

SKM 400GA173D



SEMITRANS® 4

IGBT Modules

SKM 400GA173D

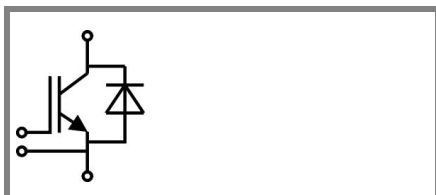
SKM 400GA173D1S

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology
- Large clearance (13 mm) and creepage distances (20 mm)

Typical Applications

- AC inverter drives on mains $575-750 V_{AC}$
- DC bus voltage $750-1200 V_{DC}$
- Public transport
- Switching (not for linear use)



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Absolute Maximum Ratings		$T_C = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1700		V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	440	A
		$T_{case} = 80^\circ\text{C}$	300	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	600		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 1200\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1700\text{ V}$	10		μs
Inverse Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	300	A
		$T_{case} = 80^\circ\text{C}$	200	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	600		A
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	2900	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					
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 20\text{ mA}$	4,8	5,5	6,2	V
I_{CES}	$V_{GE} = 0\text{ V}; V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$	0,1	0,3	mA
		$T_j = 125^\circ\text{C}$	1,65	1,9	V
V_{CE0}			1,9	2,15	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	9	6,6	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	16	9,5	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}; V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	3	3,9	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	4,3	5	V
C_{res}	$V_{CE} = 25; V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	44		nF
C_{oes}			3,5		nF
C_{res}			1		nF
Q_G	$V_{GE} = 0\text{V} \dots +15\text{V}$	330		nC	
$t_{d(on)}$	$R_{Gon} = 2\ \Omega$	$V_{CC} = 1200\text{V}$ $I_{Cnom} = 300\text{A}$	550		ns
t_r			120		ns
E_{on}	$R_{Goff} = 2\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$	180		mJ
$t_{d(off)}$			850		ns
t_f			50		ns
E_{off}			100		mJ
$R_{th(j-c)}$	per IGBT	0,05		K/W	

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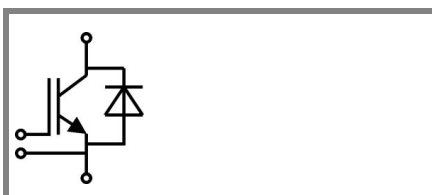
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575-750 V_{AC}
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$		2,2	2,7	V
			1,9	2,4	V
					V
V_{F0}			1,3	1,5	V
r_F			2,9	3,2	mΩ
I_{RRM}	$I_{Fnom} = 300 \text{ A}$		170		A
Q_{rr}	$di/dt = 1500 \text{ A}/\mu\text{s}$		72		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 1200 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,17	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ °C}$	0,18		mΩ
		$T_{case} = 125 \text{ °C}$	0,22		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 (M4)		2,5 (1,1)	5 (2)	Nm
w				330	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.

