



**SEMITRANS™ 2**

## Superfast NPT-IGBT Modules

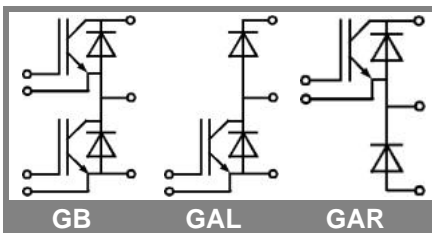
**SKM 75GB063D**  
**SKM 75GAR063D**  
**SKM 75GAL063D**

### Features

- N channel, homogeneous Si-structure (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  $V_{CEsat}$
- Very low  $C_{ies}$ ,  $C_{oes}$ ,  $C_{res}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DBC Direct Copper Bonding Technology without hard mould
- Large clearance (10 mm) and creepage distances (20 mm)

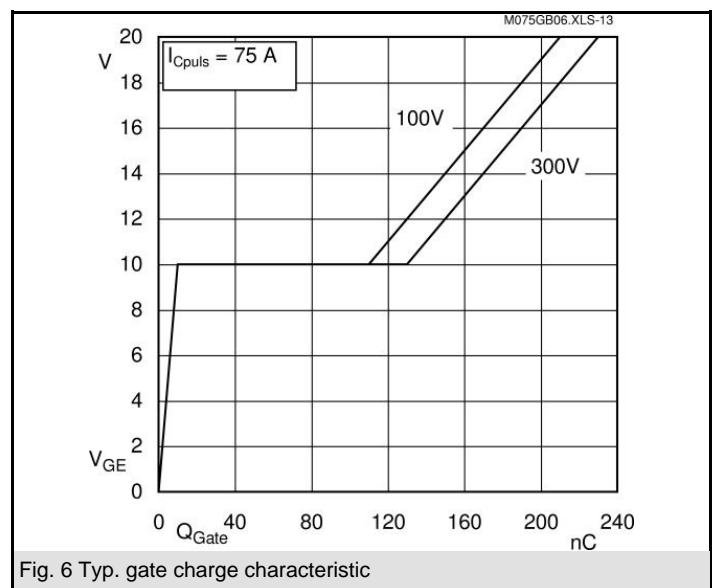
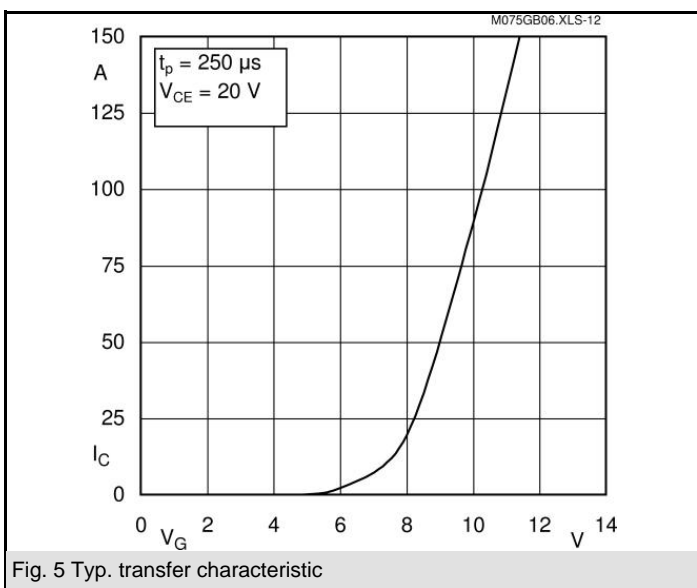
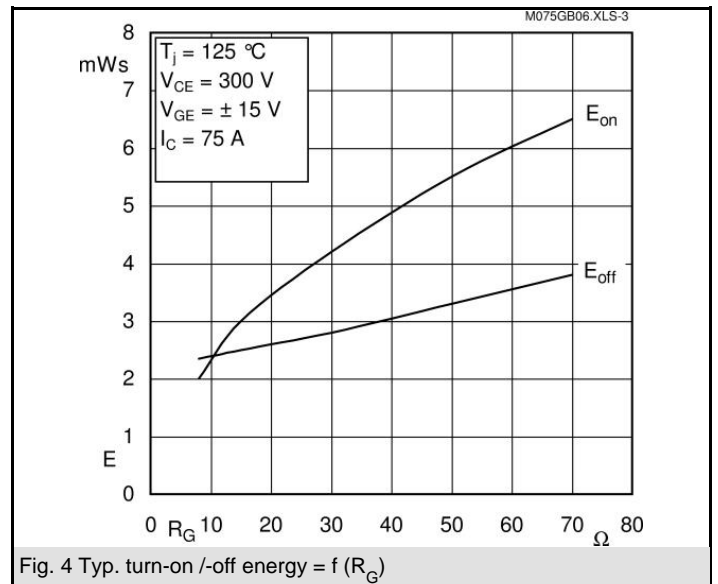
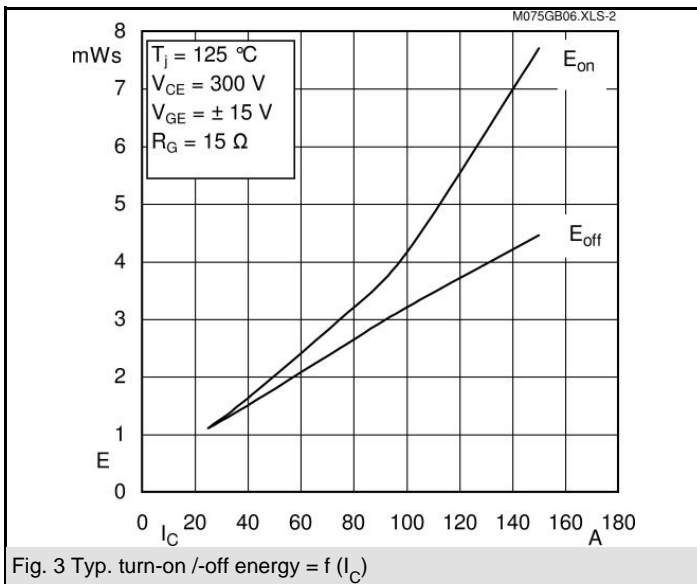
