

# SKM 22GD123D



**SEMITRANS® 6**

## IGBT modules

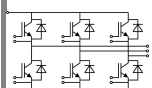
**SKM 22GD123D**

### Features

- MOS input (voltage controlled)
- N channel, homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to  $6 \times I_{Cnom}$
- Latch-up free
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (9 mm) and creepage distances (13 mm)

### Typical Applications\*

- Switched mode power supplies
- Three phase inverters for AC motor speed control
- General power switching applications
- Pulse frequencies also above 15 kHz



**GD**

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
$I_C$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	25	A
		$T_{case} = 80^\circ\text{C}$	15	A
$I_{CRM}$	$I_{CRM} = 2 \times I_{Cnom}$	50		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>				
$I_F$	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	25	A
		$T_{case} = 80^\circ\text{C}$	15	A
$I_{FRM}$	$I_{FRM} = 2 \times I_{Fnom}$	50		A
$I_{FSM}$	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	200	A
<b>Module</b>				
$I_{t(RMS)}$		100		A
$T_{vj}$		- 40 ... + 175		$^\circ\text{C}$
$T_{stg}$		- 40...+ 125		$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	2500		V

Characteristics		$T_c = 25^\circ\text{C}$ , unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1\text{ mA}$	4,5	5,5	6,5	V
$I_{CES}$	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,3	0,9	mA
$V_{CE0}$		$T_j = 25^\circ\text{C}$	1,4	1,6	V
		$T_j = 125^\circ\text{C}$	1,6	1,8	V
$r_{CE}$	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	73,33	93,33	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	100	126,66	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 15\text{ A}, V_{GE} = 15\text{ V}$	$T_j = ^\circ\text{C}_{chiplev.}$	2,5	3	V
$C_{ies}$	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	1		nF
$C_{oes}$			0,15		nF
$C_{res}$			0,07		nF
$t_{d(on)}$	$R_{Gon} = 52\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 25\text{ A}$	40		ns
$t_r$			35		ns
$E_{on}$	$R_{Goff} = 52\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = -15\text{ V}$	2		mJ
$t_{d(off)}$			350		ns
$t_f$			70		ns
$E_{off}$			1,4		mJ
$R_{th(j-c)}$	per IGBT		0,86		K/W



**SEMITRANS<sup>®</sup> 6**

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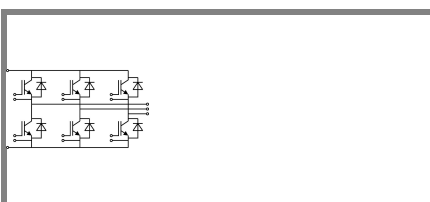
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Characteristics				min.	typ.	max.	Units
Symbol	Conditions						
<b>Inverse Diode</b>							
$V_F = V_{EC}$	$I_{Fnom} = 15 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		2	2,5		V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,8			V
$V_{F0}$		$T_j = 25 \text{ }^\circ\text{C}$		1,1	1,2		V
		$T_j = 125 \text{ }^\circ\text{C}$					V
$r_F$		$T_j = 25 \text{ }^\circ\text{C}$		60	87		mΩ
		$T_j = 125 \text{ }^\circ\text{C}$					mΩ
$I_{RRM}$	$I_F = 15 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		16			A
$Q_{rr}$				2,7			μC
$E_{rr}$	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$			0,95			mJ
$R_{th(j-c)D}$	per diode					1,5	K/W
<b>Module</b>							
$L_{CE}$						60	nH
$R_{th(c-s)}$	per module					0,05	K/W
$M_s$	to heat sink M5			4		5	Nm
w						175	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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## IGBT modules

