

# SKM 400GA128D



**SEMITRANS® 4**

## SPT IGBT Modules

**SKM 400GA128D**

### Features

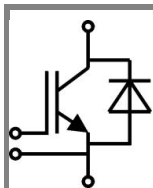
- SPT = Soft-Punch-Through technology
- $V_{CEsat}$  with positive temperature coefficient
- High short circuit capability, self limiting to  $6 \times I_C$

### Typical Applications

- AC inverter drives
- UPS
- Electronic welders at  $f_{sw}$  up to 20 kHz

### Remarks

- $I_{DC} \leq 500 \text{ A}$  for  $T_{Terminal} = 100 \text{ }^\circ\text{C}$



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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	
$I_C$	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	565	A
		$T_c = 80^\circ\text{C}$	400	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>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	390	A
		$T_{case} = 80^\circ\text{C}$	260	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	600	A	
$I_{FSM}$	$t_p = 10 \text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	2900	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>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 12 \text{ mA}$	4,5	5,5	6,45	V
$I_{CES}$	$V_{GE} = 0 \text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$	0,2	0,6	mA
		$T_j = 125^\circ\text{C}$	0,9	1,05	V
$V_{CE0}$			1	1,15	V
$r_{CE}$	$V_{GE} = 15 \text{ V}$	$T_j = 25^\circ\text{C}$	3	4	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	4	5	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300 \text{ A}, V_{GE} = 15 \text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	1,9	2,35	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,1	2,55	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0 \text{ V}$	$f = 1 \text{ MHz}$	26		nF
$C_{oes}$			3		nF
$C_{res}$			3		nF
$Q_G$	$V_{GE} = -8\text{V} - +20\text{V}$		3500		nC
$R_{Gint}$	$T_j = ^\circ\text{C}$		1,25		$\Omega$
$t_{d(on)}$	$R_{Gon} = 5 \Omega$	$V_{CC} = 600\text{V}$ $I_{Cnom} = 300\text{A}$	120		ns
$t_r$			70		ns
$E_{on}$			31		mJ
$t_{d(off)}$	$R_{Goff} = 5 \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{V}$	800		ns
$t_f$			75		ns
$E_{off}$			33		mJ
$R_{th(j-c)}$	per IGBT			0,055	K/W



