

SKM 400GA173D



SEMITRANS™ 4

IGBT Modules

SKM 400GA173D

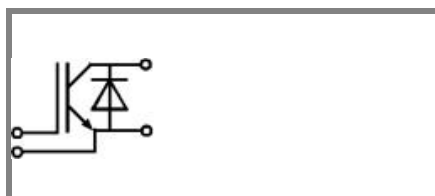
SKM 400GA173D1S

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

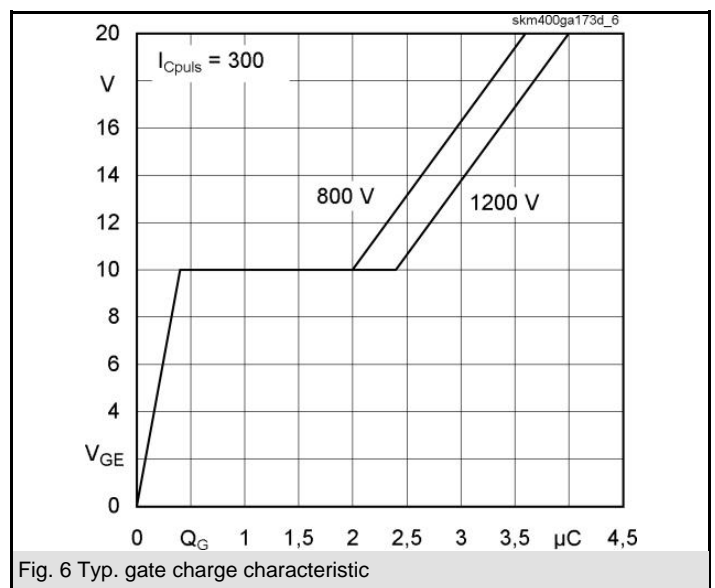
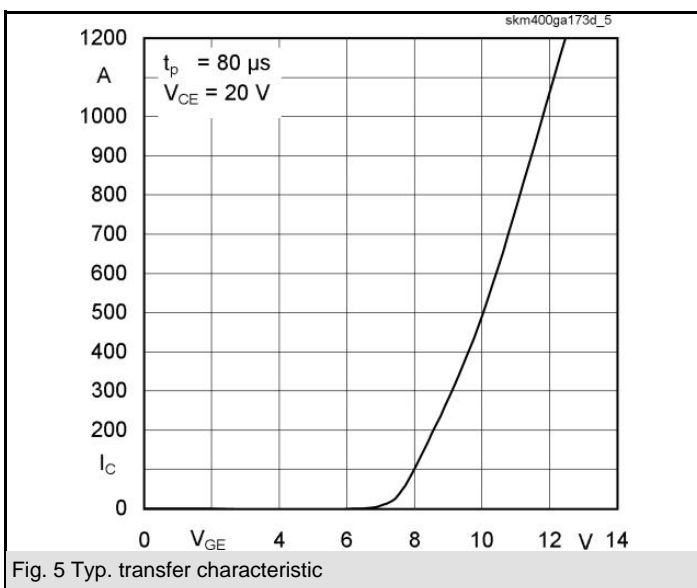