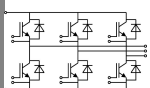
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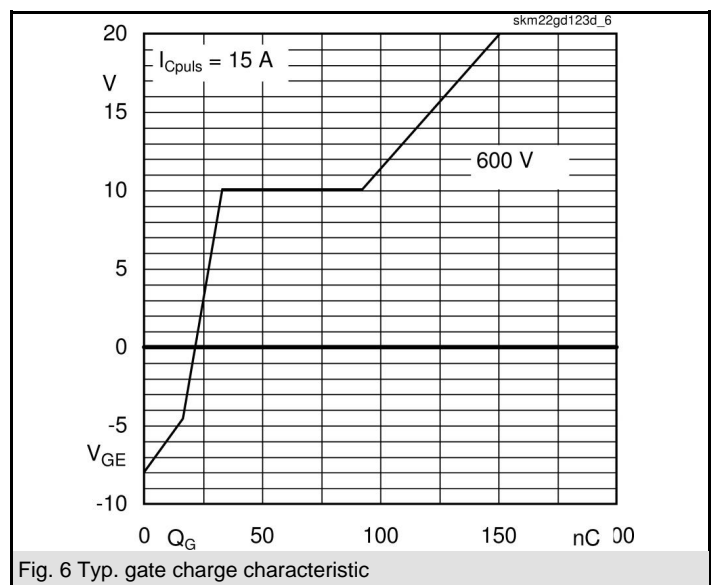
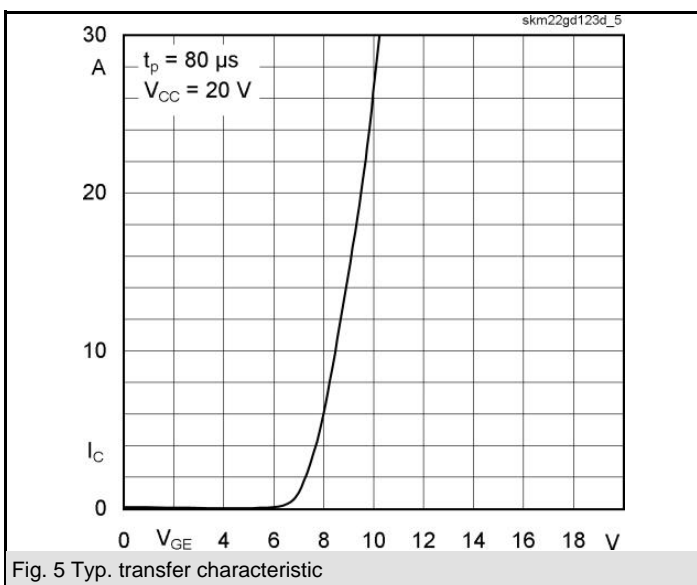