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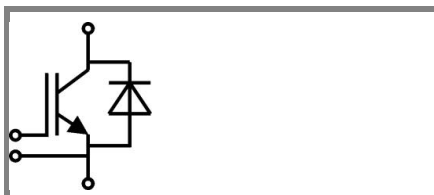
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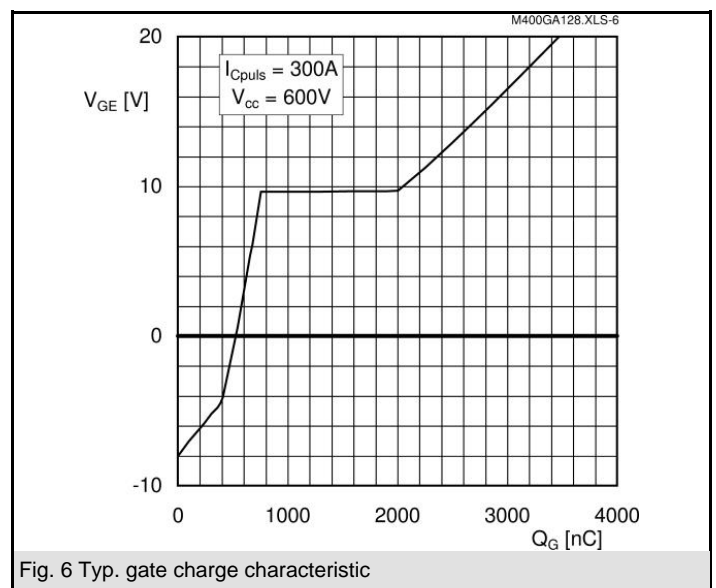
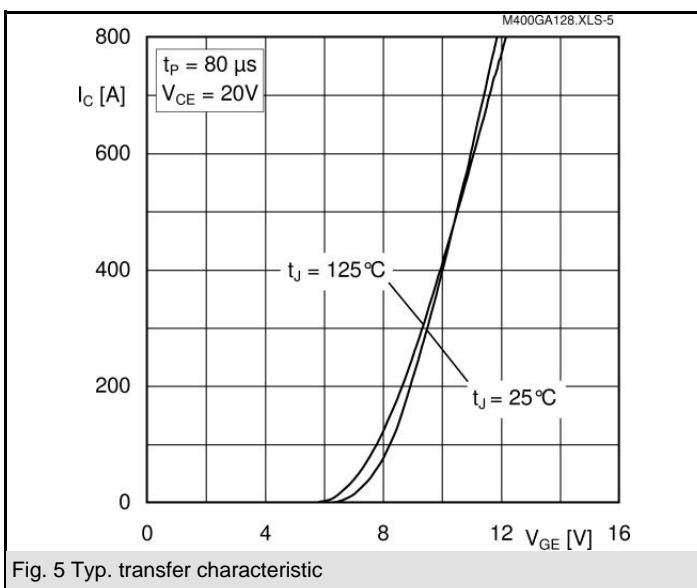
