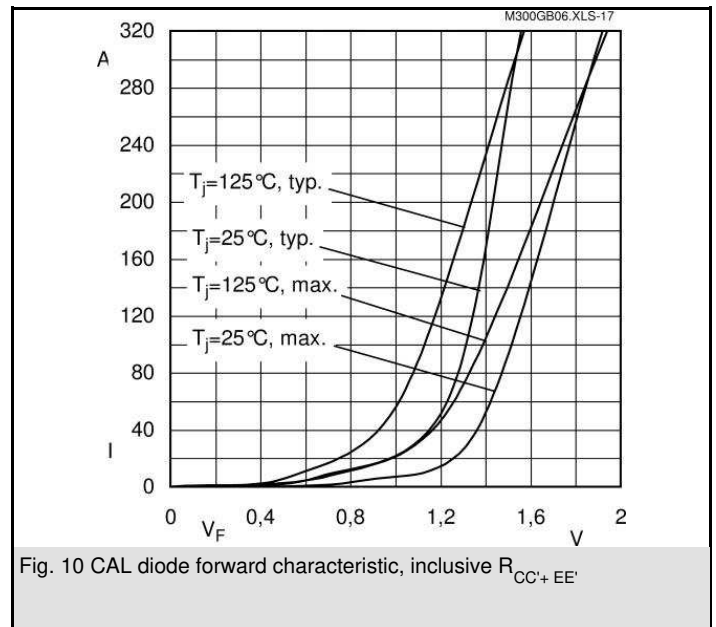
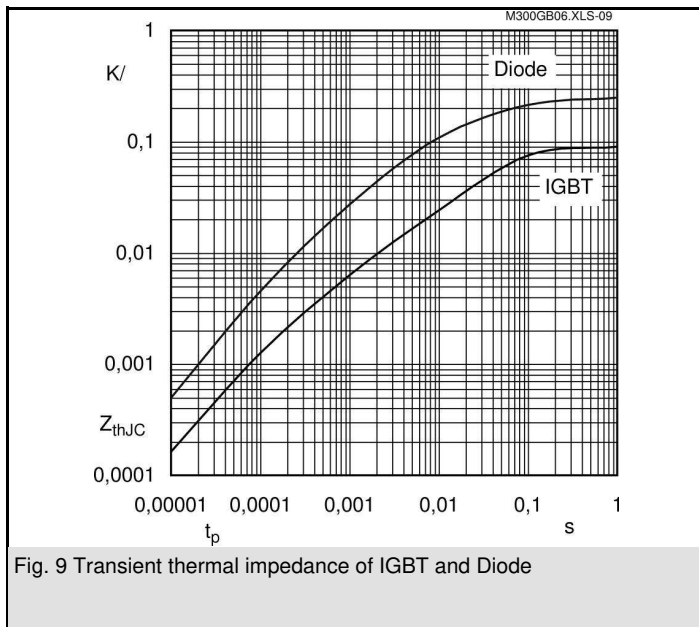
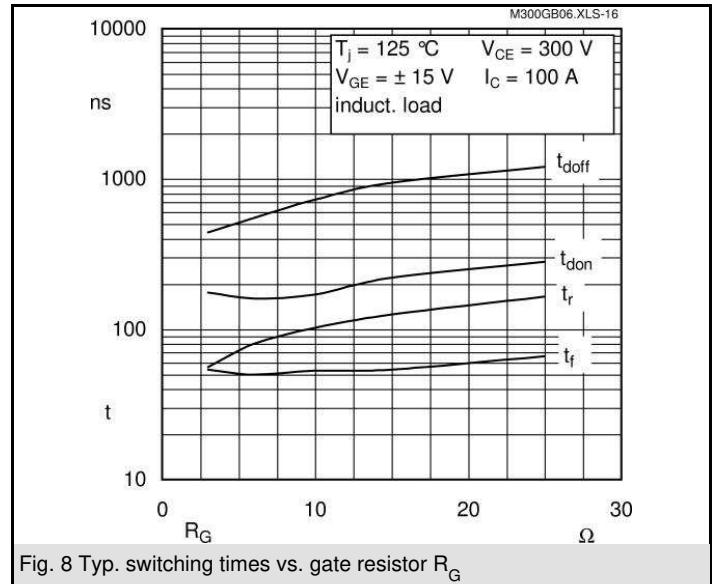
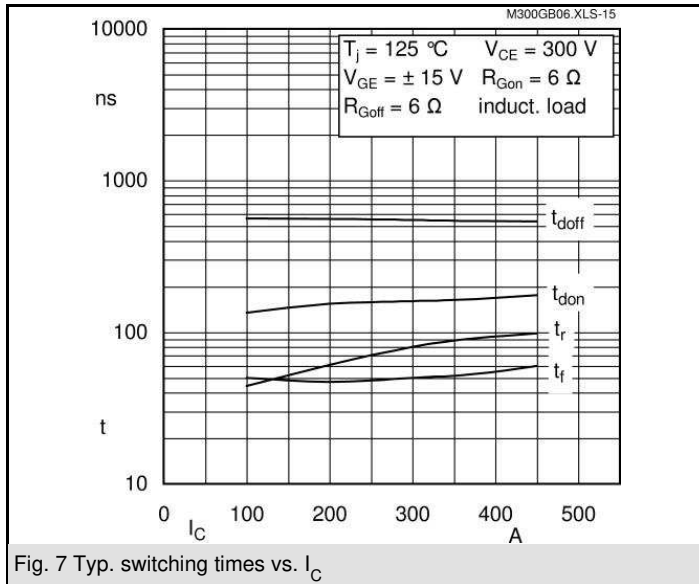
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Z_{th}		Conditions	Values	Units
Symbol				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		65	mk/W
$R_{\theta j-c}$	$i = 2$		19	mk/W
$R_{\theta j-c}$	$i = 3$		4,7	mk/W
$R_{\theta j-c}$	$i = 4$		1,3	mk/W
$\tau_{th(j-c)I}$	$i = 1$		0,0518	s
$\tau_{th(j-c)I}$	$i = 2$		0,0241	s
$\tau_{th(j-c)I}$	$i = 3$		0,0021	s
$\tau_{th(j-c)I}$	$i = 4$		0,0001	s
Symbol				
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		140	mk/W
$R_{\theta j-c}$	$i = 2$		85	mk/W
$R_{\theta j-c}$	$i = 3$		20,55	mk/W
$R_{\theta j-c}$	$i = 4$		4,45	mk/W
$\tau_{th(j-c)D}$	$i = 1$		0,0613	s
$\tau_{th(j-c)D}$	$i = 2$		0,0041	s
$\tau_{th(j-c)D}$	$i = 3$		0,0045	s
$\tau_{th(j-c)D}$	$i = 4$		0,0003	s