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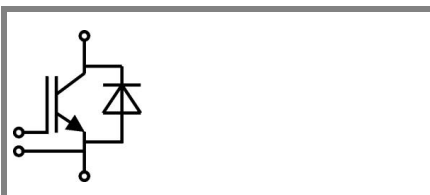
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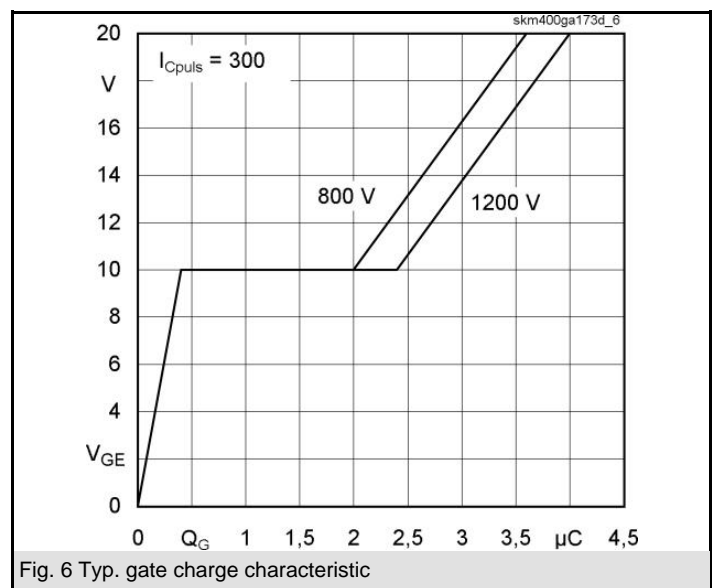
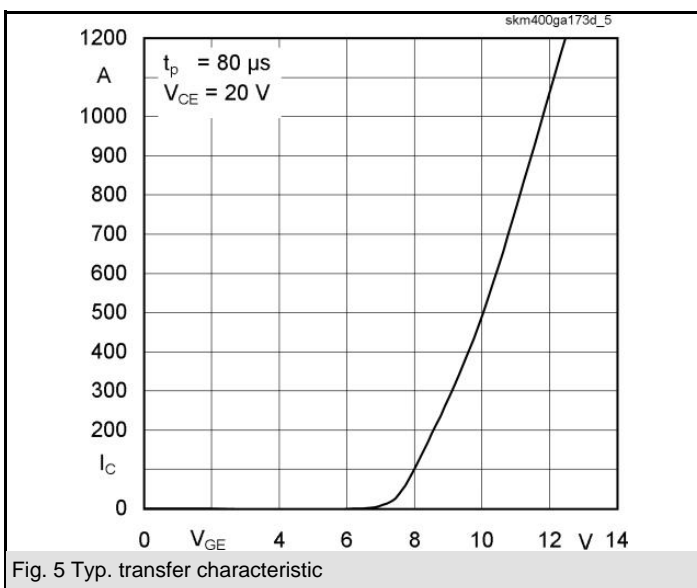
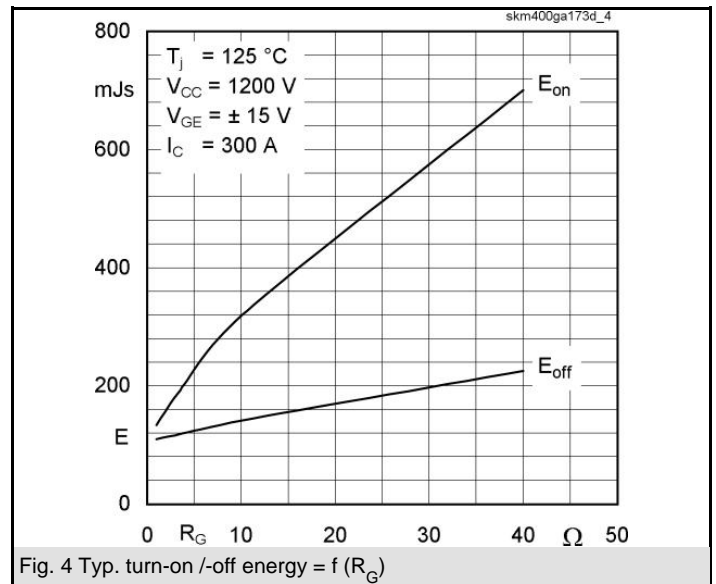
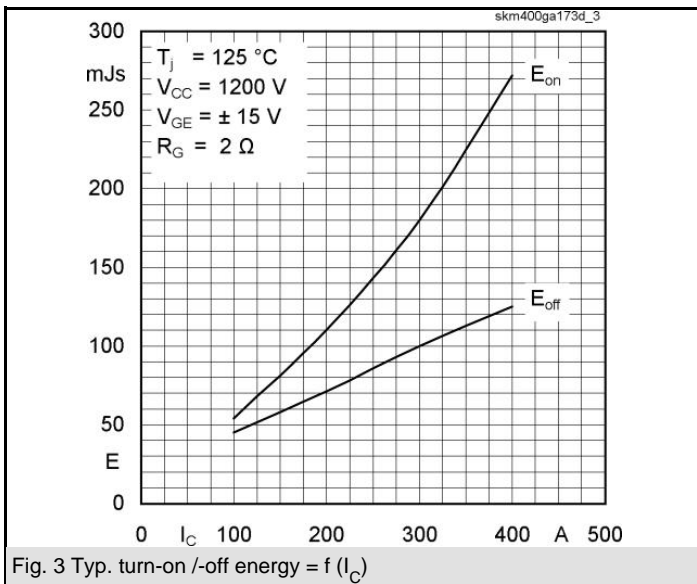
