

# SKM 300GB063D



**SEMITRANS<sup>®</sup> 3**

## Superfast IGBT Modules

**SKM 300GB063D**

**SKM 300GAR063D**

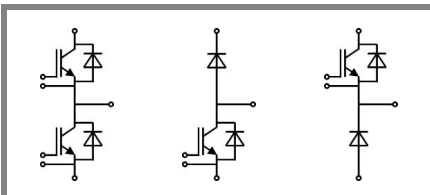
**SKM 300GAL063D**

### 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



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Absolute Maximum Ratings		$T_c = 25\text{ °C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25\text{ °C}$	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
<b>Inverse Diode</b>				
$I_F$	$T_j = 150\text{ °C}$	$T_{case} = 25\text{ °C}$	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
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 150\text{ °C}$	$T_c = 25\text{ °C}$	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
<b>Module</b>				
$I_{t(RMS)}$		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
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 6\text{ mA}$	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
		$T_j = 125\text{ °C}$	1		V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25\text{ °C}$	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	
$R_{Gint}$	$T_j = \text{°C}$	0		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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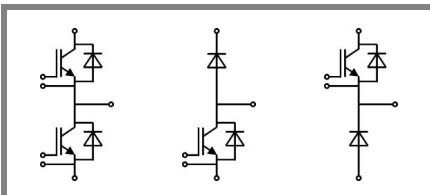
**SKM 300GAL063D**

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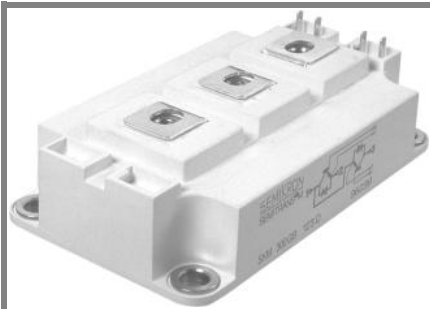
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,65	2	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	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	m $\Omega$
$I_{RRM}$	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	120		A
$Q_{rr}$			18		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 300 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,25	K/W
<b>Freewheeling Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 400 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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		$\mu\text{C}$
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 300 \text{ V}$				mJ
$R_{th(j-c)FD}$	per diode			0,15	K/W
<b>Module</b>					
$L_{CE}$			15	20	nH
$R_{CC+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,35		m $\Omega$
		$T_{case} = 125 \text{ }^\circ\text{C}$	0,5		m $\Omega$
$R_{th(c-s)}$	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.

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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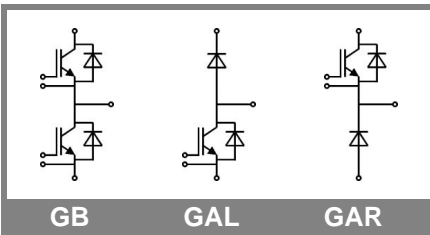
### Features