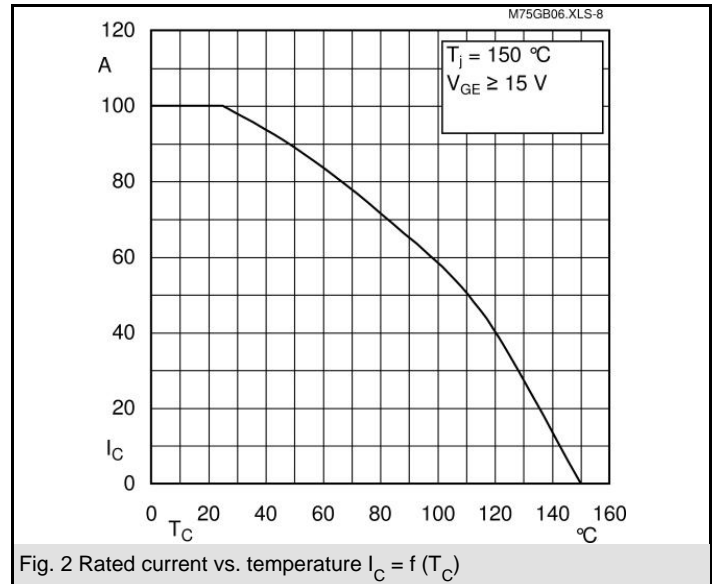
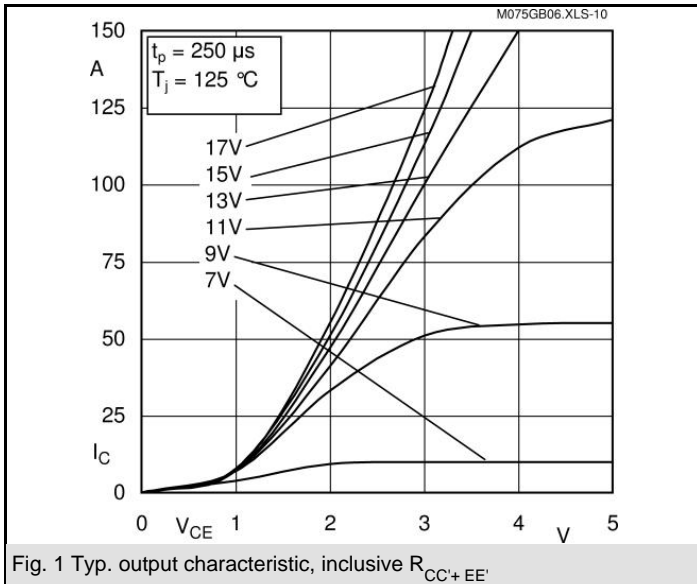
### Typical Applications

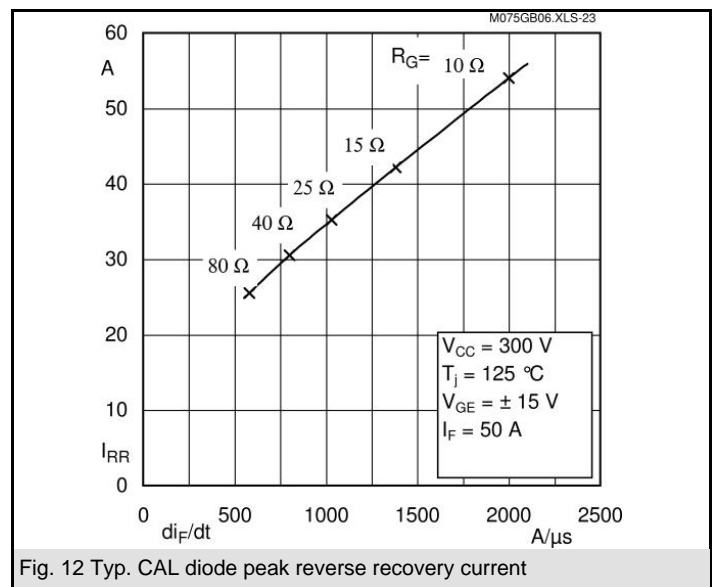
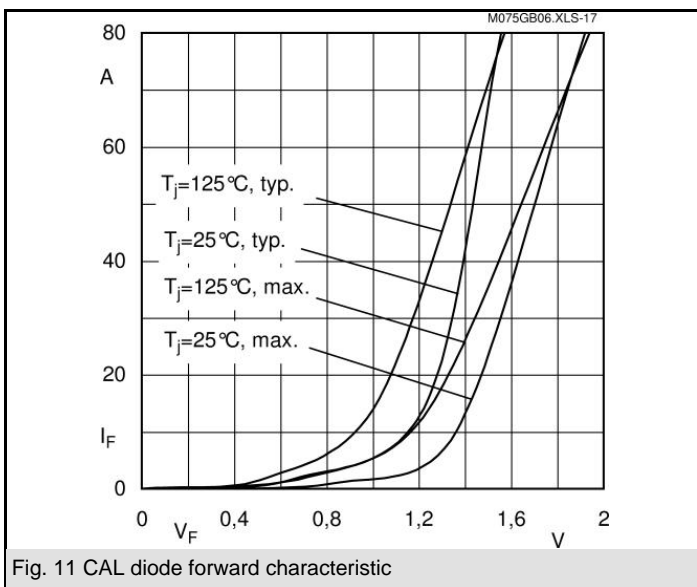
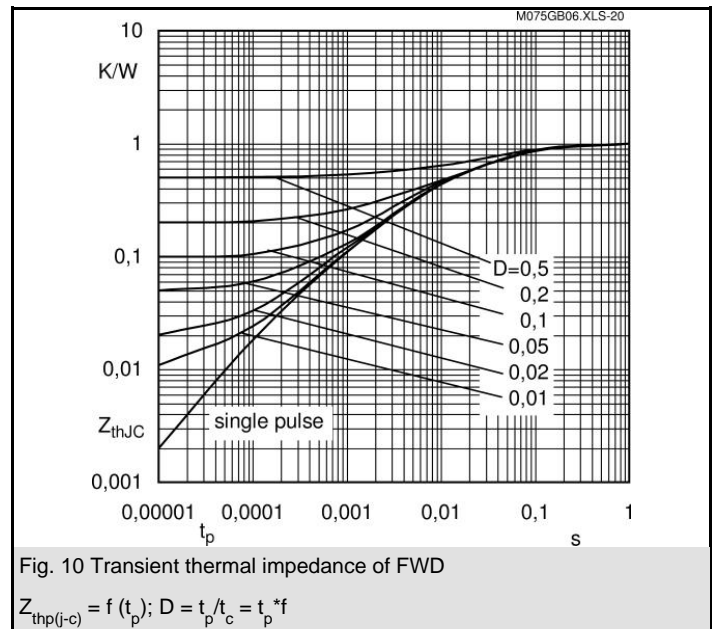
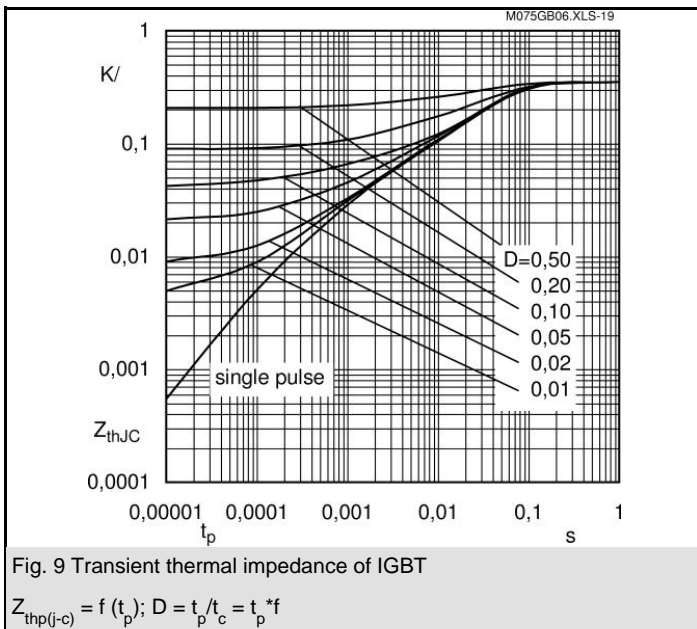
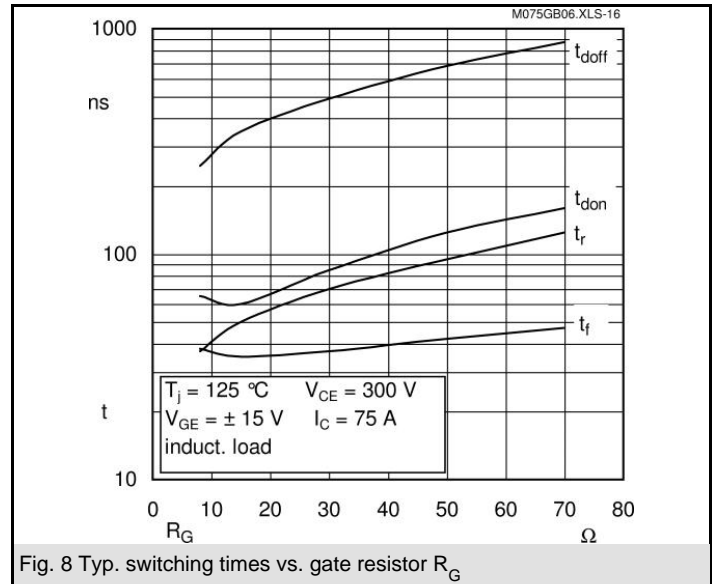
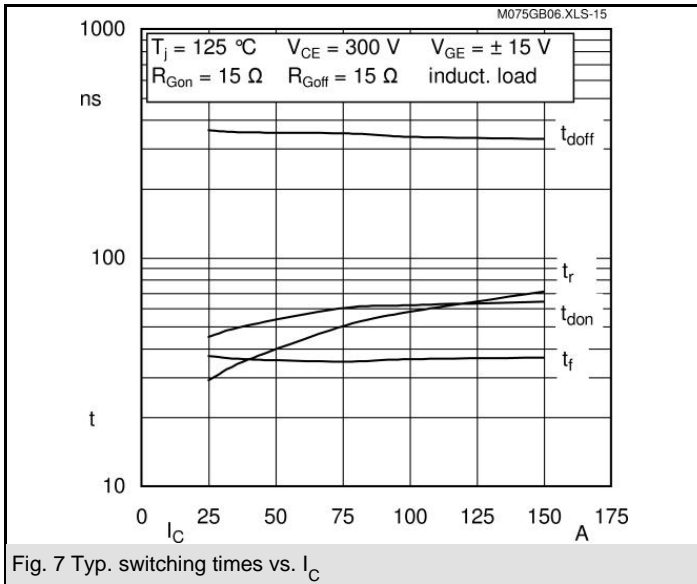
- Switching (not for linear use)
- Switched mode power supplies
- UPS
- Three phase inverters for servo / AC motor speed control
- Pulse frequencies also > 10kHz

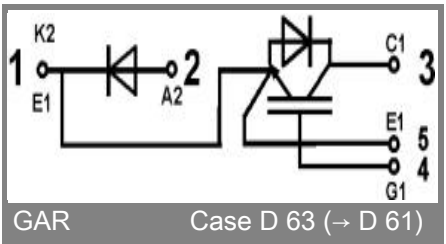
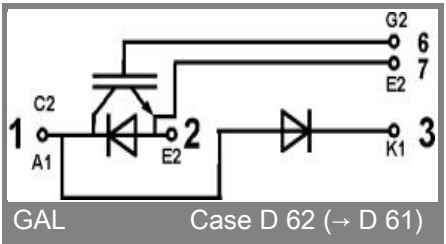
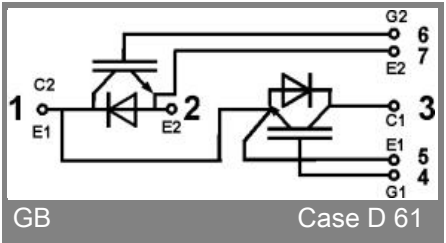