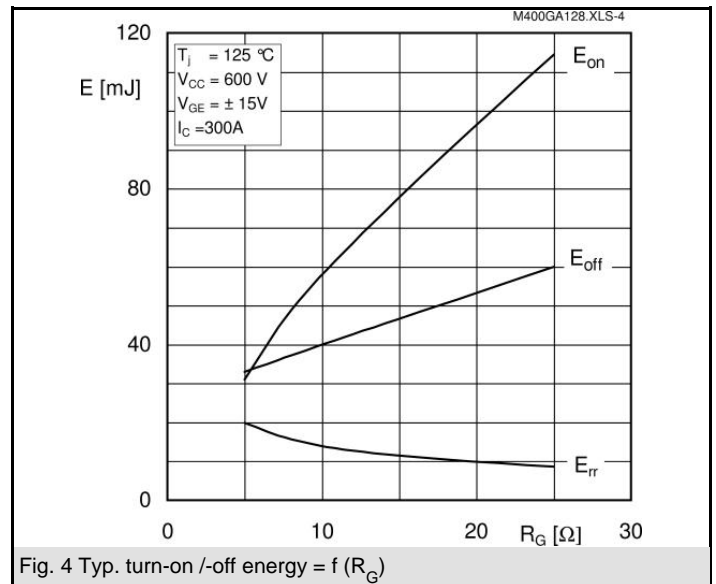
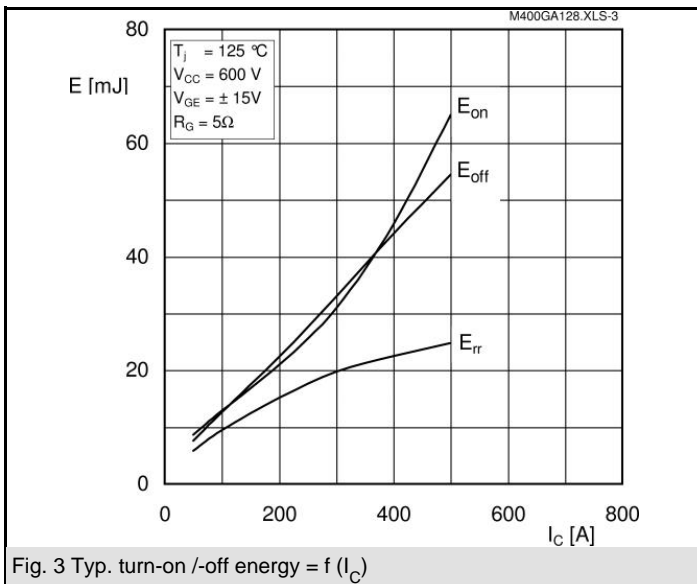
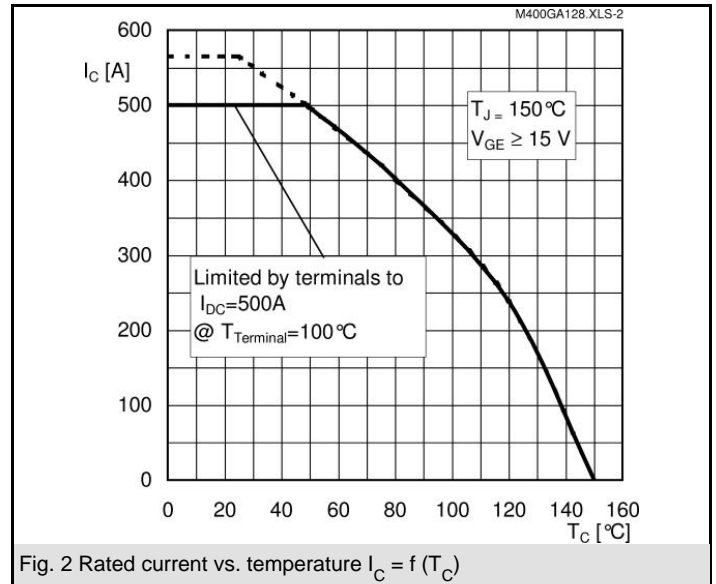
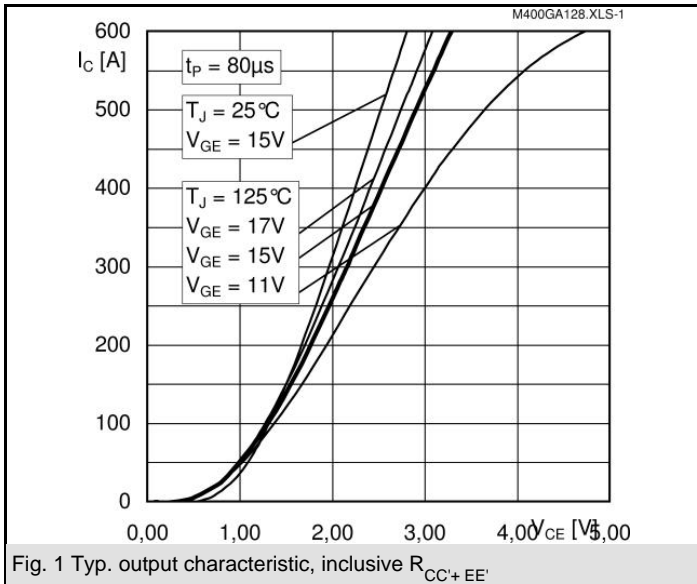
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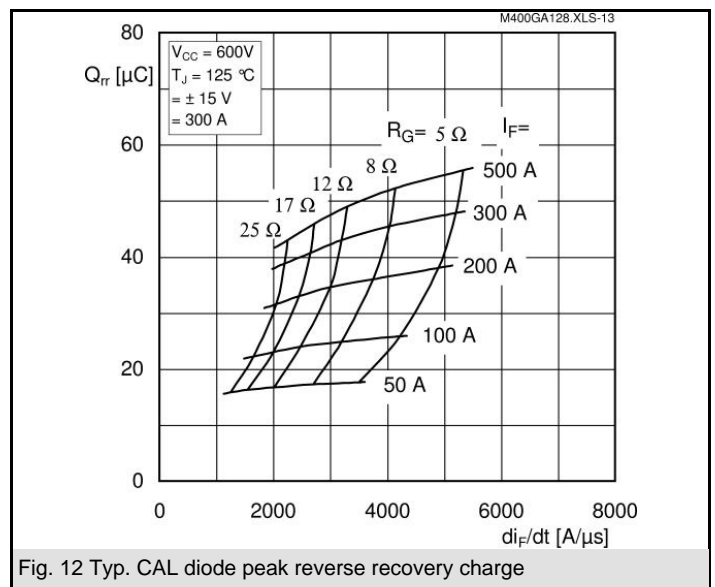