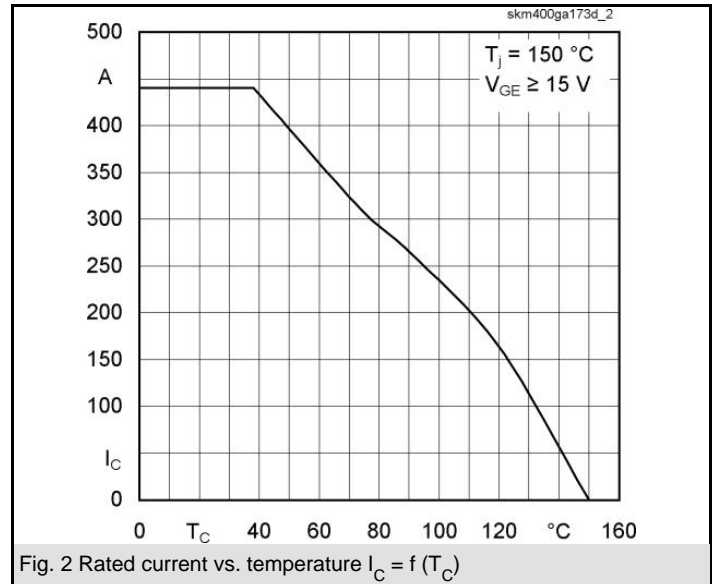
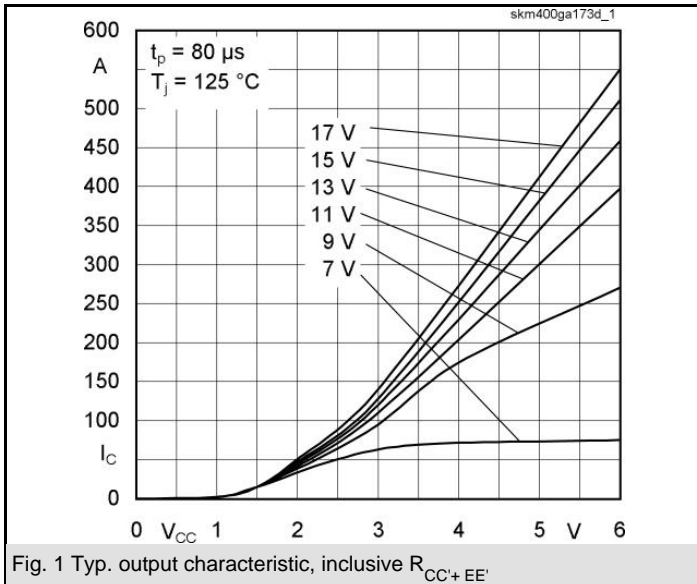
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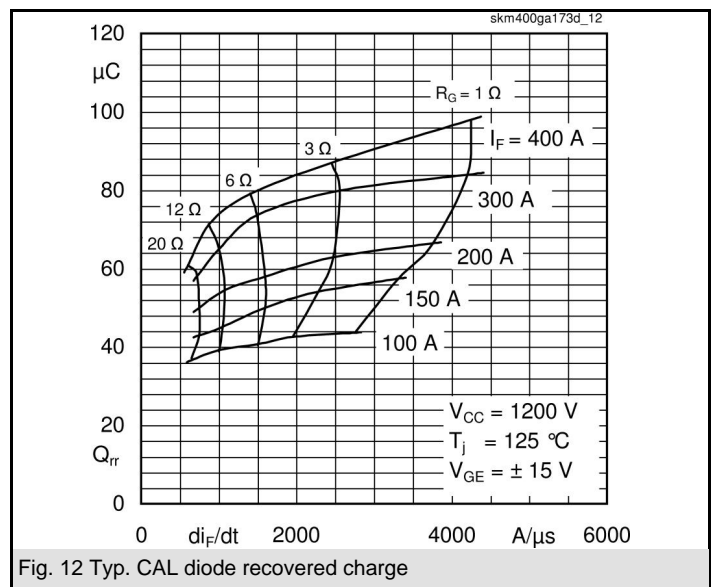
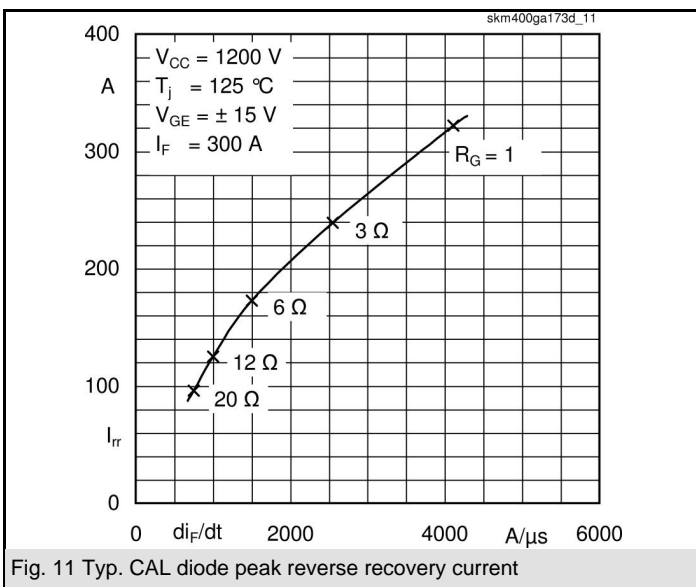
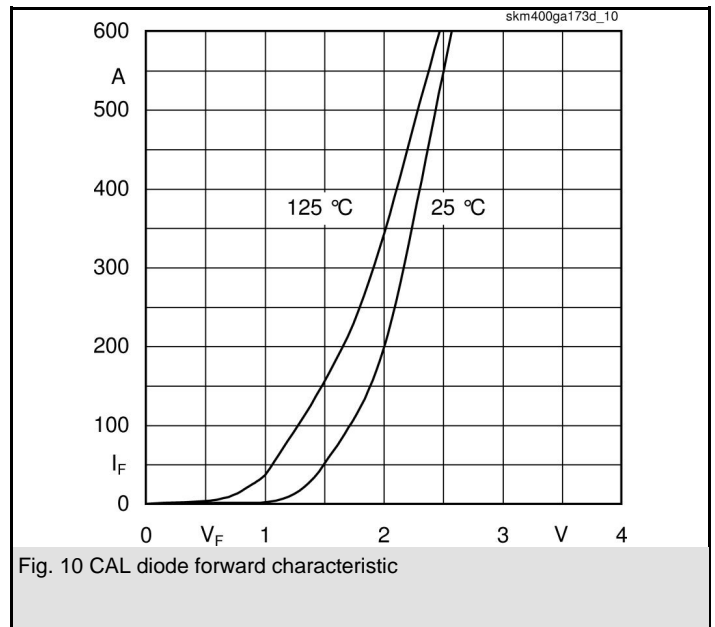
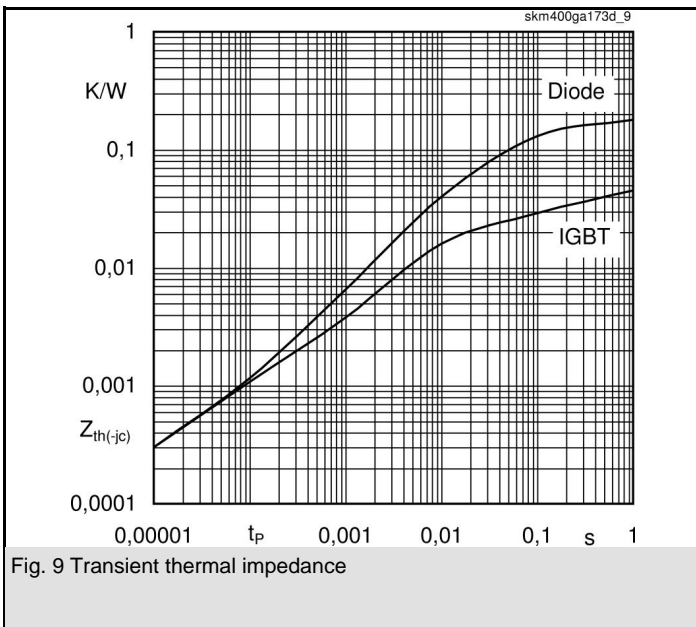
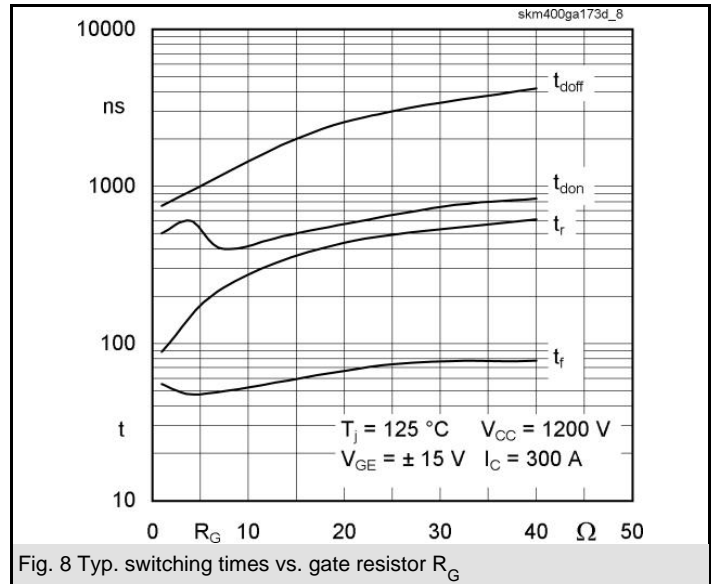