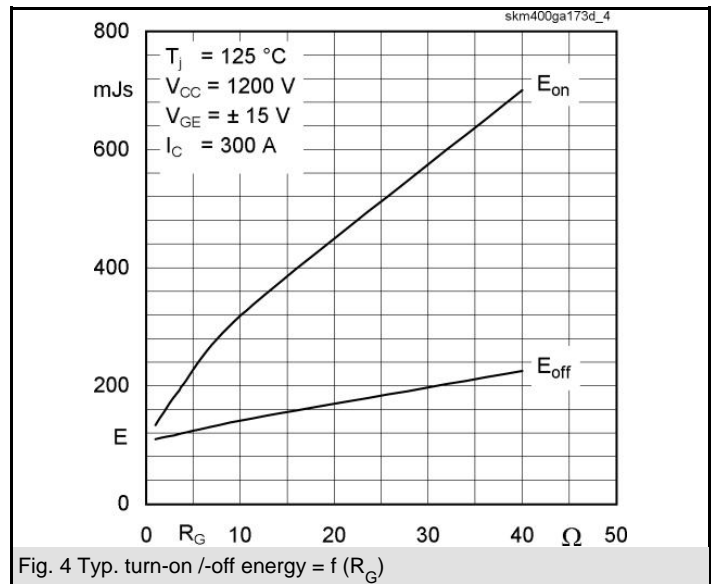
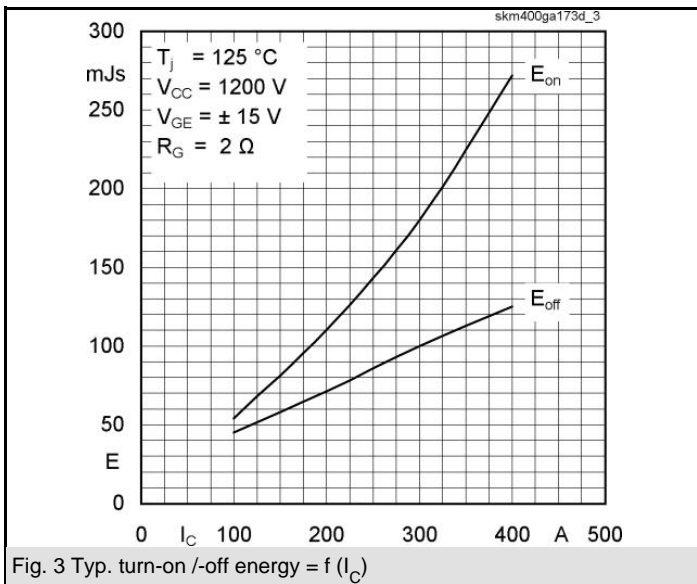
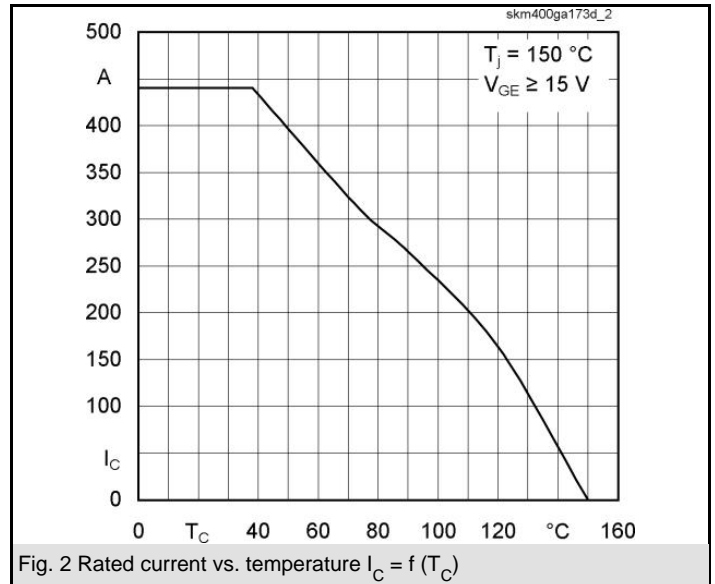
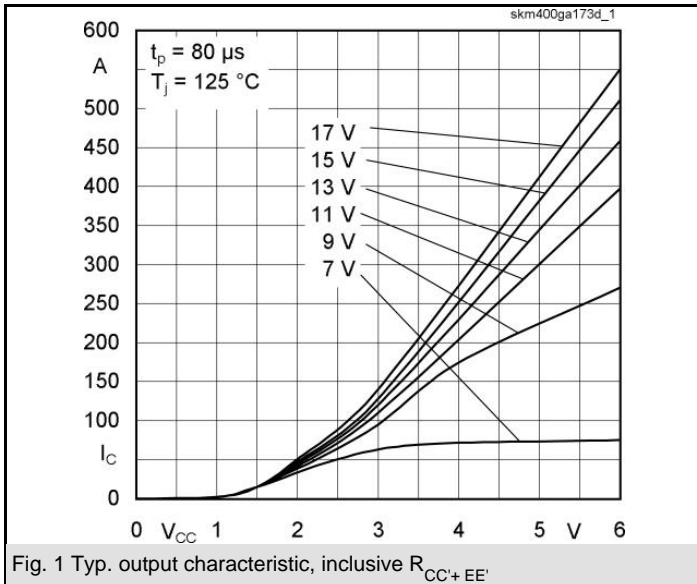
- AC inverter drives on mains 575-750 V_{AC}
- DC bus voltage 750-1200 V_{DC}
- Public transport
- Switching (not for linear use)

