

SKM 145GB123D



SEMITRANS[®] 2

IGBT Modules

SKM 145GB123D

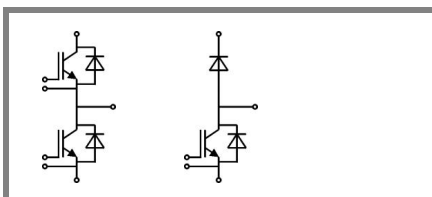
SKM 145GAL123D

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 DCB Direct Copper Bonding
- Large clearance (10 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)
- AC inverter drives



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Absolute Maximum Ratings		$T_c = 25\text{ °C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25\text{ °C}$	1200		V
I_C	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	145	A
		$T_{case} = 80\text{ °C}$	110	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	200		A
V_{GES}		± 20		V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ °C}$ $V_{CES} < 1200\text{ V}$	10		µs
Inverse Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	130	A
		$T_{case} = 80\text{ °C}$	90	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200		A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ °C}$	900	A
Freewheeling Diode				
I_F	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	170	A
		$T_{case} = 80\text{ °C}$	115	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	300		A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ °C}$	1440	A
Module				
$I_{t(RMS)}$		200		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					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 4\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
V_{CE0}		$T_j = 25\text{ °C}$	1,4	1,6	V
		$T_j = 125\text{ °C}$	1,6	1,8	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	11	14	mΩ
		$T_j = 125\text{ °C}$	15	19	mΩ
$V_{CE(sat)}$	$I_{Cnom} = 100\text{ A}, V_{GE} = 15\text{ V}$	$T_j = \text{°C}_{chiplev.}$	2,5	3	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	6,5	8,5	nF
C_{oes}			1	1,5	nF
C_{res}			0,5	0,6	nF
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$		1000		nC
R_{Gint}	$T_j = \text{°C}$		5		Ω
$t_{d(on)}$	$R_{Gon} = 6,8\text{ Ω}$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 100\text{ A}$	160	320	ns
t_r			80	160	ns
E_{on}	$R_{Goff} = 6,8\text{ Ω}$	$T_j = 125\text{ °C}$ $V_{GE} = -15\text{ V}$	16		mJ
$t_{d(off)}$			400	520	ns
t_f			70	100	ns
E_{off}			12		mJ
$R_{th(j-c)}$	per IGBT			0,15	K/W



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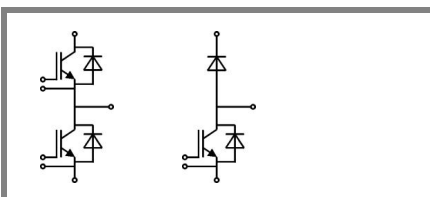
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 100 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,8		V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	1,1	1,4	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	9	11	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			mΩ
I_{RRM}	$I_{Fnom} = 100 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	35		A
Q_{rr}	$di/dt = 1000 \text{ A}/\mu\text{s}$		5		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,36	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 150 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,8		V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	1,1	1,4	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	9	11	V
		$T_j = 125 \text{ }^\circ\text{C}$			V
I_{RRM}	$I_{Fnom} = 150 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	55		A
Q_{rr}			8		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)FD}$	per diode			0,3	K/W
Module					
L_{CE}				30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,75		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$	1		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.