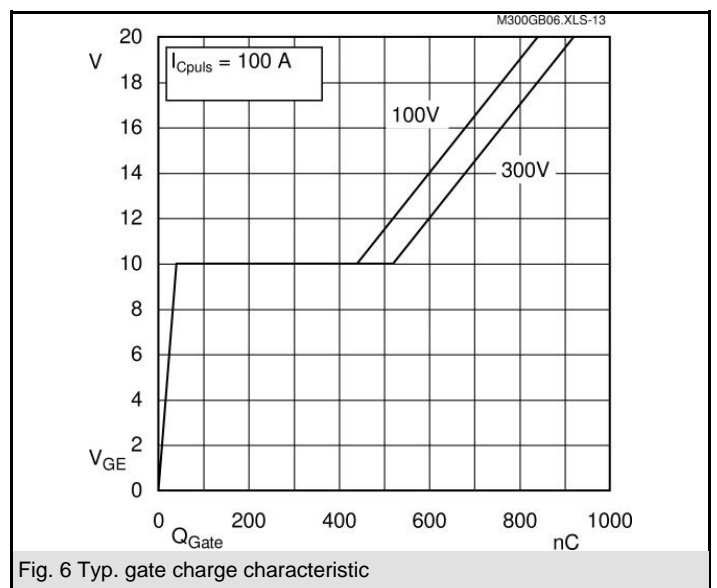
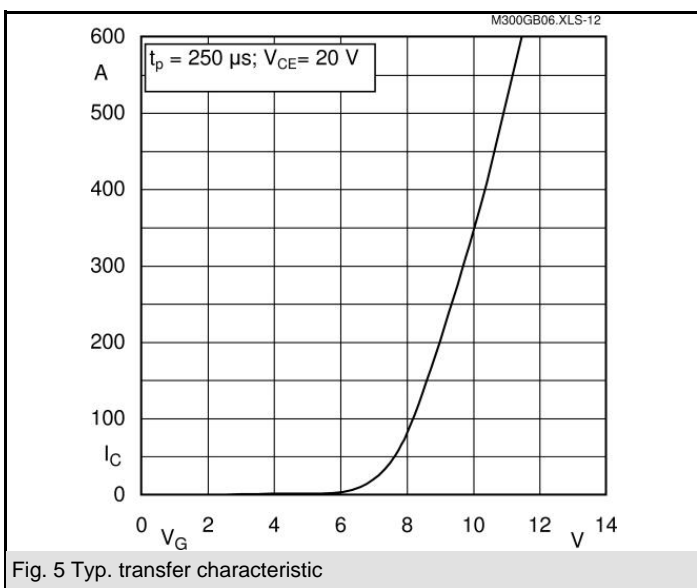
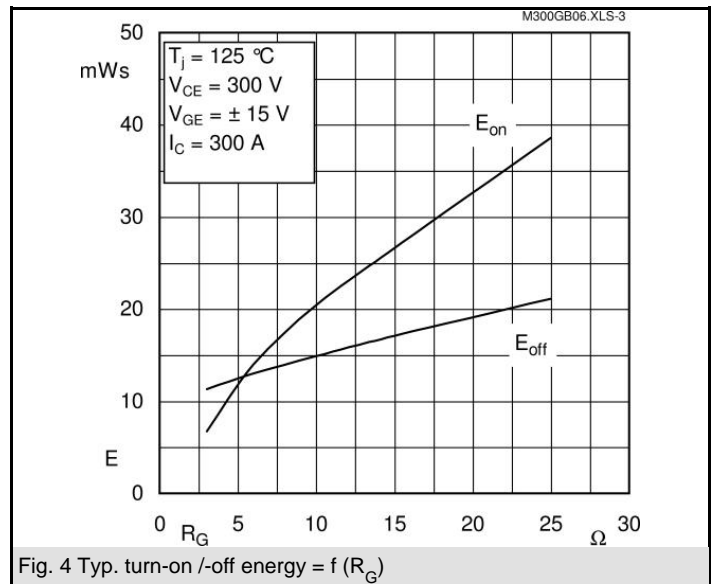
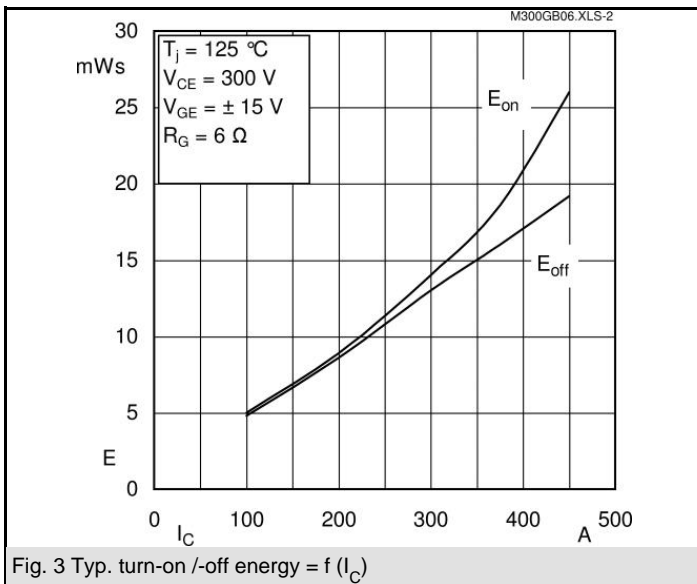
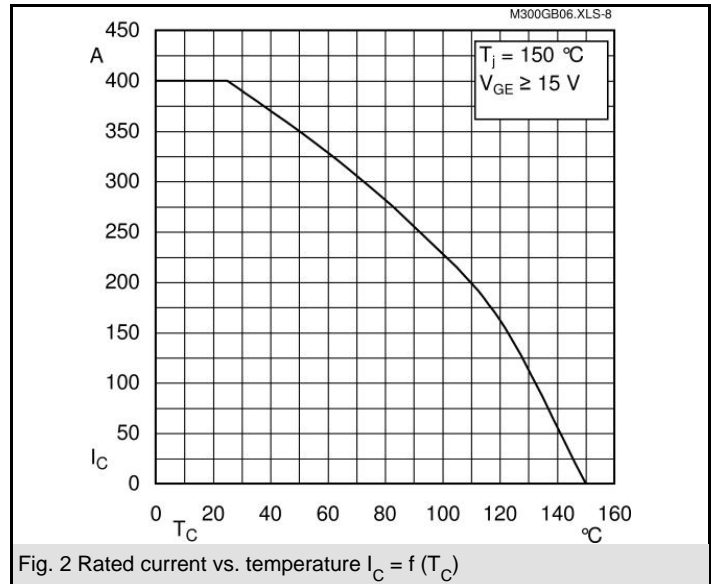
