

# SKM 400GB126D ...



**SEMITRANS® 3**

## Trench IGBT Module

**SKM 400GB126D**

**SKM 400GAL126D**

### Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_C$

### Typical Applications\*

- AC inverter drives
- UPS
- Electronic welders



**GB**

**GAL**

Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$ , unless otherwise specified		
Symbol	Conditions	Values		Units
<b>IGBT</b>				
$V_{CES}$	$T_j = 25^\circ\text{C}$	1200		V
$I_C$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	470	A
		$T_{case} = 80^\circ\text{C}$	330	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	600		A
$V_{GES}$		$\pm 20$		V
$t_{psc}$	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1200\text{ V}$	10		$\mu\text{s}$
<b>Inverse Diode</b>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	400	A
		$T_{case} = 80^\circ\text{C}$	270	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600		A
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	2200	A
<b>Freewheeling Diode</b>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	400	A
		$T_{case} = 80^\circ\text{C}$	270	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600		A
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	2200	A
<b>Module</b>				
$I_{t(RMS)}$		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
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 12\text{ mA}$	5	5,8	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,15	0,45	mA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	1	1,2	V
		$T_j = 125^\circ\text{C}$	0,9		V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	2,3	3,2	m $\Omega$
		$T_j = 125^\circ\text{C}$	3,7		m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,7	2,15	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2		V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	23,1		nF
$C_{oes}$			1,9		nF
$C_{res}$			1,2		nF
$Q_G$	$V_{GE} = -8\text{ V} \dots +20\text{ V}$	2800		nC	
$R_{Gint}$	$T_j = ^\circ\text{C}$	2,5		$\Omega$	
$t_{d(on)}$	$R_{Gon} = 2\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 300\text{ A}$	330		ns
			$T_j = 125^\circ\text{C}$	50	ns
$E_{on}$	$R_{Goff} = 2\ \Omega$	$V_{GE} = \pm 15\text{ V}$	29		mJ
$t_{d(off)}$			650		ns
$t_f$			110		ns
$E_{off}$			48		mJ
$R_{th(j-c)}$	per IGBT			0,08	K/W



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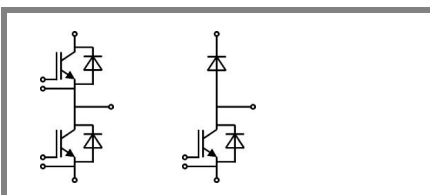
### Typical Applications\*

- AC inverter drives
- UPS
- Electronic welders

Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
<b>Inverse Diode</b>							
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		1,6	1,8		V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,6	1,8		V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$		1	1,1		V
		$T_j = 125 \text{ }^\circ\text{C}$		0,8	0,9		V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$		2	2,3		mΩ
		$T_j = 125 \text{ }^\circ\text{C}$		2,7	3		mΩ
$I_{RRM}$	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		390			A
$Q_{rr}$	$di/dt = 6300 \text{ A}/\mu\text{s}$			77			μC
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			27			mJ
$R_{th(j-c)D}$	per diode				0,18		K/W
<b>Freewheeling Diode</b>							
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		1,6	1,8		V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,6	1,8		V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$		1	1,1		V
		$T_j = 125 \text{ }^\circ\text{C}$		0,8	0,9		V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$		2	2,3		V
		$T_j = 125 \text{ }^\circ\text{C}$		2,7	3		V
$I_{RRM}$	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		390			A
$Q_{rr}$	$di/dt = 6300 \text{ A}/\mu\text{s}$			77			μC
$E_{rr}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$			27			mJ
$R_{th(j-c)D}$	per diode				0,18		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			mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$		0,5			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			2,5	5		Nm
w					325		g