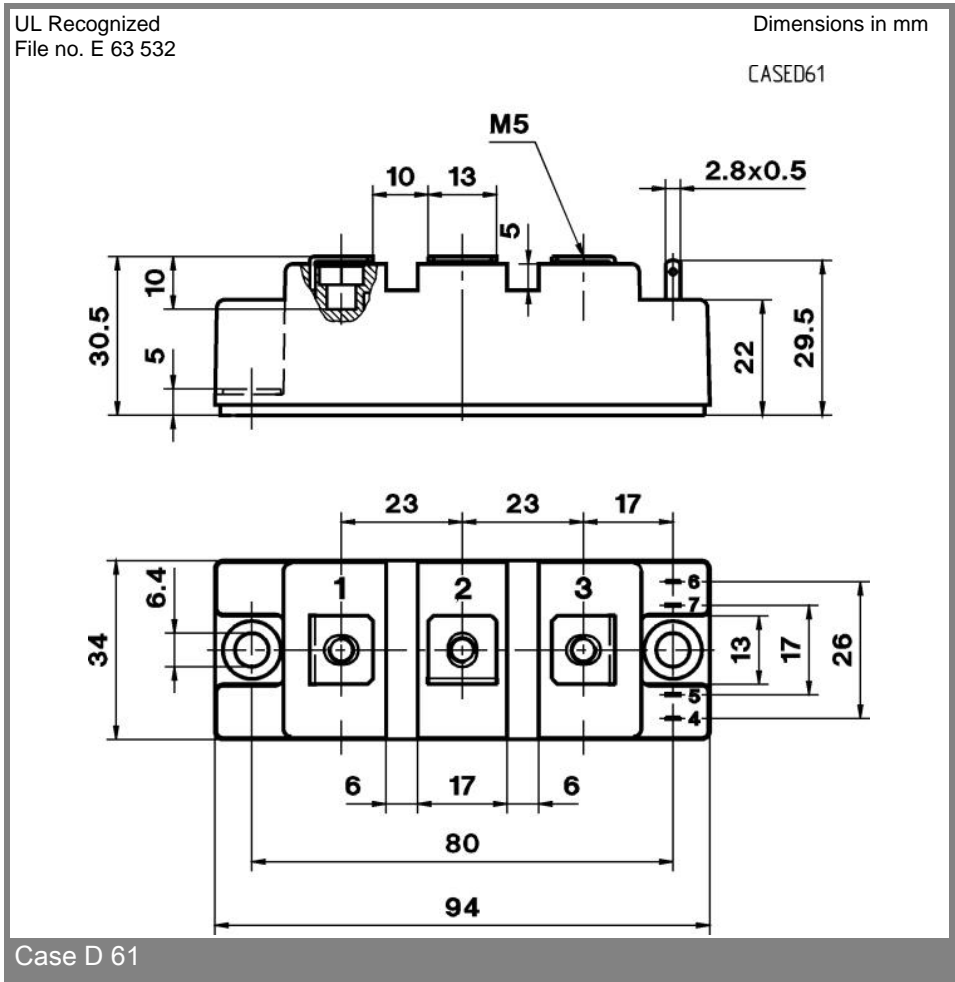
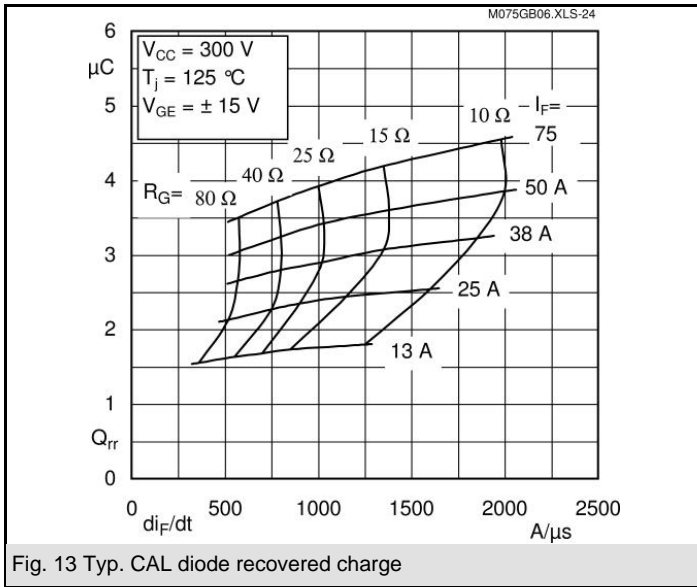


Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		600	V
$I_C$	$T_c = 25\text{ (75) }^\circ\text{C}$	100 (75)	A
$I_{CRM}$	$t_p = 1\text{ ms}$	150	A
$V_{GES}$		$\pm 20$	V
$T_{vj}$ , ( $T_{stg}$ )	$T_{OPERATION} \leq T_{stg}$	- 40 ... + (125) 150	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500	V
<b>Inverse diode</b>			
$I_F$	$T_c = 25\text{ (80) }^\circ\text{C}$	75 (50)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	150	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ }^\circ\text{C}$	440	A
<b>Freewheeling diode</b>			
