

# SKM 800GA126D



**SEMITRANS® 4**

## Trench IGBT Modules

**SKM 800GA126D**

### Features

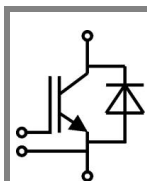
- Trench = Trenchgate technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_C$

### Typical Applications\*

- AC inverter drives
- UPS
- Electronic welders

### Remarks

- $I_{DC} \leq 500A$  limited by terminals



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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	
$I_C$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	960		A
		$T_{case} = 80^\circ\text{C}$	620		A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	1200		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>					
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	680		A
		$T_{case} = 125^\circ\text{C}$	470		A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	1200		A	
$I_{FSM}$	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	3600		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>						
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 16\text{ mA}$	5	5,8	6,5	V	
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$	0,2		0,6	mA
		$T_j = 125^\circ\text{C}$				mA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	1		1,15	V
		$T_j = 125^\circ\text{C}$	0,9			V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	1,2		1,7	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	1,8			$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 600\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,7		2,15	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2			V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	42		nF	
$C_{oes}$			3,3		nF	
$C_{res}$			3,1		nF	
$Q_G$	$V_{GE} = -8\text{ V} - +20\text{ V}$	5200			nC	
$R_{Gint}$	$T_j = ^\circ\text{C}$	1,25			$\Omega$	
$t_{d(on)}$	$R_{Gon} = 3\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 600\text{ A}$	220		ns	
$t_r$			100		ns	
$E_{on}$			65		mJ	
$t_{d(off)}$	$R_{Goff} = 3\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	860		ns	
$t_f$			135		ns	
$E_{off}$			95		mJ	
$R_{th(j-c)}$	per IGBT	0,042			K/W	



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#### Typical Applications\*

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#### Remarks

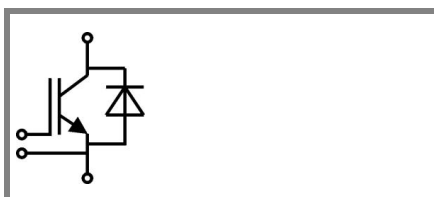
- $I_{DC} \leq 500A$  limited by terminals

#### Characteristics

Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 600 A; V_{GE} = 0 V$				
	$T_j = 25\text{ }^\circ\text{C}_{chiplev.}$		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
$r_F$					
	$T_j = 25\text{ }^\circ\text{C}$		1	1,2	mΩ
	$T_j = 125\text{ }^\circ\text{C}$		1,3	1,5	mΩ
$I_{RRM}$	$I_F = 600 A$		540		A
$Q_{rr}$	$di/dt = 6000 A/\mu s$		125		μC
$E_{rr}$	$V_{GE} = -15 V; V_{CC} = 600 V$		59		mJ
$R_{th(j-c)D}$	per diode			0,09	K/W
<b>Module</b>					
$L_{CE}$			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25\text{ }^\circ\text{C}$	0,18		mΩ
		$T_{case} = 125\text{ }^\circ\text{C}$	0,22		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 (M4)		2,5 (1,1)	5 (2)	Nm
w				330	g

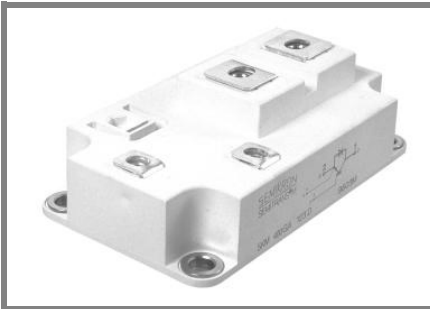
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

\* 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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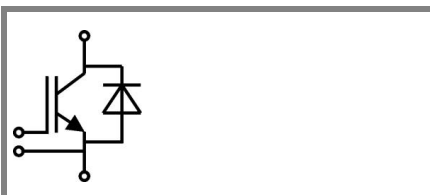
### Typical Applications\*