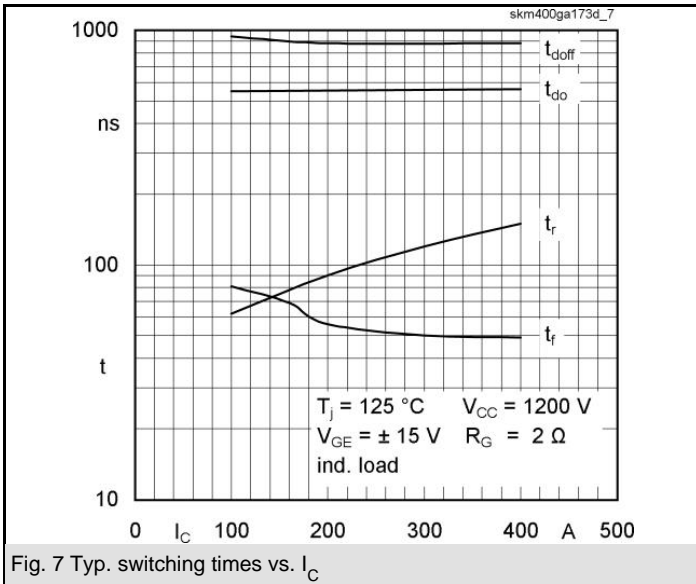
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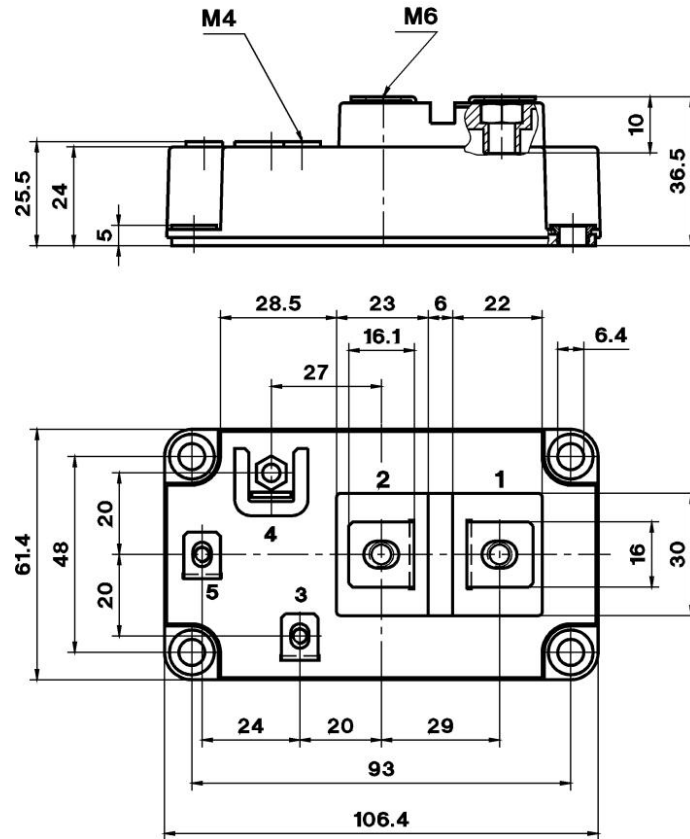
Z_{th}		Conditions	Values	Units
Symbol				
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$		34	mk/W
$R_{\theta j-c}$	$i = 2$		12,3	mk/W
$R_{\theta j-c}$	$i = 3$		2,7	mk/W
$R_{\theta j-c}$	$i = 4$		1	mk/W