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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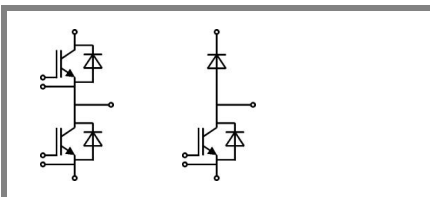
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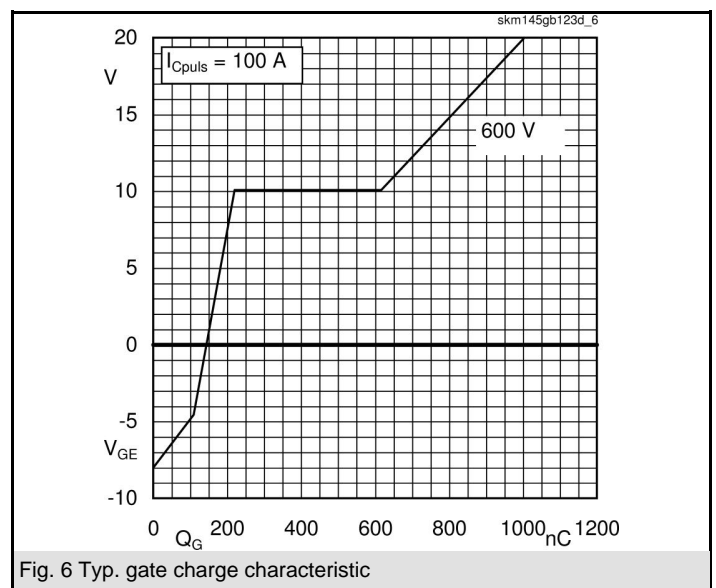
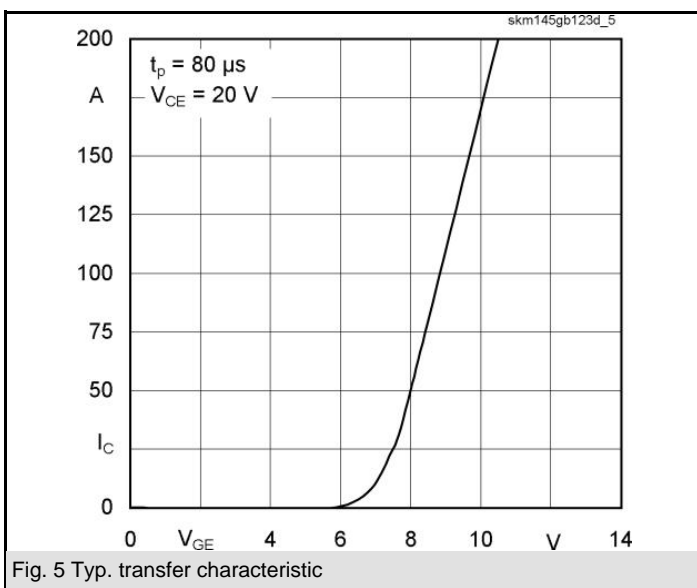
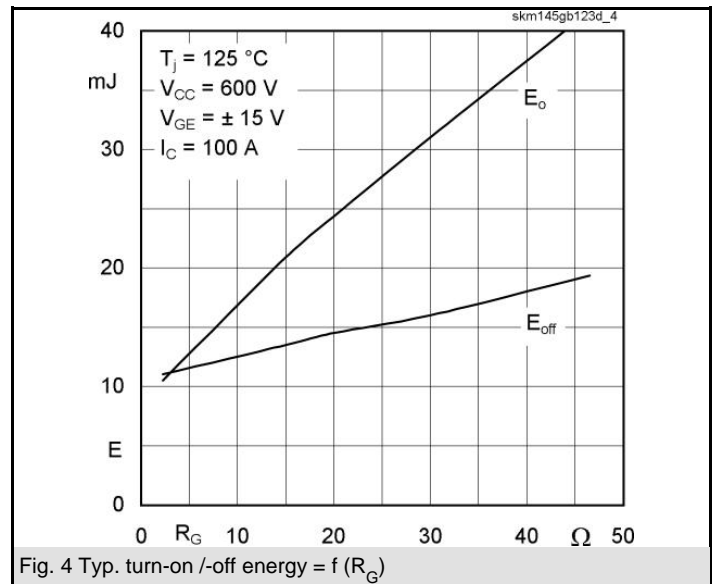
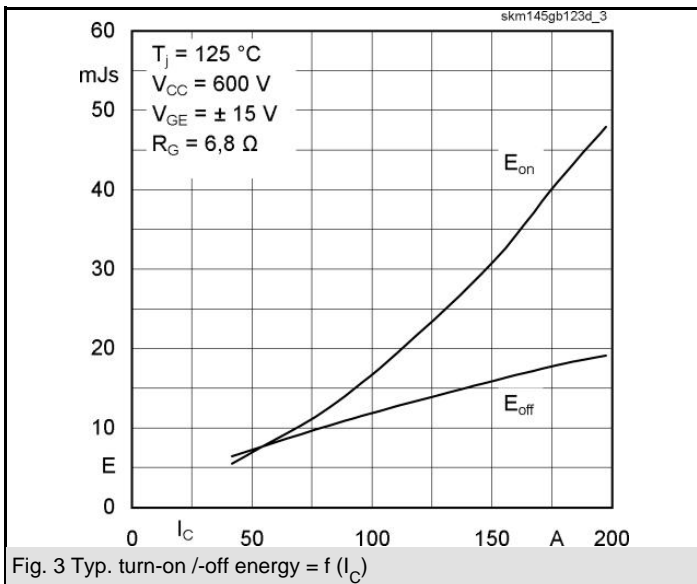
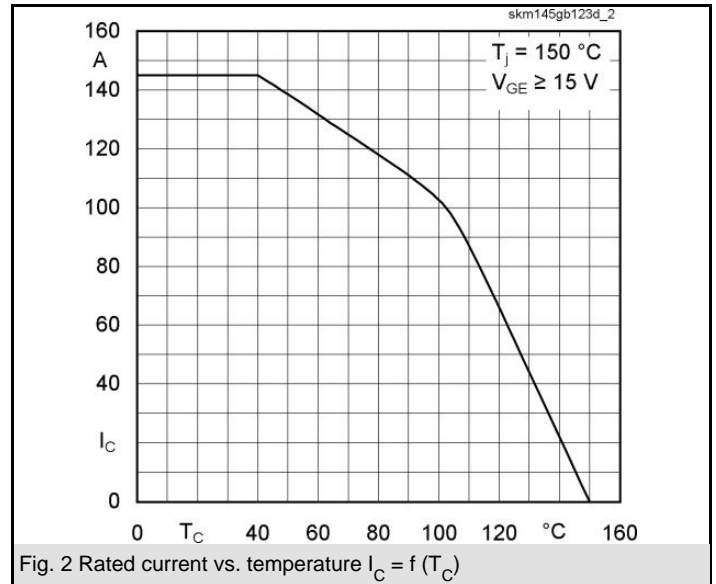