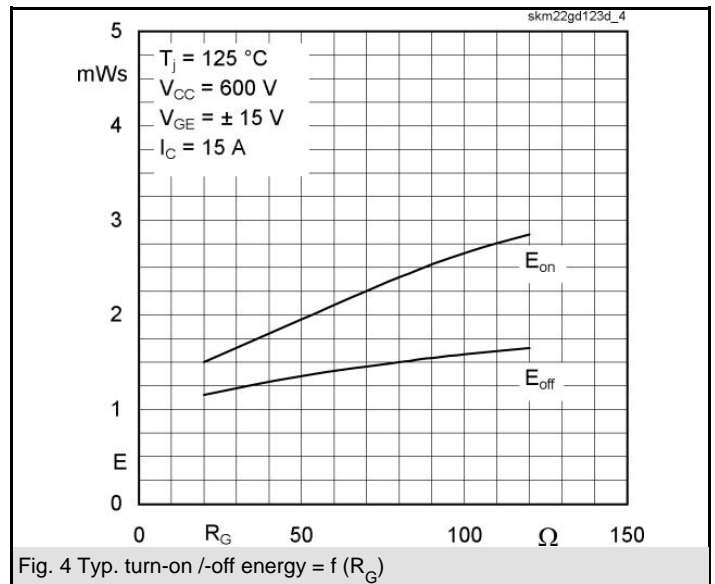
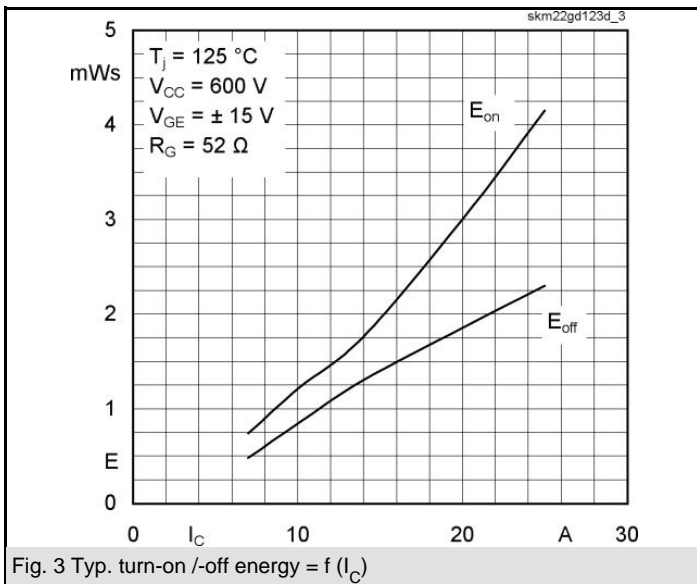
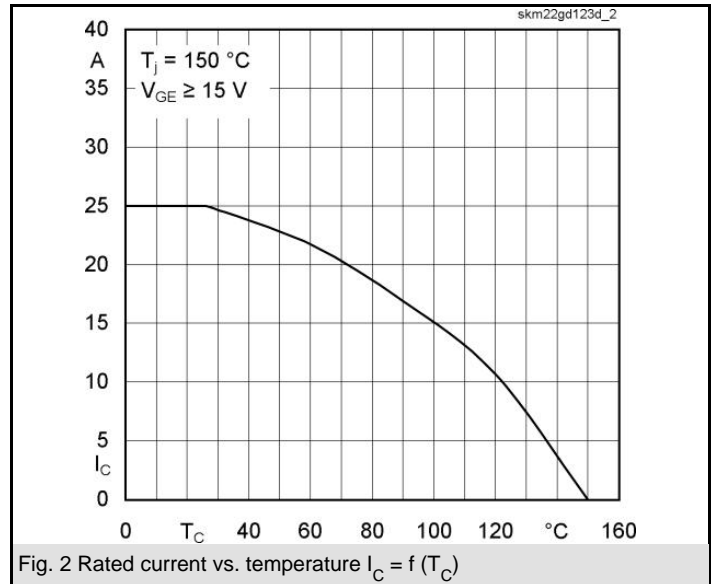
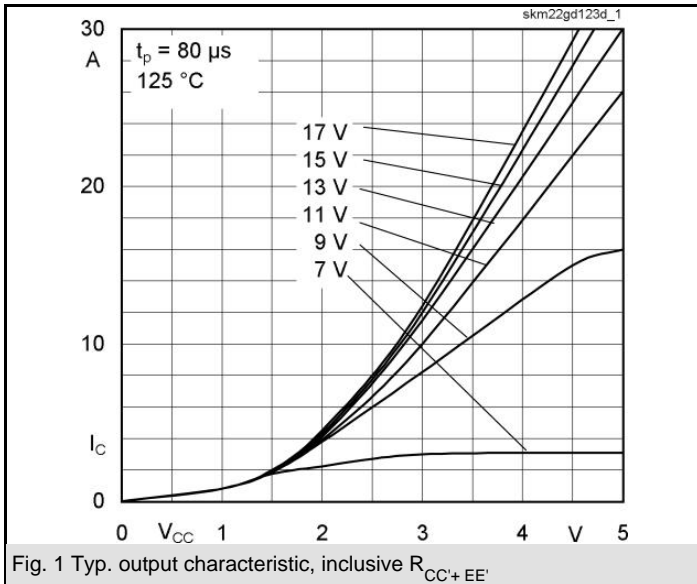
### Typical Applications\*