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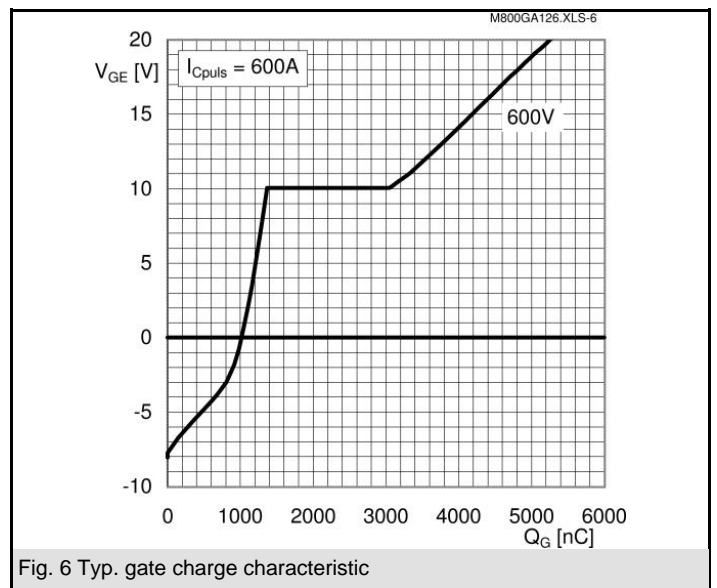
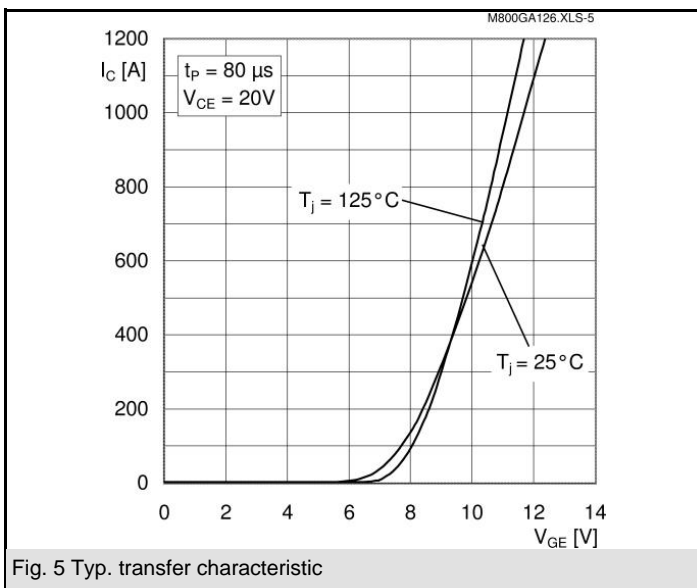
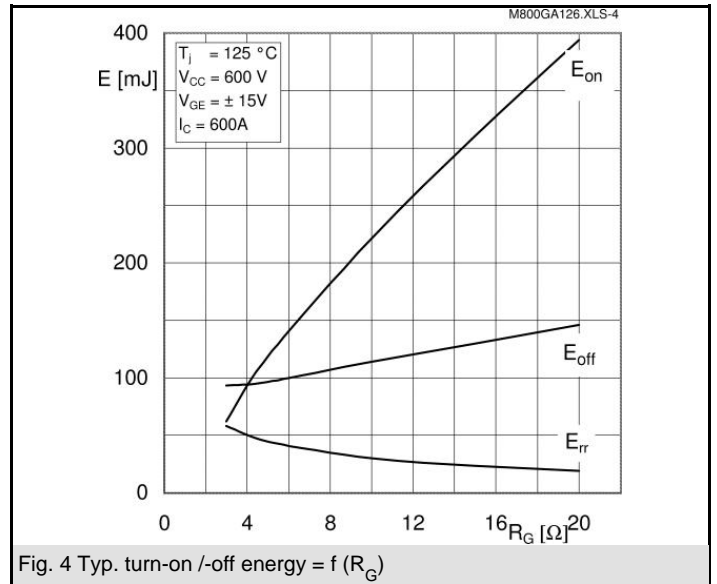