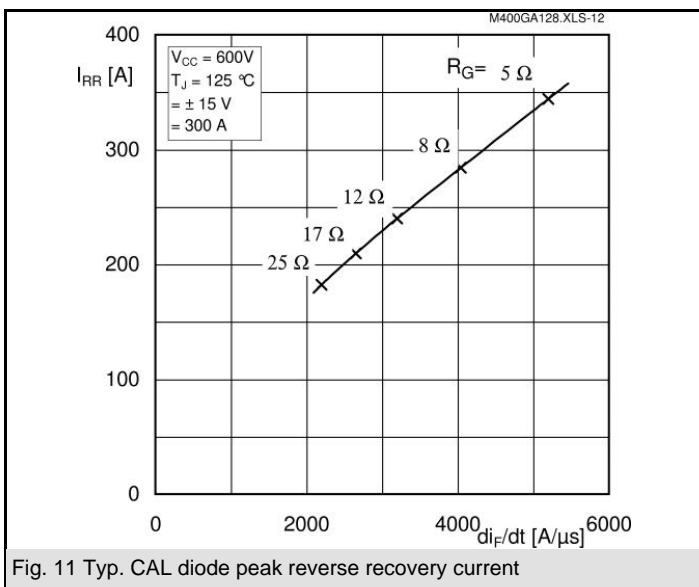
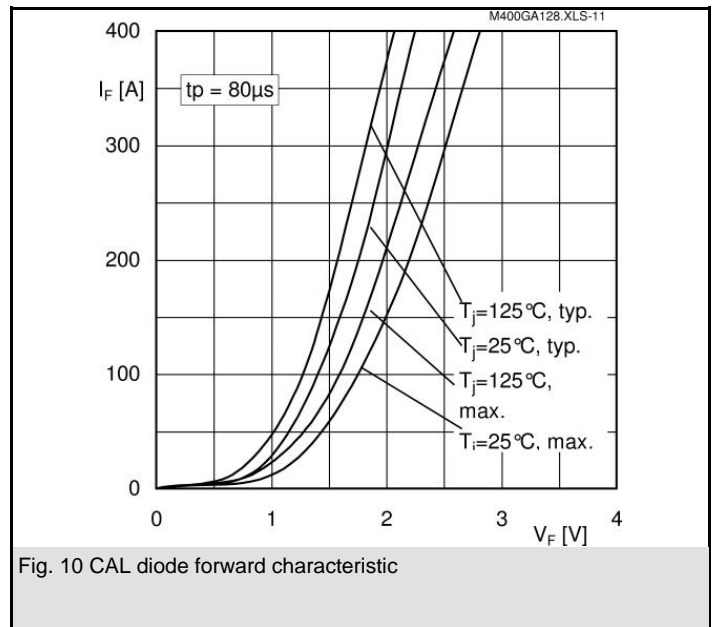
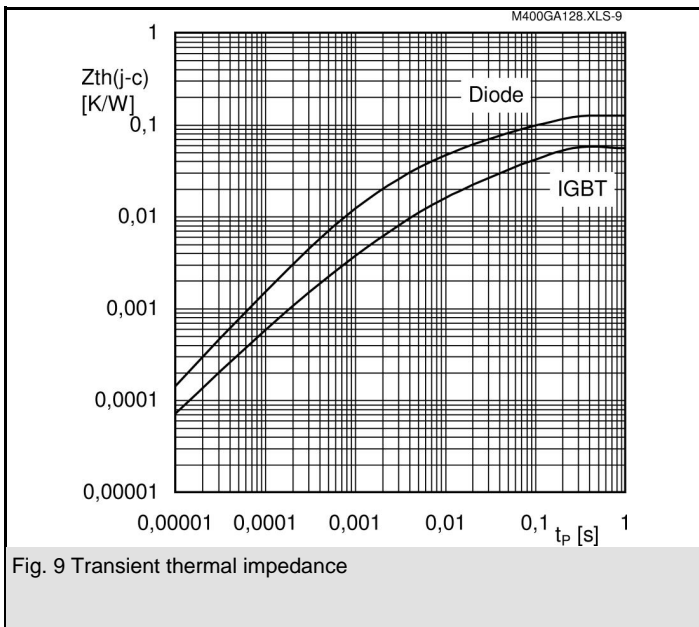
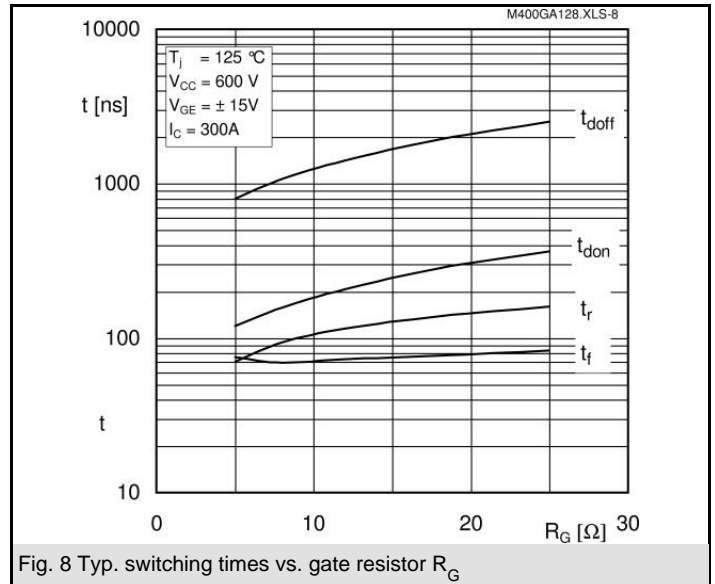
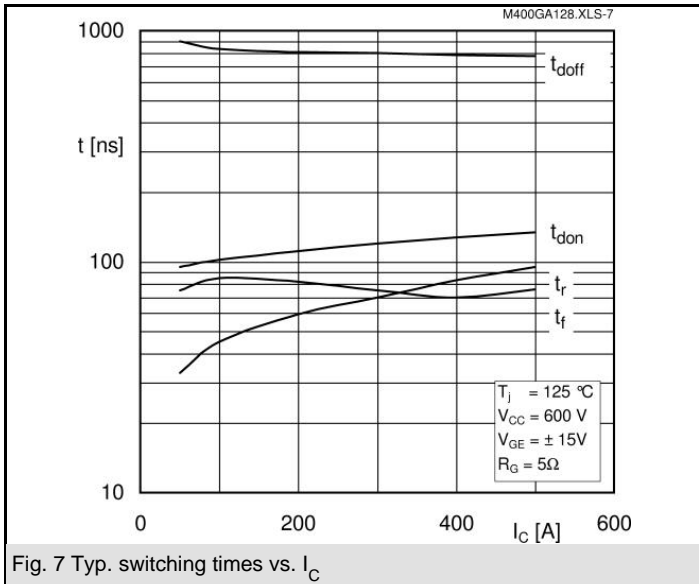
### Characteristics