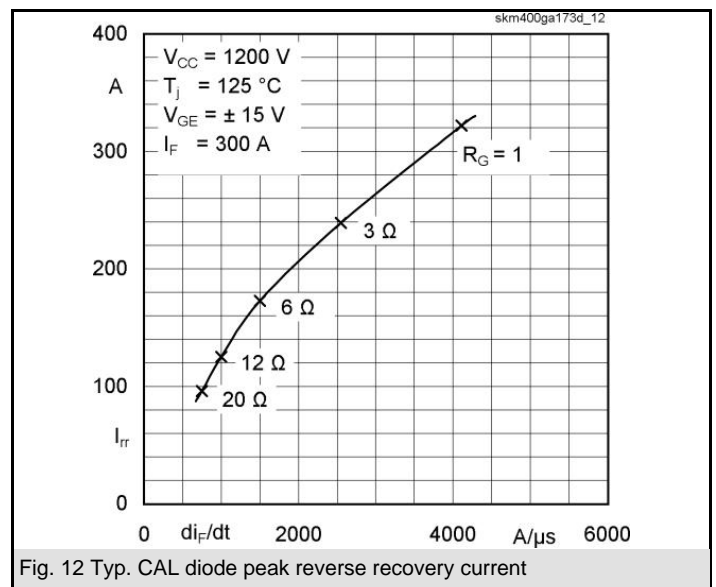
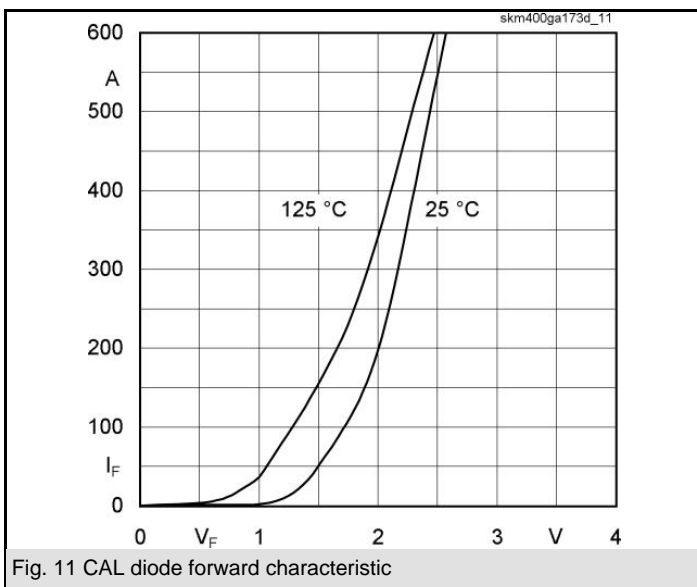
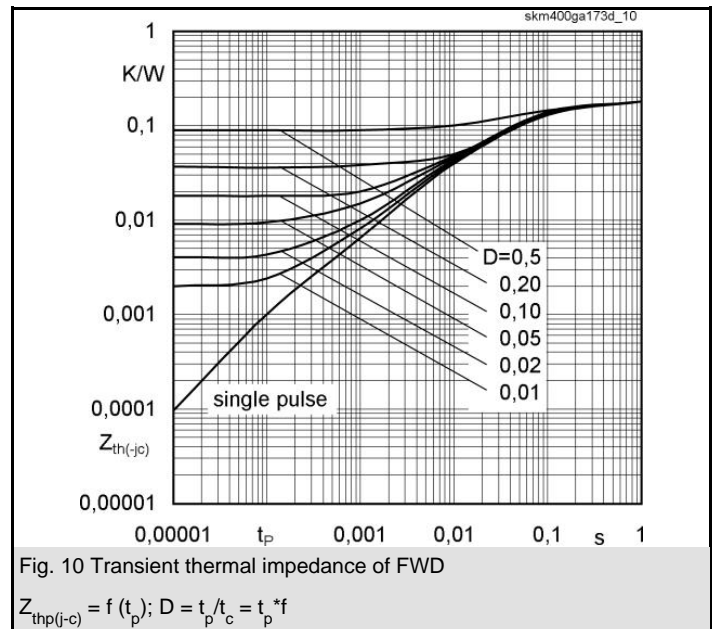