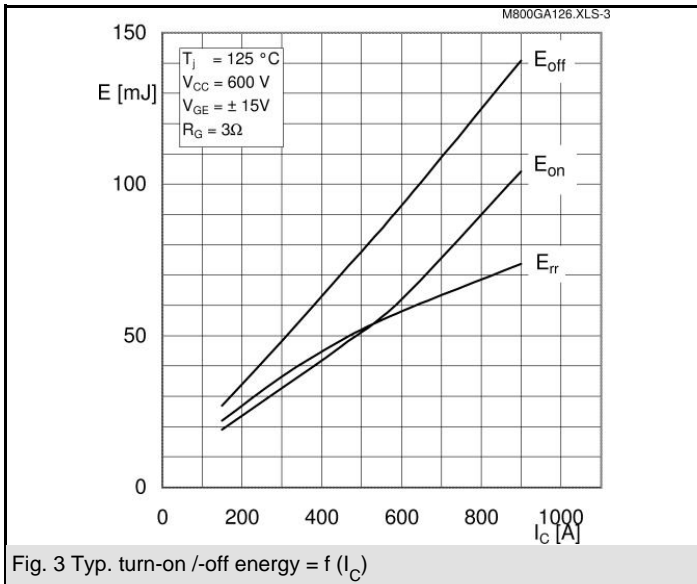
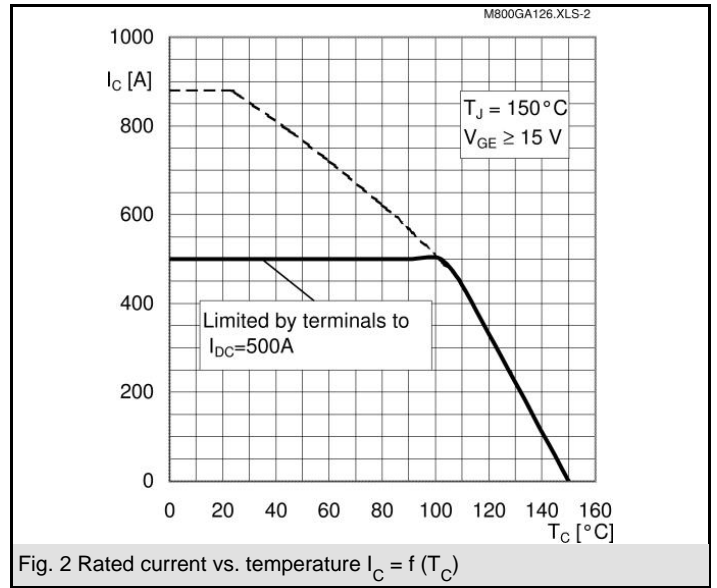
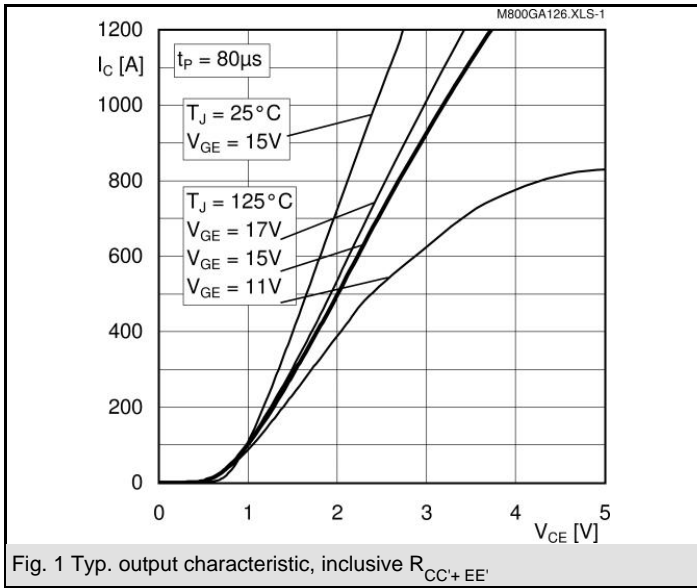
### Remarks