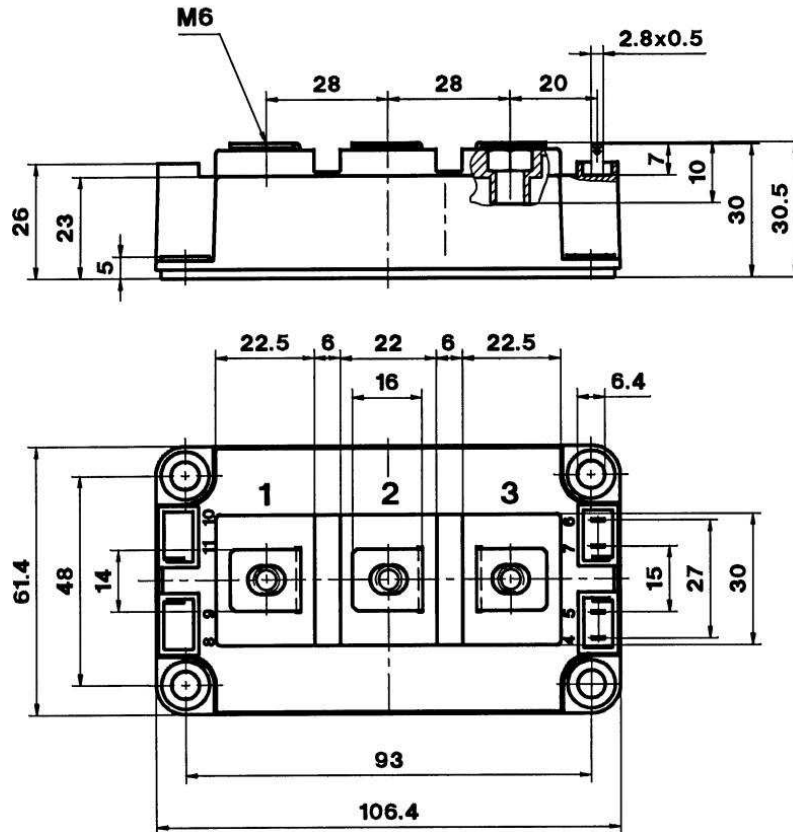


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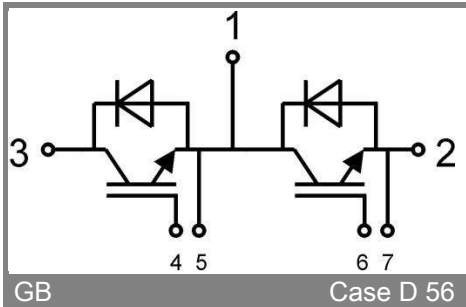
UL Recognized

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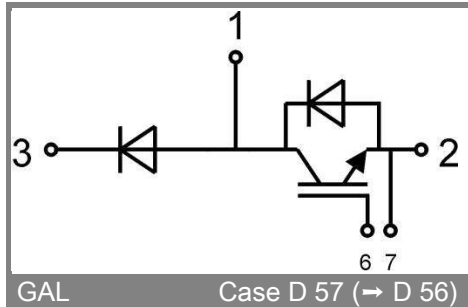
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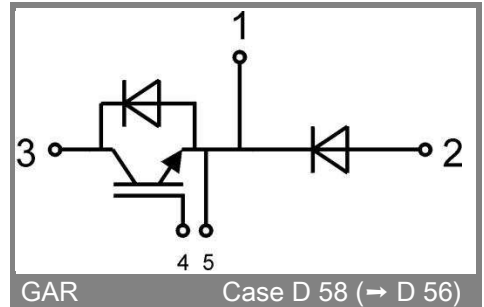
Case D 56



GB Case D 56



GAL Case D 57 (→ D 56)



GAR Case D 58 (→ D 56)