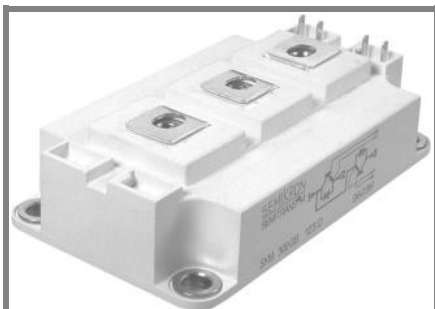
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

\* The specifications of our components may not be considered as an assurance of component characteristics. Components have to be tested for the respective application. Adjustments may be necessary. The use of SEMIKRON products in life support appliances and systems is subject to prior specification and written approval by SEMIKRON. We therefore strongly recommend prior consultation of our personal.



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## Trench IGBT Module

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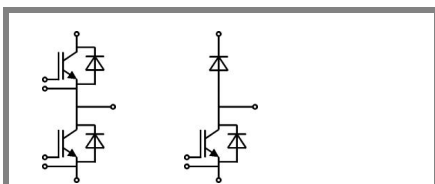
### Features

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- High short circuit capability, self limiting to  $6 \times I_c$

### Typical Applications\*

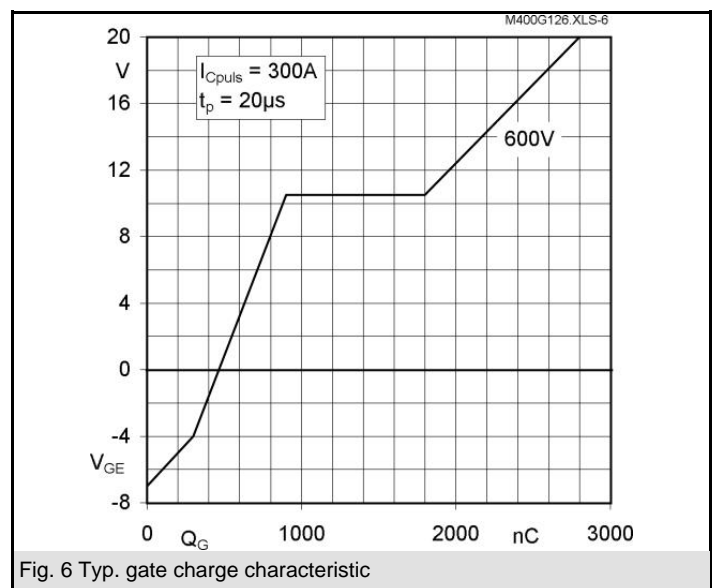
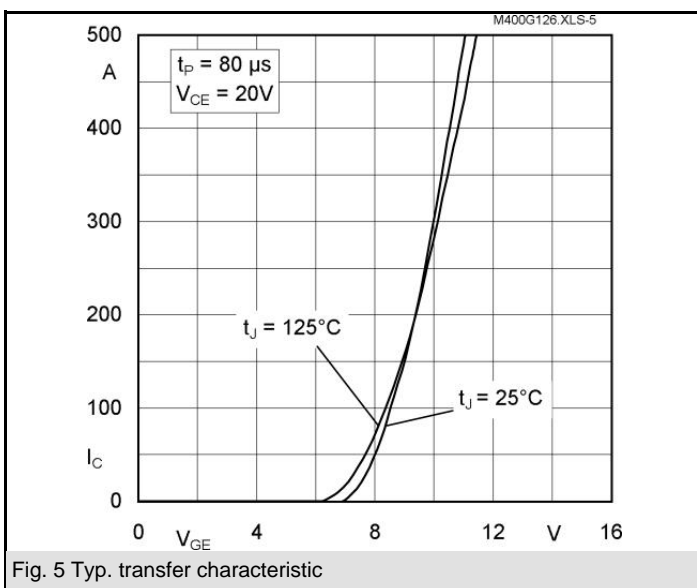
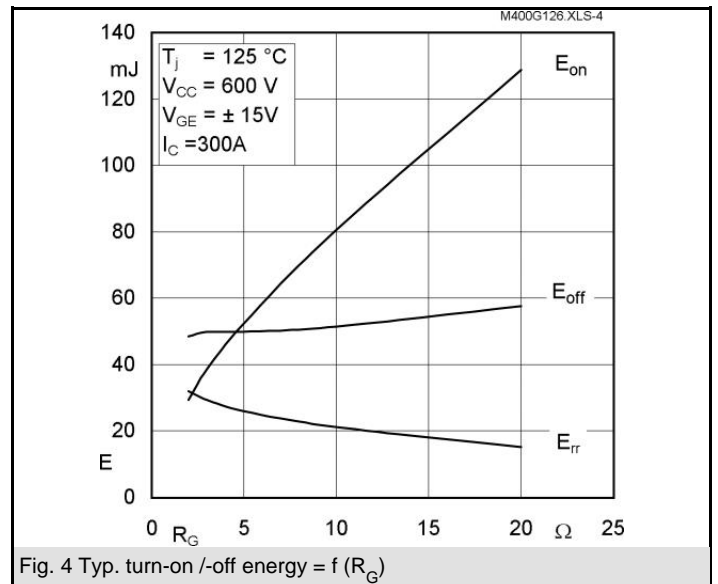
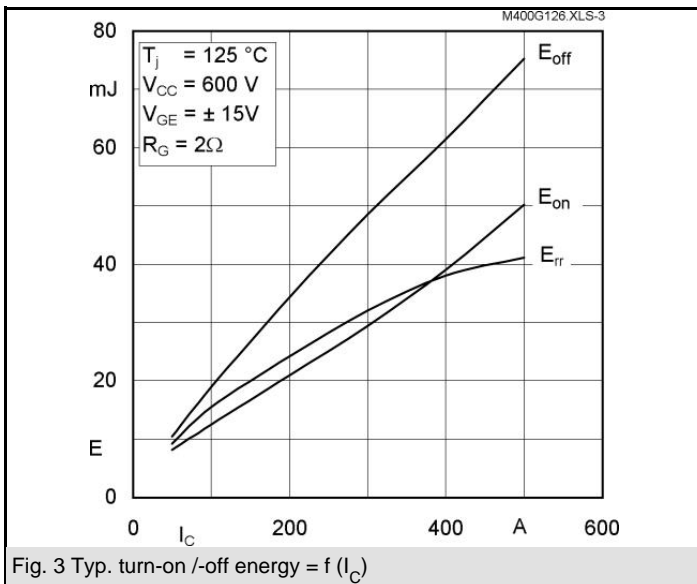
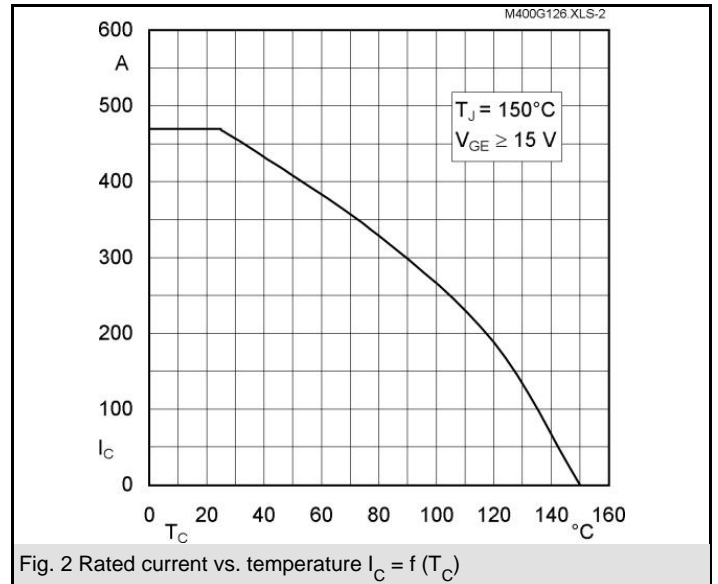
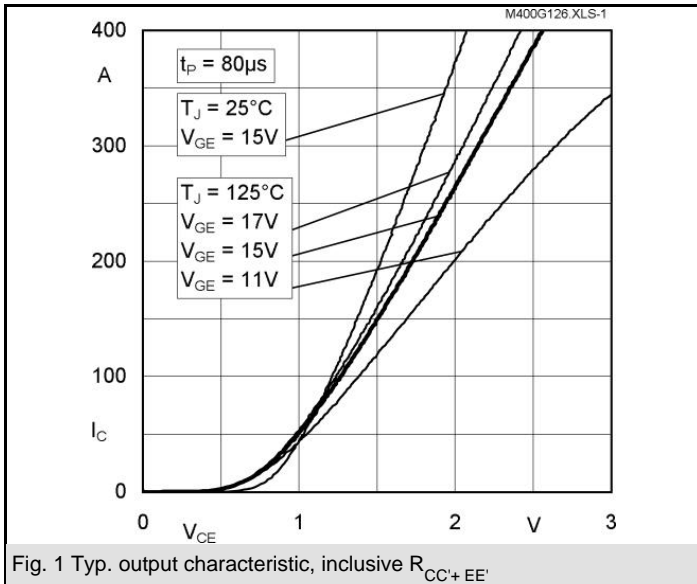
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- UPS
- Electronic welders