- $I_{DC} \leq 500A$  limited by terminals

$Z_{th}$		Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>				
$R_{\theta j-c}$	$i = 1$		30	mk/W
$R_{\theta j-c}$	$i = 2$		9,5	mk/W
$R_{\theta j-c}$	$i = 3$		2,2	mk/W
$R_{\theta j-c}$	$i = 4$		0,3	mk/W
$\tau_{\theta j-c}$	$i = 1$		0,1043	s
$\tau_{\theta j-c}$	$i = 2$		0,009	s
$\tau_{\theta j-c}$	$i = 3$		0,0015	s
$\tau_{\theta j-c}$	$i = 4$		0,004	s
<b><math>Z_{th(j-c)D}</math></b>				
$R_{\theta j-cD}$	$i = 1$		62	mk/W
$R_{\theta j-cD}$	$i = 2$		23	mk/W
$R_{\theta j-cD}$	$i = 3$		4,2	mk/W
$R_{\theta j-cD}$	$i = 4$		0,8	mk/W
$\tau_{\theta j-cD}$	$i = 1$		0,0566	s
$\tau_{\theta j-cD}$	$i = 2$		0,0166	s
$\tau_{\theta j-cD}$	$i = 3$		0,0015	s
$\tau_{\theta j-cD}$	$i = 4$		0,0002	s



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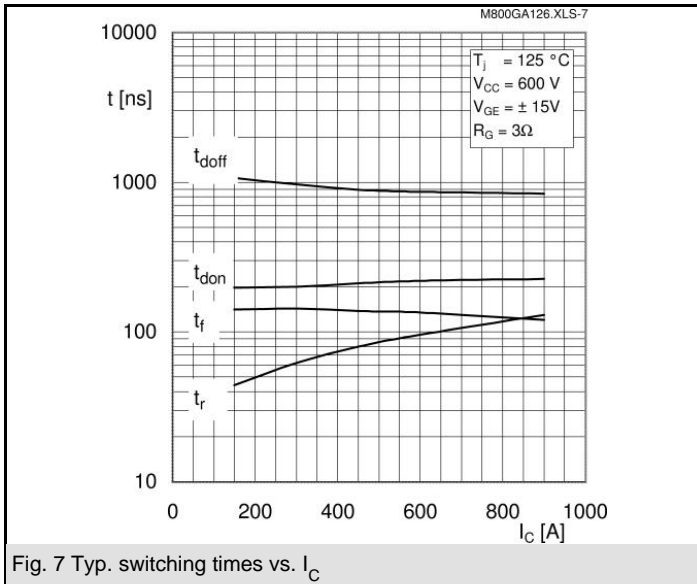