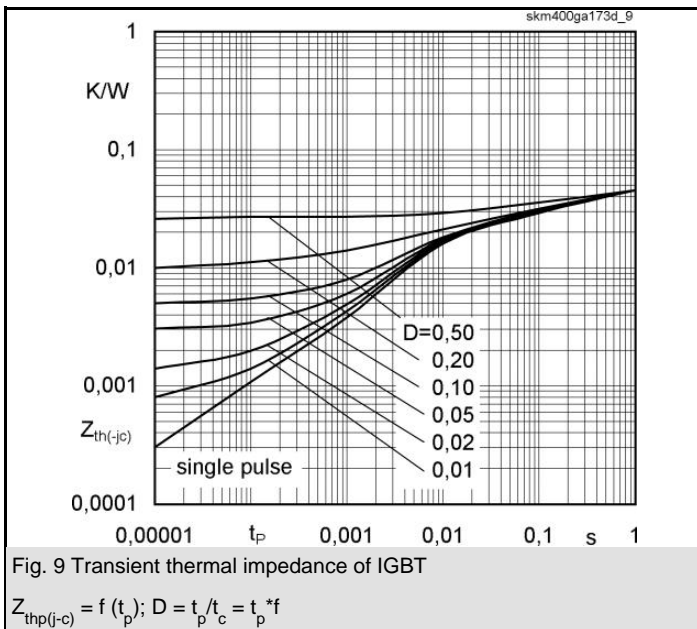
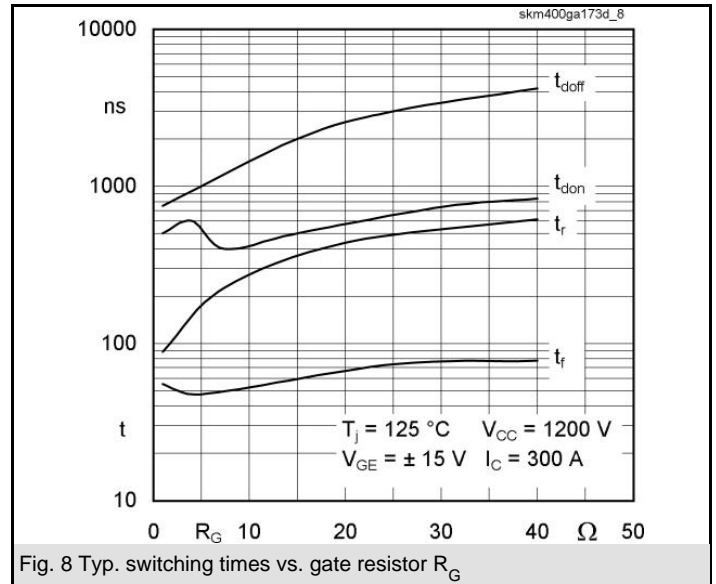
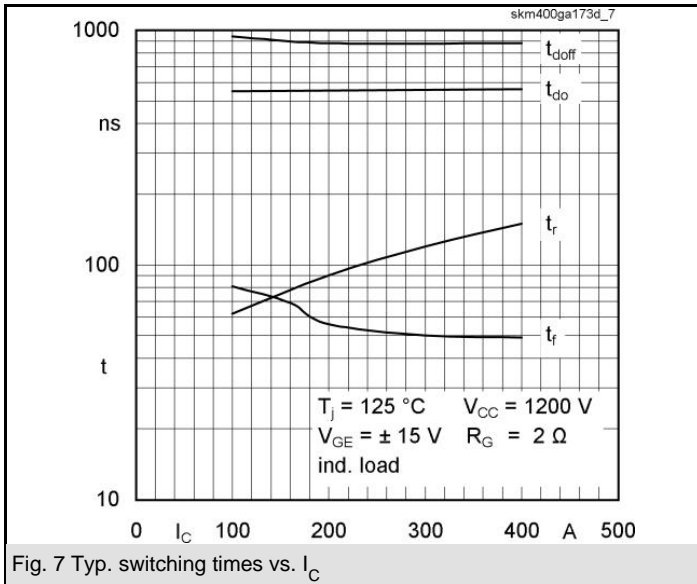