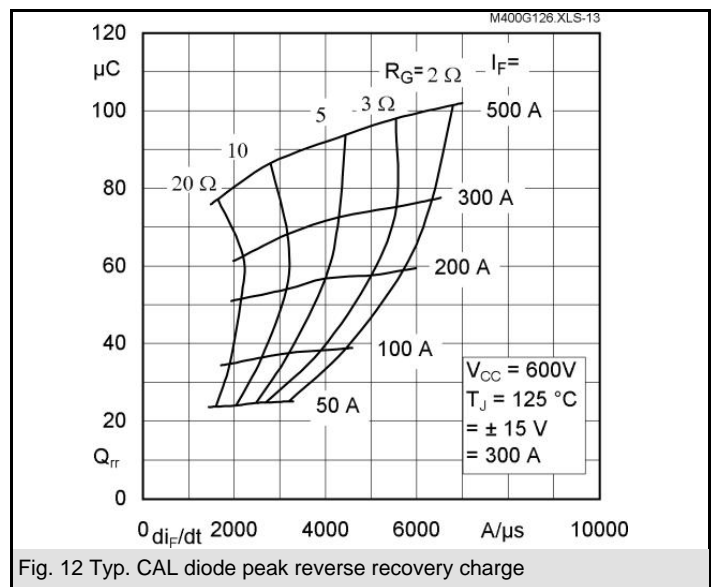
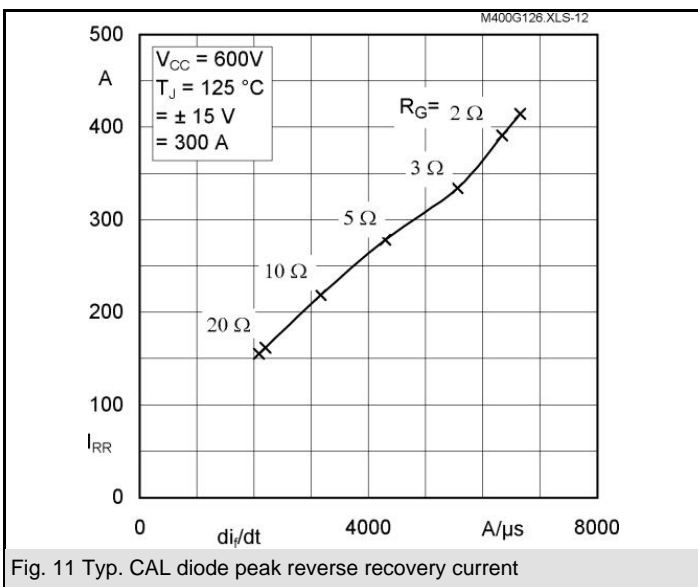
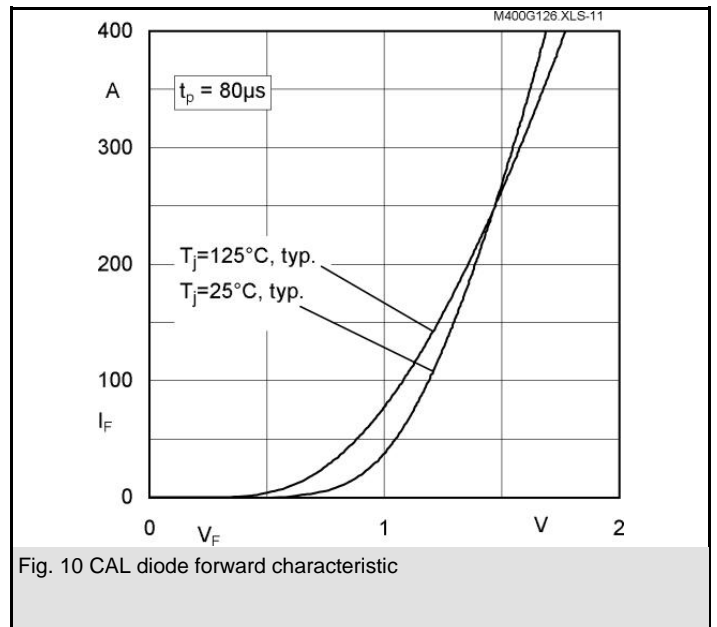
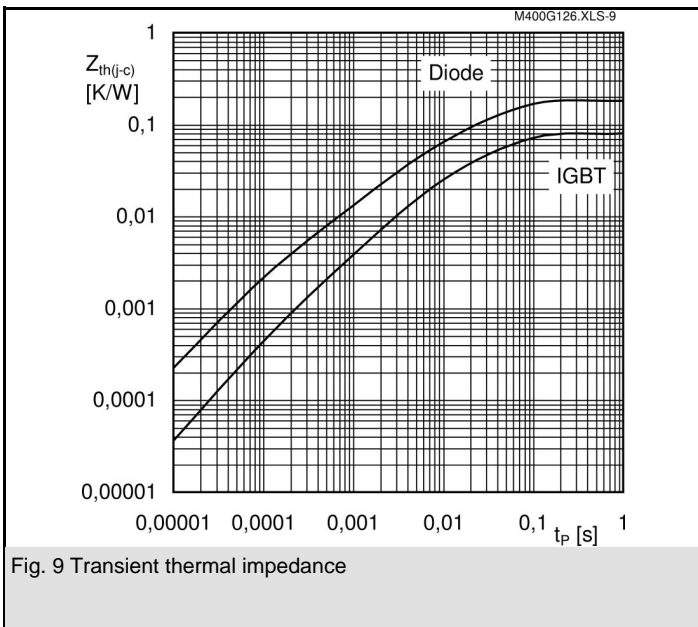
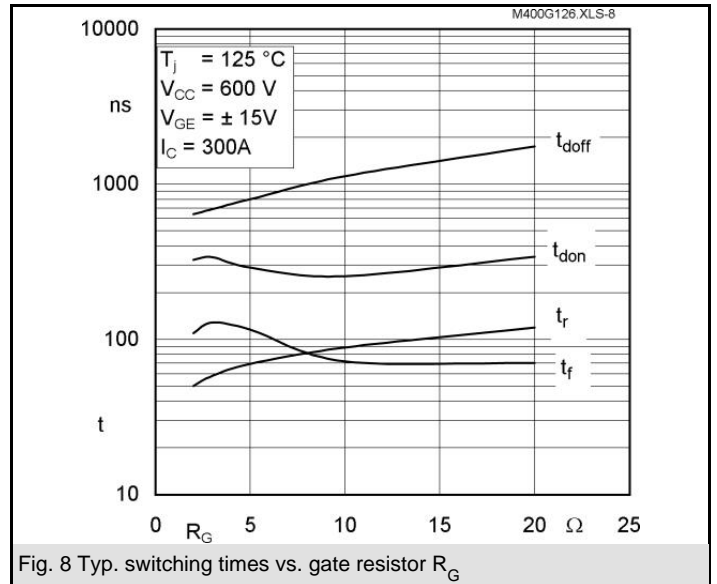
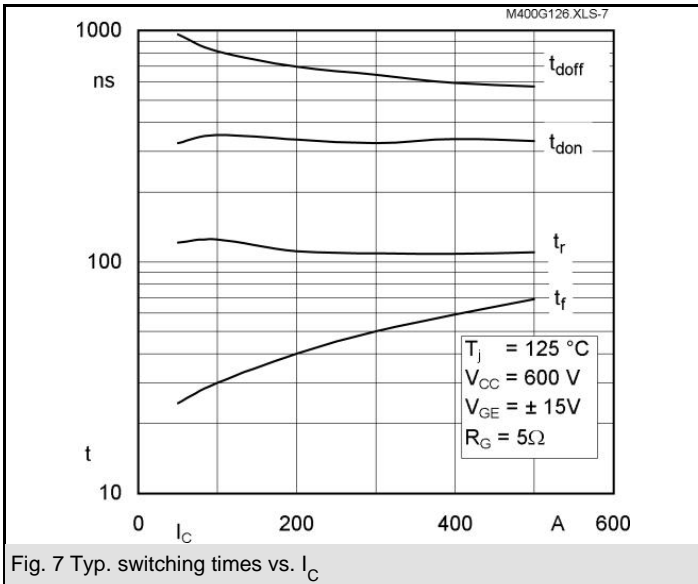
$Z_{th}$		Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>				
$R_{\theta j-c}$		$i = 1$	55	mk/W