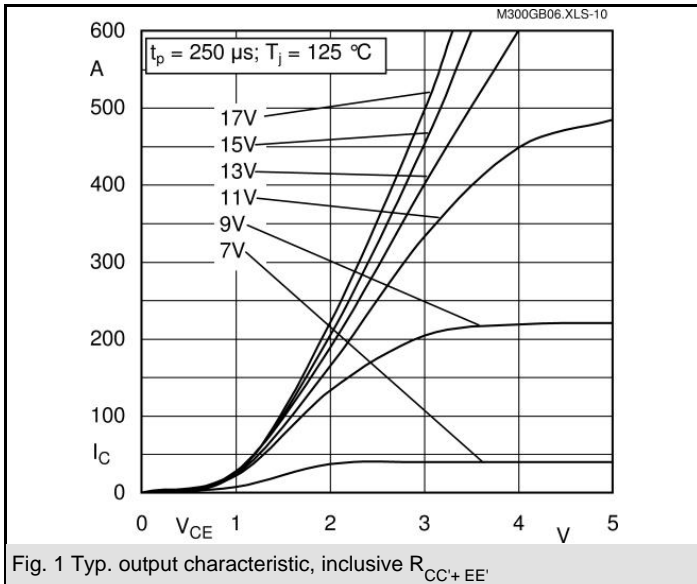
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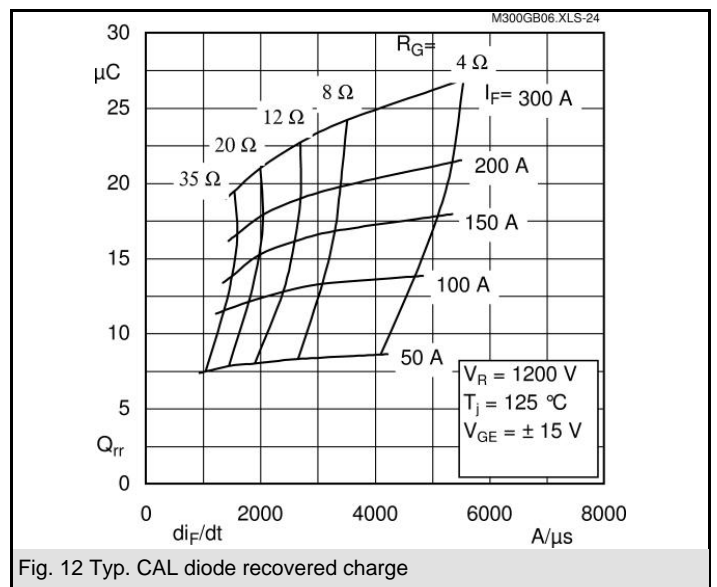
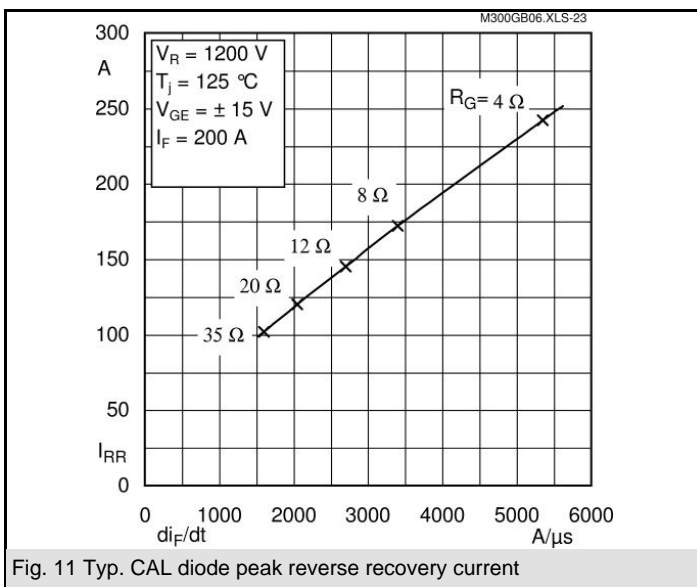