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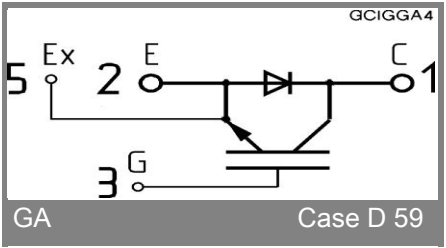
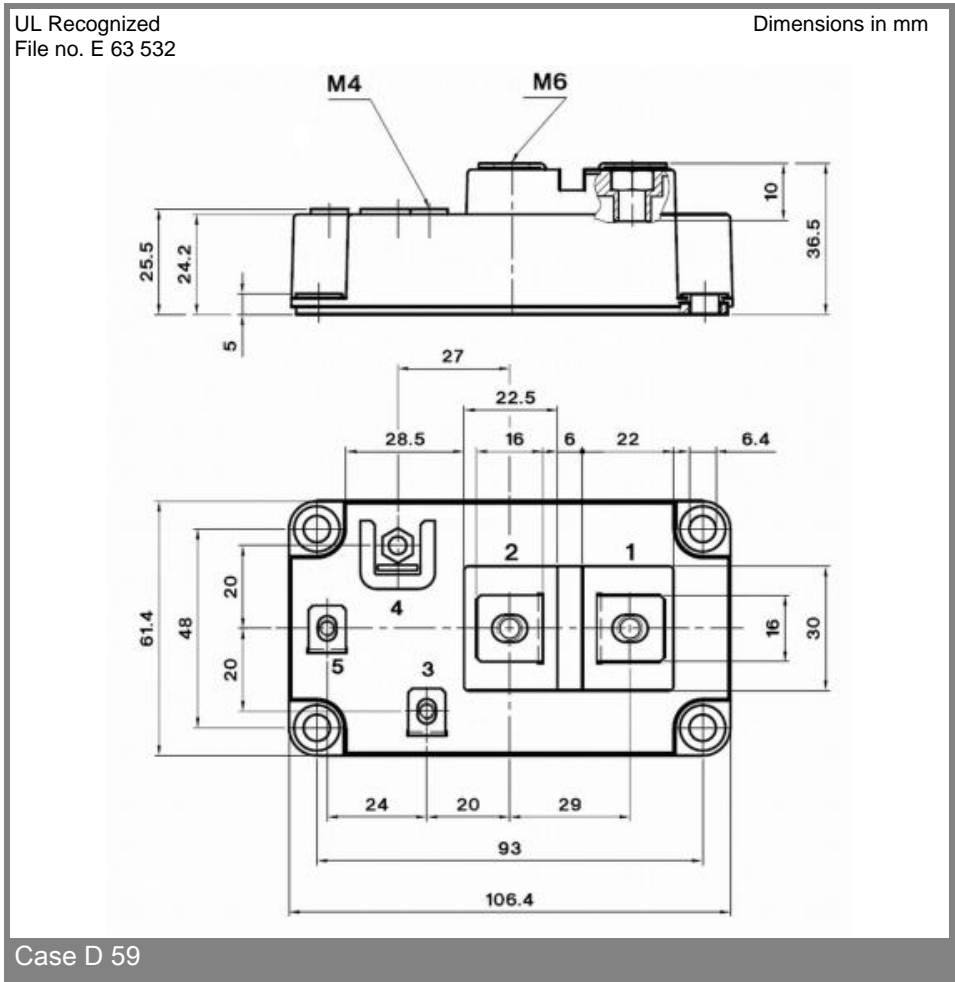
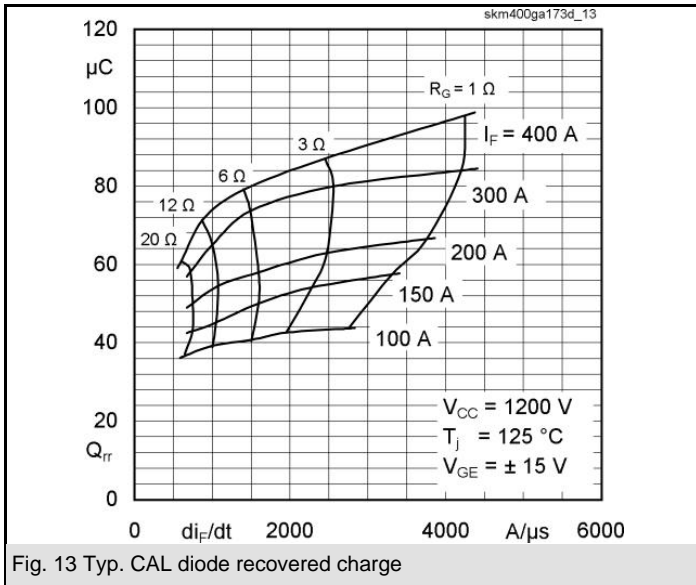
Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1700	V
I_C	$T_c = 25\text{ (80) }^\circ\text{C}$	440 (300)	A
I_{CRM}	$t_p = 1\text{ ms}$	600	A
V_{GES}		± 20	V
T_{vj} (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F	$T_c = 25\text{ (80) }^\circ\text{C}$	300 (200)	A
I_{FRM}	$t_p = 1\text{ ms}$	600	A
I_{FSM}	$t_p = 10\text{ ms; sin.; } T_j = 150\text{ }^\circ\text{C}$	2900	A