Fig. 7 Typ. switching times vs.  $I_C$

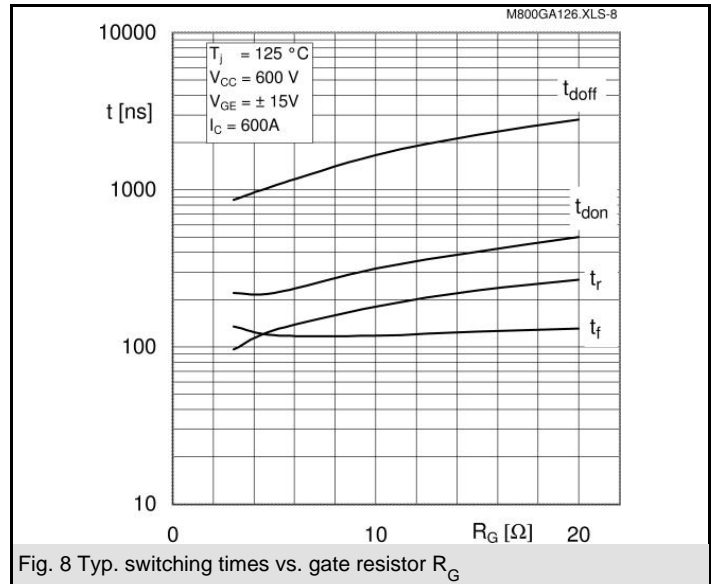


Fig. 8 Typ. switching times vs. gate resistor  $R_G$

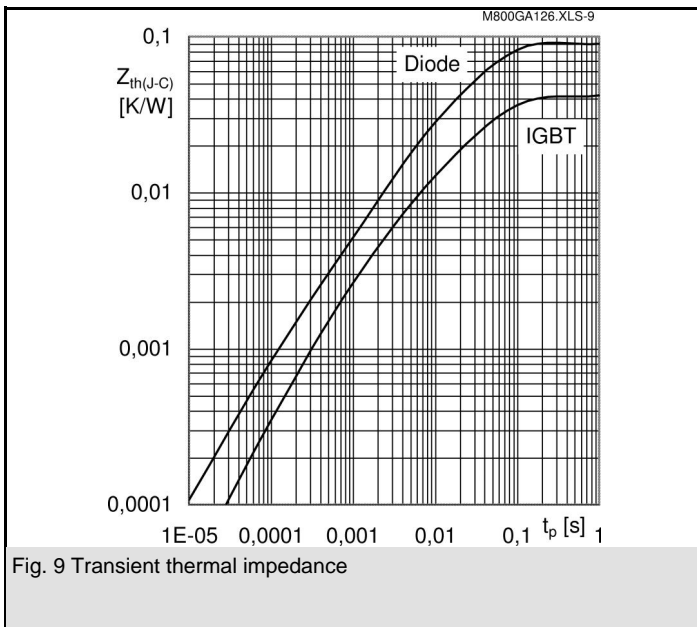


Fig. 9 Transient thermal impedance

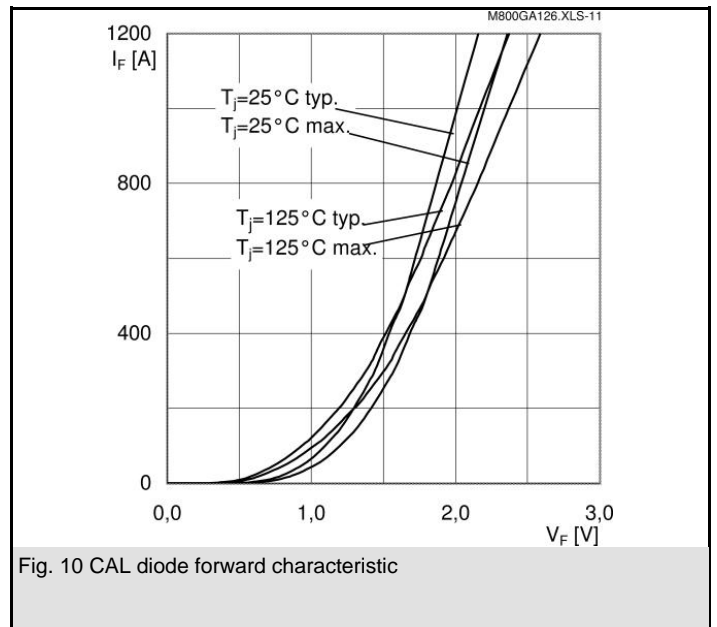


Fig. 10 CAL diode forward characteristic

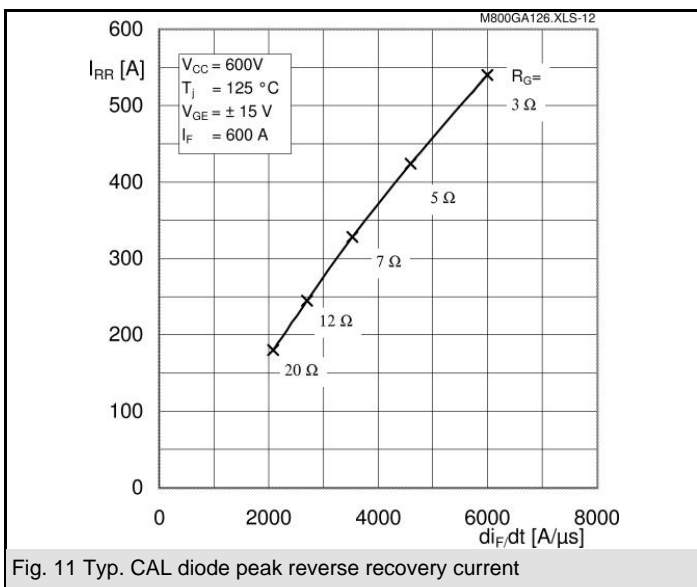


Fig. 11 Typ. CAL diode peak reverse recovery current