$I_F$	$T_c = 25\text{ (80) }^\circ\text{C}$	100 (75)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	200	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ }^\circ\text{C}$	720	A

Characteristics		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified			Units
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_C = 1\text{ mA}$	4,5	5,5	6,5	V
$I_{CES}$	$V_{GE} = 0$ , $V_{CE} = V_{CES}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		0,1	0,3	mA
$V_{CE(TO)}$	$T_j = 25\text{ (125) }^\circ\text{C}$		1,05 (1)		V
$r_{CE}$	$V_{GE} = 15\text{ V}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		14 (18,7)		m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 75\text{ A}$ , $V_{GE} = 15\text{ V}$ , chip level		2,1 (2,4)	2,5 (2,8)	V
$C_{ies}$	under following conditions		4,2		nF
$C_{oes}$	$V_{GE} = 0$ , $V_{CE} = 25\text{ V}$ , $f = 1\text{ MHz}$		0,5		nF
$C_{res}$			0,3		nF
$L_{CE}$				30	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25\text{ (125) }^\circ\text{C}$		0,75 (1)		m $\Omega$
$t_{d(on)}$	$V_{CC} = 300\text{ V}$ , $I_{Cnom} = 75\text{ A}$		60		ns
$t_r$	$R_{Gon} = R_{Goff} = 15\text{ }^\circ\Omega$ , $T_j = 125\text{ }^\circ\text{C}$		50		ns
$t_{d(off)}$	$V_{GE} = \pm 15\text{ V}$		350		ns
$t_f$			35		ns
$E_{on}$ ( $E_{off}$ )			3 (2,5)		mJ