Symbol	Conditions	min.	typ.	max.	Units
<b>Inverse Diode</b>					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$		2	2,5	V
			1,8		V
					$T_j = 25 \text{ °C}_{chiplev.}$
					$T_j = 125 \text{ °C}_{chiplev.}$
$V_{F0}$			1,1	1,2	V
$r_F$			3	4,3	mΩ
					$T_j = 25 \text{ °C}$
$I_{RRM}$	$I_{Fnom} = 300 \text{ A}$		345		A
$Q_{rr}$	$di/dt = 5200 \text{ A}/\mu\text{s}$		48		μC
$E_{off}$	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		20		mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
<b>Module</b>					
$L_{CE}$			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ °C}$	0,18		mΩ
		$T_{case} = 125 \text{ °C}$	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.

This technical information specifies semiconductor devices but promises no characteristics. No warranty or guarantee expressed or implied is made regarding delivery, performance or suitability.



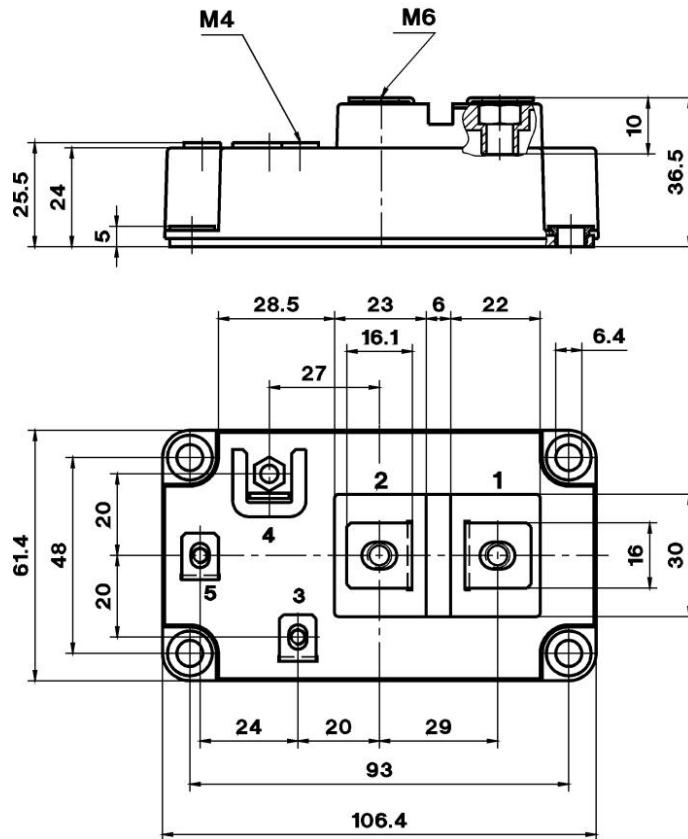


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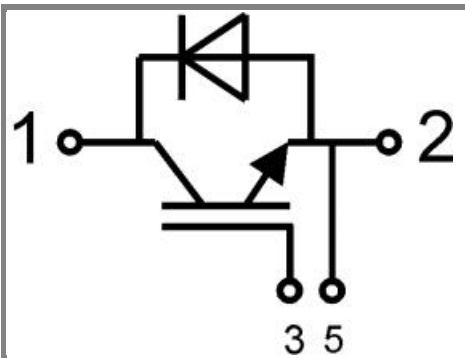
UL Recognized  
File no. E 63 532

Dimensions in mm

CASED59



Case D 59



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Case D 59