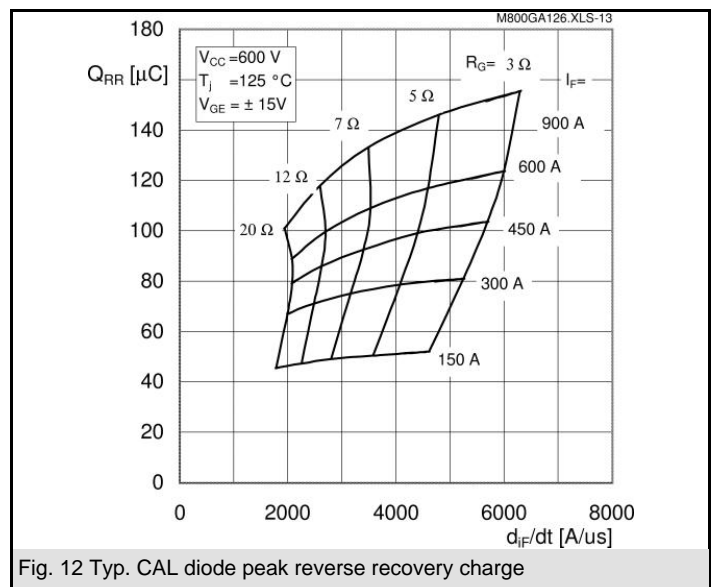


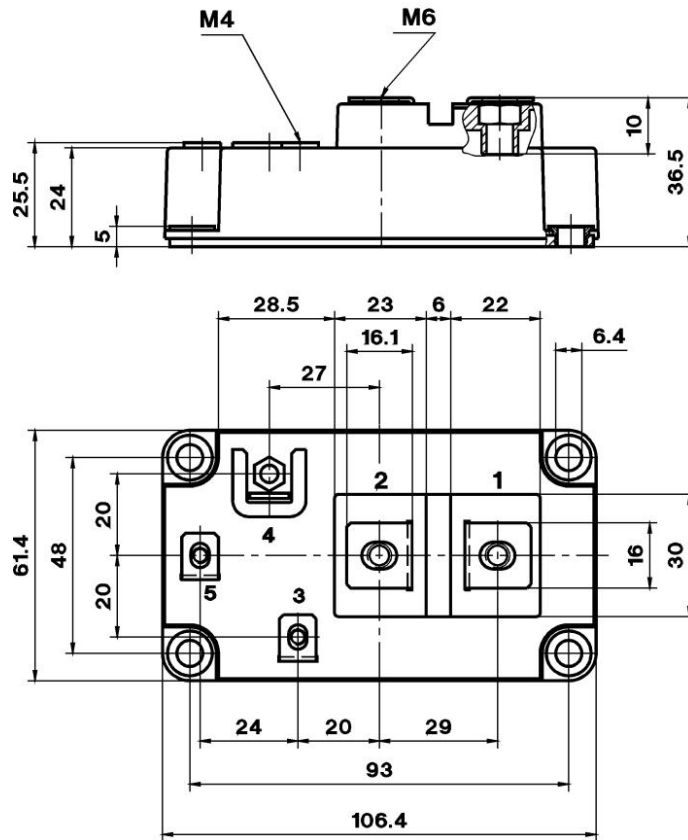
Fig. 12 Typ. CAL diode peak reverse recovery charge

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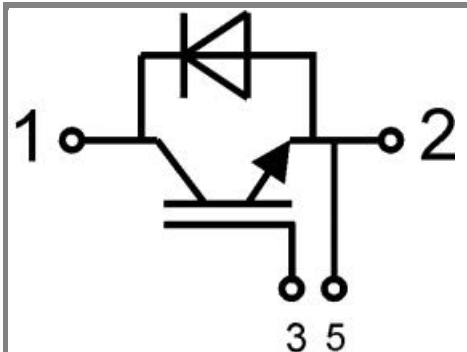
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Case D 59



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