Characteristics		$T_c = 25\text{ }^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}; I_C = 20\text{ mA}$	4,8	5,5	6,2	V
I_{CES}	$V_{GE} = 0; V_{CE} = V_{CES}; T_j = 25\text{ (125) }^\circ\text{C}$		0,1	0,3	mA
$V_{CE(TO)}$	$T_j = 25\text{ (125) }^\circ\text{C}$		1,65 (1,9)	1,9 (2,15)	V
r_{CE}	$V_{GE} = 15\text{ V}; T_j = 25\text{ (125) }^\circ\text{C}$		9 (16)	6,6666 (9,5)	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}; V_{GE} = 15\text{ V}$, chip level		3 (4,3)	3,9 (5)	V
C_{ies}	under following conditions		44		nF
C_{oes}	$V_{GE} = 0; V_{CE} = 25\text{ V}; f = 1\text{ MHz}$		3,5		nF
C_{res}			1		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25\text{ (125) }^\circ\text{C}$		0,18 (0,22)		m Ω
$t_{d(on)}$	$V_{CC} = 1200\text{ V}; I_{Cnom} = 300\text{ A}$		550		ns
t_r	$R_{Gon} = R_{Goff} = 2\text{ }^\circ\Omega; T_j = 125\text{ }^\circ\text{C}$		120		ns
$t_{d(off)}$	$V_{GE} = \pm 15\text{ V}$		850		ns
t_f			50		ns
$E_{on} (E_{off})$			180 (10)		mJ
Inverse diode					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}; V_{GE} = 0\text{ V}; T_j = 25\text{ (125) }^\circ\text{C}$		2,2 (1,9)	2,7 (2,4)	V
$V_{(TO)}$	$T_j = 125\text{ () }^\circ\text{C}$		1,3	1,5	V
r_T	$T_j = 125\text{ () }^\circ\text{C}$		2,9	3,2	m Ω
I_{RRM}	$I_{Fnom} = 300\text{ A}; T_j = 25\text{ (125) }^\circ\text{C}$		120 (170)		A
Q_{rr}	$di/dt = 1500\text{ A}/\mu\text{s}$		30 (72)		μC
E_{rr}	$V_{GE} = V$				mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,05	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,17	K/W
$R_{th(c-s)}$	per module			0,038	K/W
Mechanical data					
M_s	to heatsink M6	3		5	Nm
M_t	to terminals M6 (M4)	2,5 (1,1)		5 (2)	Nm
w				330	g





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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.