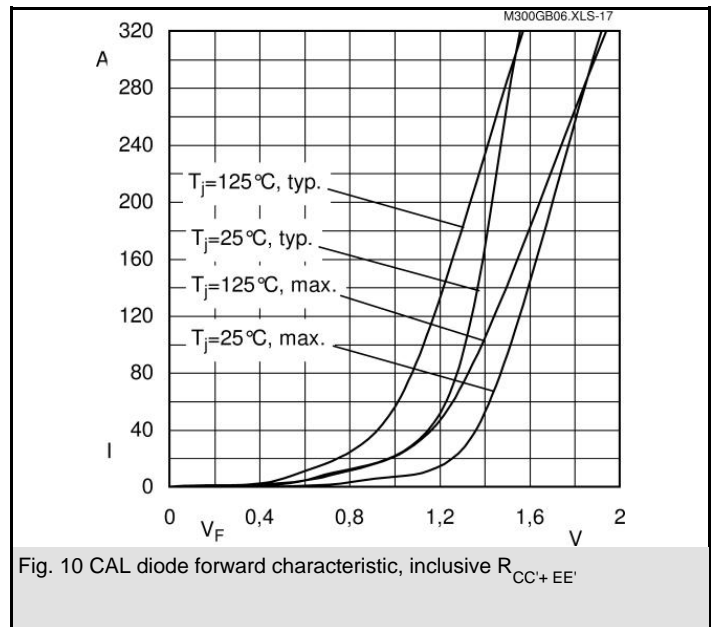
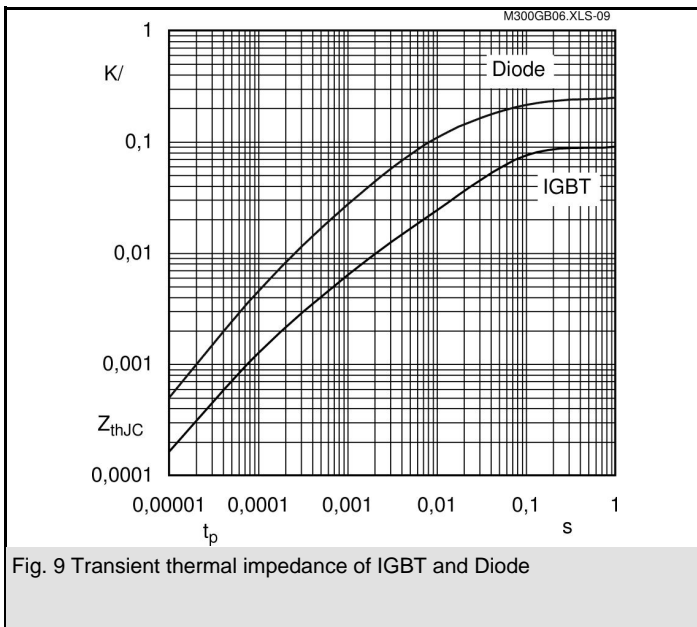
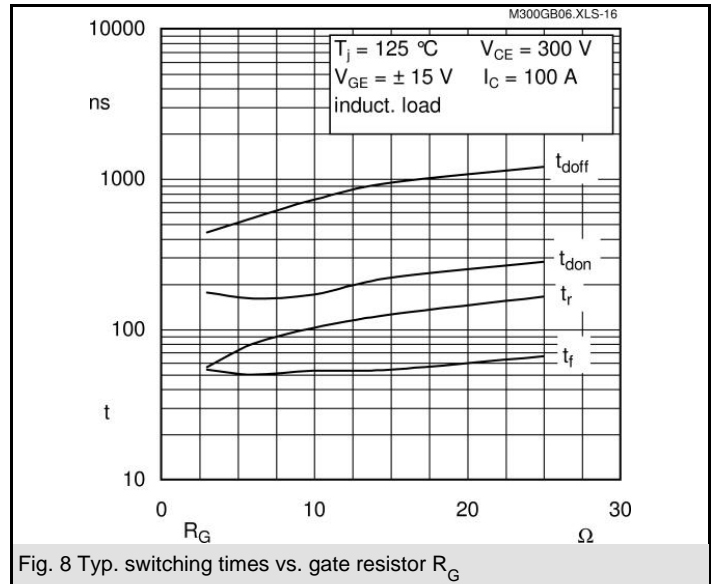
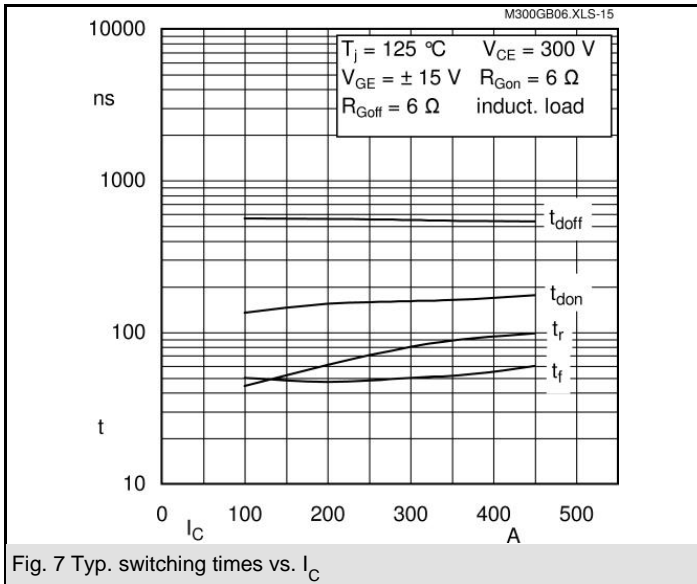
### Typical Applications