<b>Inverse diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 75\text{ A}$ ; $V_{GE} = 0\text{ V}$ ; $T_j = 25\text{ (125) }^\circ\text{C}$		1,55 (1,55)	1,9	V
$V_{(TO)}$	$T_j = 125\text{ ( ) }^\circ\text{C}$			0,9	V
$r_T$	$T_j = 125\text{ ( ) }^\circ\text{C}$		10	13,3	m $\Omega$
$I_{RRM}$	$I_{Fnom} = 75\text{ A}$ ; $T_j = 125\text{ ( ) }^\circ\text{C}$		30		A
$Q_{rr}$	$di/dt = 800\text{ A}/\mu\text{s}$		3,7		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0\text{ V}$				mJ
<b>FWD</b>					
$V_F = V_{EC}$	$I_F = 100\text{ A}$ ; $V_{GE} = 0\text{ V}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		1,55 (1,55)	1,9	V
$V_{(TO)}$	$T_j = 125\text{ ( ) }^\circ\text{C}$			0,9	V
$r_T$	$T_j = 125\text{ ( ) }^\circ\text{C}$		8	10	m $\Omega$
$I_{RRM}$	$I_F = 100\text{ A}$ ; $T_j = 125\text{ ( ) }^\circ\text{C}$		44		A
$Q_{rr}$	$di/dt = 0\text{ A}/\mu\text{s}$		6		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0\text{ V}$				mJ
<b>Thermal characteristics</b>					
$R_{th(j-c)}$	per IGBT			0,35	K/W
$R_{th(j-c)D}$	per Inverse Diode			1	K/W
$R_{th(j-c)FD}$	per FWD			0,6	K/W
$R_{th(c-s)}$	per module			0,05	K/W
<b>Mechanical data</b>					
$M_s$	to heatsink 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.

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