$\tau_{th(j-c)I}$	$i = 1$		0,2395	s
$\tau_{th(j-c)I}$	$i = 2$		0,0044	s
$\tau_{th(j-c)I}$	$i = 3$		0,008	s
$\tau_{th(j-c)I}$	$i = 4$		0	s
Symbol				
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$		136	mk/W
$R_{\theta j-c}$	$i = 2$		28	mk/W
$R_{\theta j-c}$	$i = 3$		5	mk/W
$R_{\theta j-c}$	$i = 4$		1	mk/W
$\tau_{th(j-c)D}$	$i = 1$		0,0772	s
$\tau_{th(j-c)D}$	$i = 2$		0,0148	s
$\tau_{th(j-c)D}$	$i = 3$		0,0008	s
$\tau_{th(j-c)D}$	$i = 4$		0,005	s



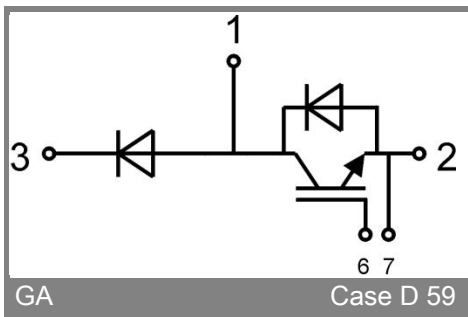


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CASED59



Case D 59



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Case D 59