$R_{\theta j-c}$		$i = 2$	21	mk/W
$R_{\theta j-c}$		$i = 3$	3,6	mk/W
$R_{\theta j-c}$		$i = 4$	0,4	mk/W
$\tau_{th(j-c)}$		$i = 1$	0,0393	s
$\tau_{th(j-c)}$		$i = 2$	0,0171	s
$\tau_{th(j-c)}$		$i = 3$	0,002	s
$\tau_{th(j-c)}$		$i = 4$	0,0002	s
<b><math>Z_{th(j-c)D}</math></b>				
$R_{\theta j-cD}$		$i = 1$	120	mk/W
$R_{\theta j-cD}$		$i = 2$	48	mk/W
$R_{\theta j-cD}$		$i = 3$	10	mk/W
$R_{\theta j-cD}$		$i = 4$	2	mk/W
$\tau_{th(j-c)D}$		$i = 1$	0,0262	s
$\tau_{th(j-c)D}$		$i = 2$	0,0417	s
$\tau_{th(j-c)D}$		$i = 3$	0,0012	s
$\tau_{th(j-c)D}$		$i = 4$	0,001	s



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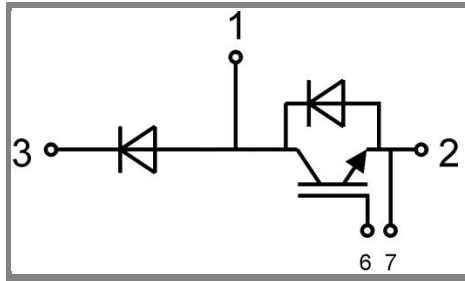




Case D 56



GB Case D 56



GAL Case D 57 (→ D 56)