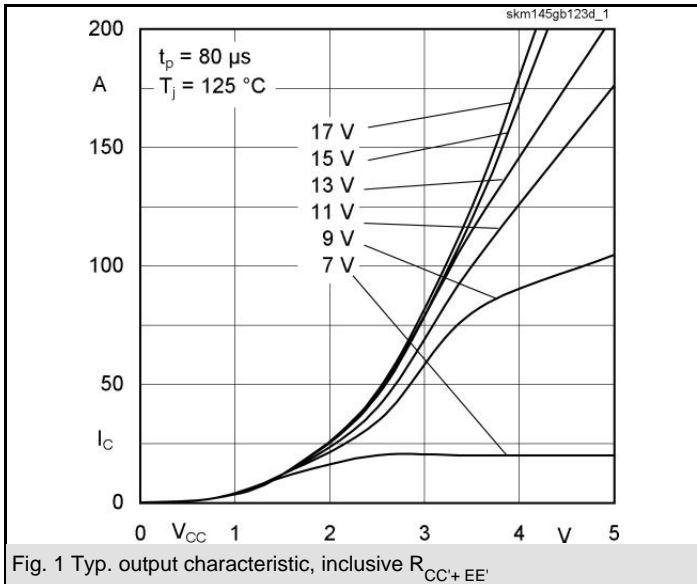
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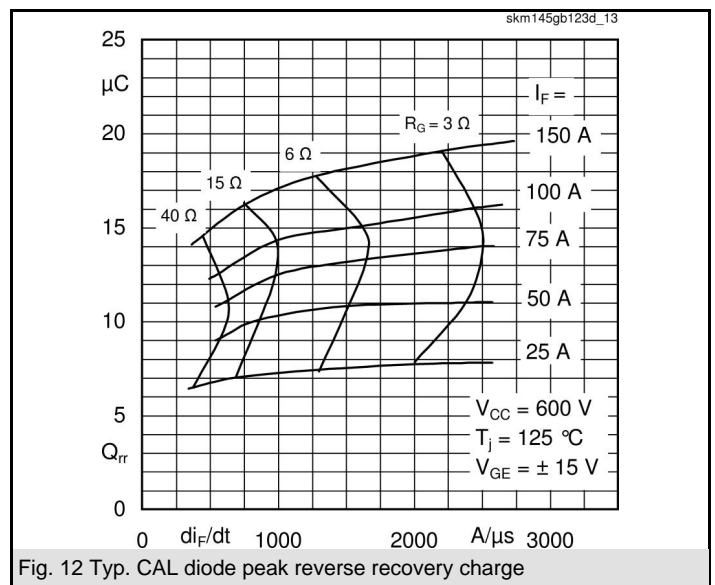
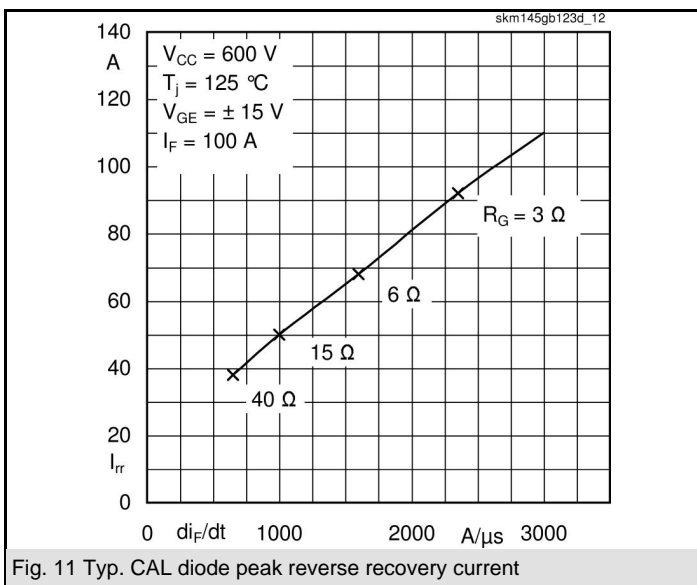
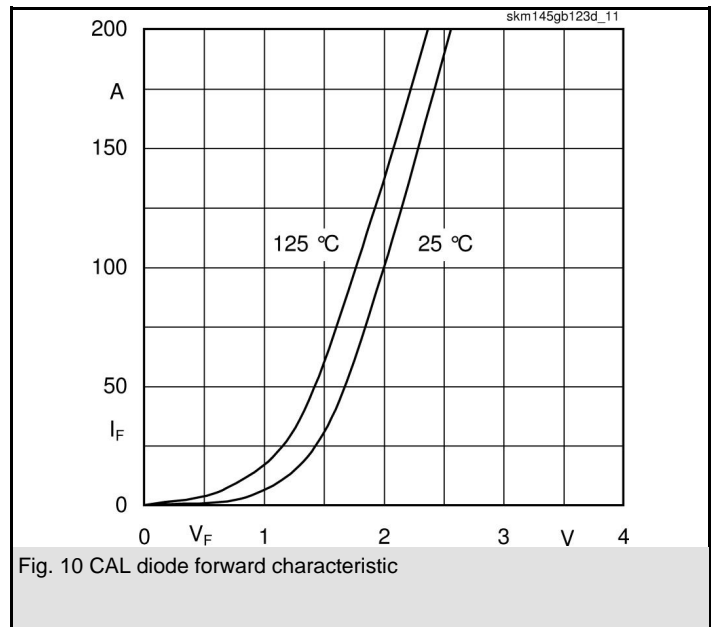
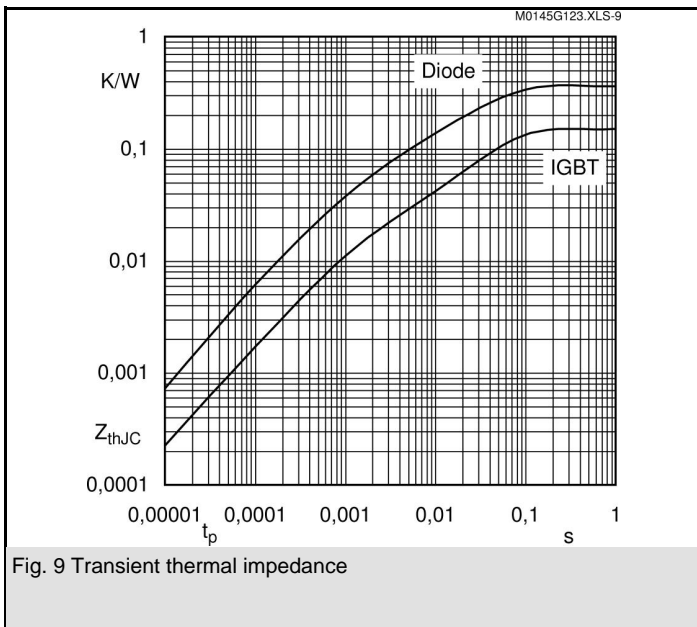
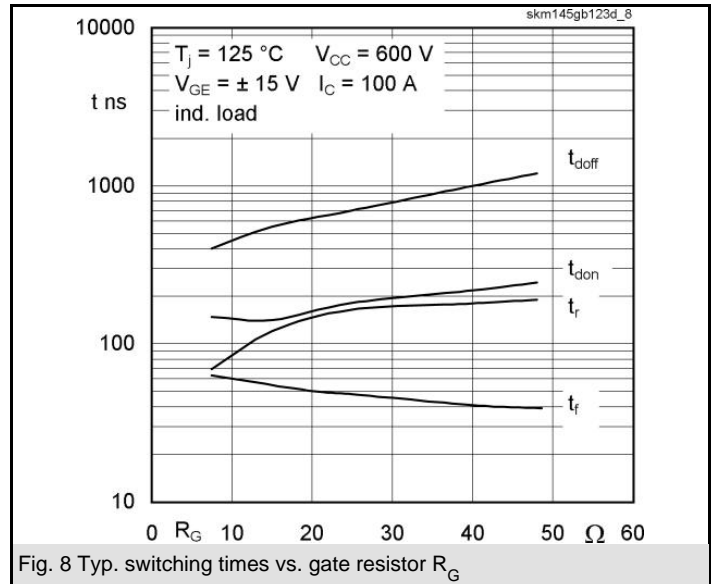
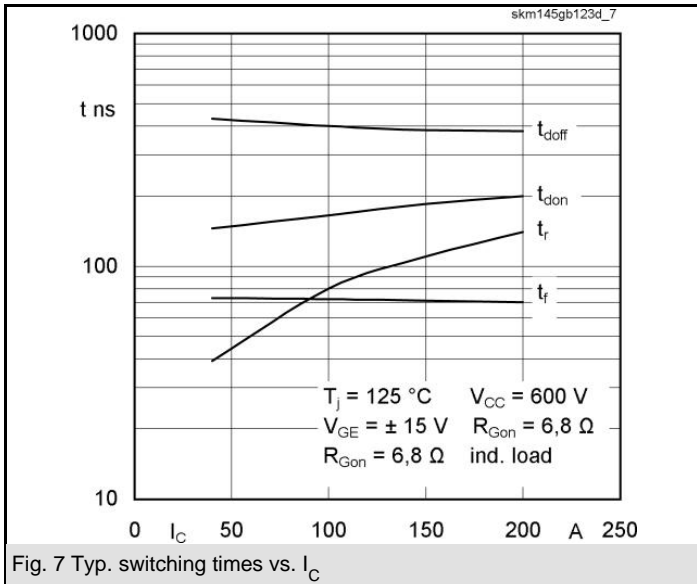
Z_{th}				