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$Z_{th}$		Values	Units
Symbol	Conditions		
$Z_{th(j-c)I}$			
$R_{\theta j-c}$	$i = 1$	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
$\tau_{th j-c}$	$i = 1$	0,0518	s
$\tau_{th j-c}$	$i = 2$	0,0241	s
$\tau_{th j-c}$	$i = 3$	0,0021	s
$\tau_{th j-c}$	$i = 4$	0,0001	s
$Z_{th(j-c)D}$			
$R_{\theta j-c}$	$i = 1$	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
$\tau_{th j-c}$	$i = 1$	0,0613	s
$\tau_{th j-c}$	$i = 2$	0,0041	s
$\tau_{th j-c}$	$i = 3$	0,0045	s
$\tau_{th j-c}$	$i = 4$	0,0003	s







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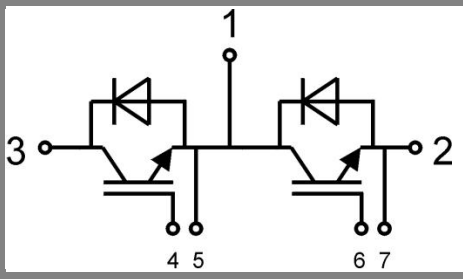
UL Recognized

CASED56

File no. E 63 532



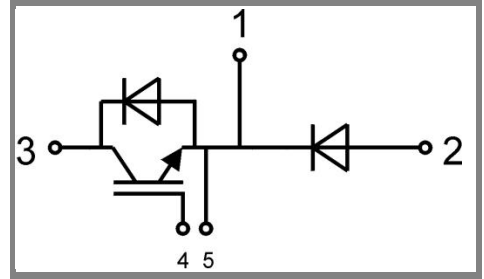
Case D 56



GB Case D 56



GAL Case D 57 (→ D 56)



GAR Case D 58 (→ D 56)