Symbol	Conditions	Values		Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$	100		mk/W
$R_{\theta j-c}$	$i = 2$	38		mk/W
$R_{\theta j-c}$	$i = 3$	10		mk/W
$R_{\theta j-c}$	$i = 4$	2		mk/W
$\tau_{th j-c}$	$i = 1$	0,03		s
$\tau_{th j-c}$	$i = 2$	0,0287		s
$\tau_{th j-c}$	$i = 3$	0,0012		s
$\tau_{th j-c}$	$i = 4$	0,0002		s
$Z_{th(j-c)D}$				
$R_{\theta j-c}$	$i = 1$	240		mk/W
$R_{\theta j-c}$	$i = 2$	95		mk/W
$R_{\theta j-c}$	$i = 3$	22		mk/W
$R_{\theta j-c}$	$i = 4$	3		mk/W
$\tau_{th j-c}$	$i = 1$	0,054		s
$\tau_{th j-c}$	$i = 2$	0,0113		s
$\tau_{th j-c}$	$i = 3$	0,0012		s
$\tau_{th j-c}$	$i = 4$	0,005		s



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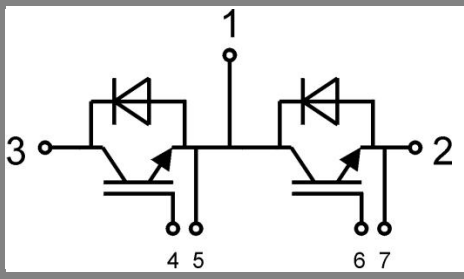
UL Recognized

CASED61

File no. E 63 532



Case D 61



GB Case D 61



GAL Case D 62 (→ D 61)