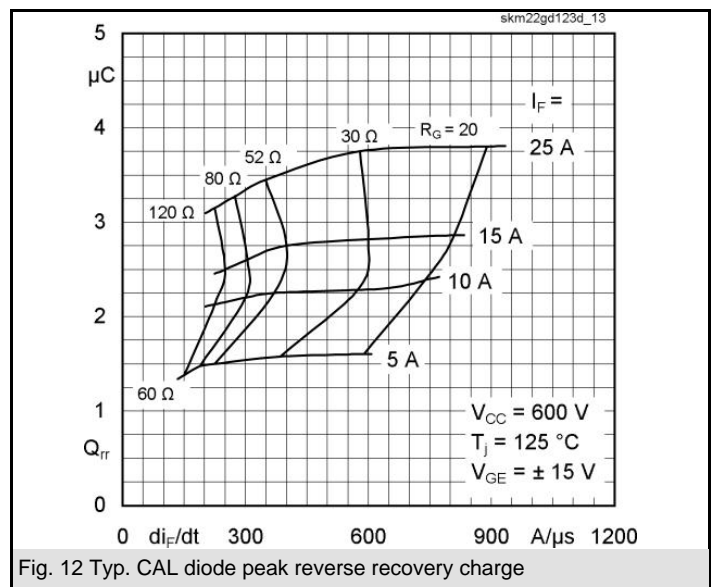
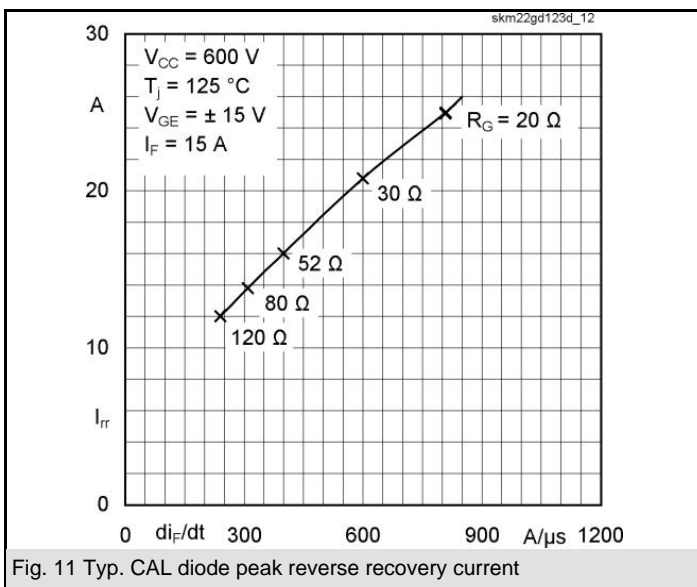
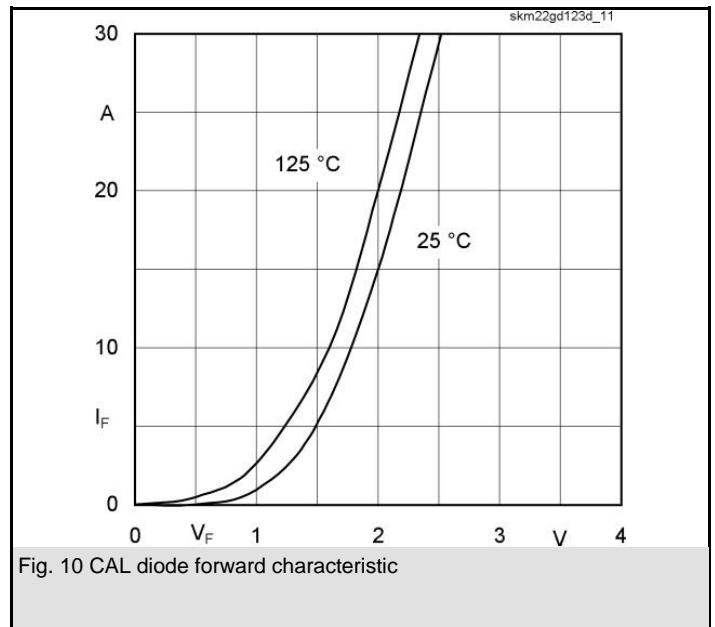
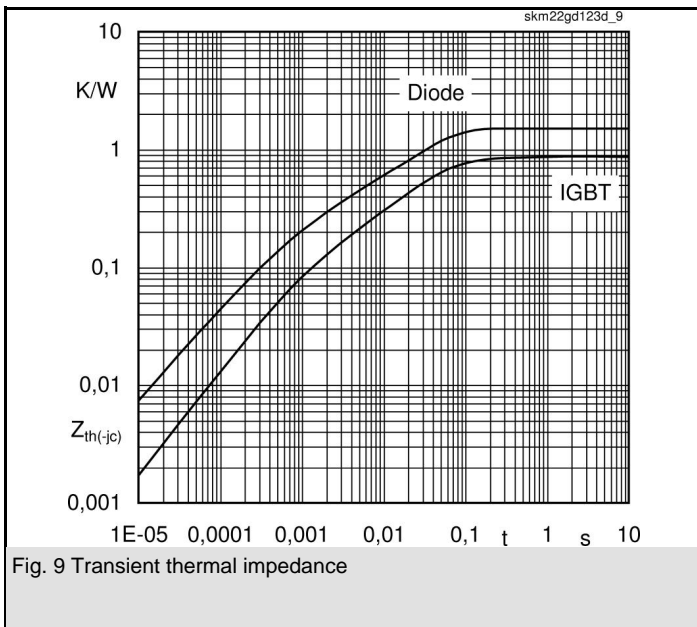
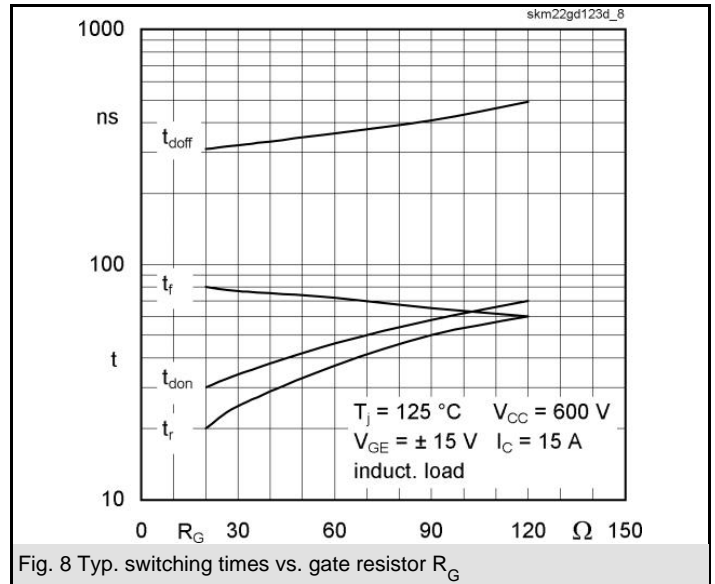
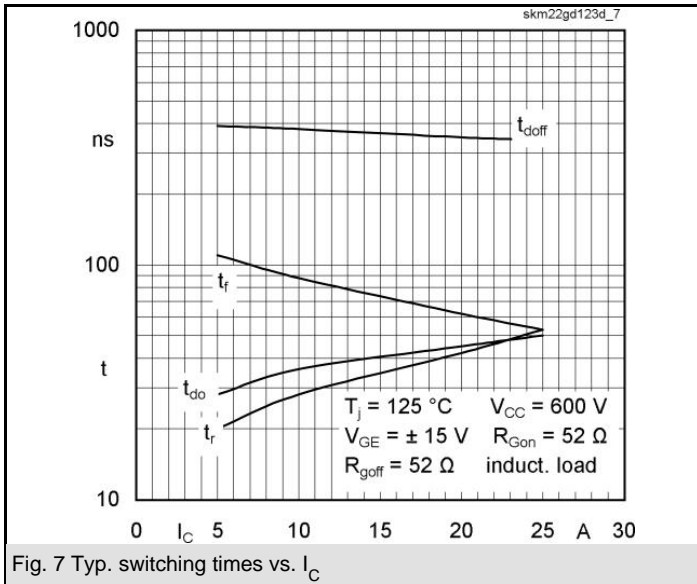
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$Z_{th}$		Conditions	Values	Units
<b><math>Z_{th(j-c)I}</math></b>				
$R_{\theta j-c}$	$i = 1$		560	mk/W
$R_{\theta j-c}$	$i = 2$		220	mk/W
$R_{\theta j-c}$	$i = 3$		67	mk/W
$R_{\theta j-c}$	$i = 4$		13	mk/W
$\tau_{th(j-c)}$	$i = 1$		0,056	s
$\tau_{th(j-c)}$	$i = 2$		0,0078	s
$\tau_{th(j-c)}$	$i = 3$		0,017	s
$\tau_{th(j-c)}$	$i = 4$		0,0001	s
<b><math>Z_{th(j-c)D}</math></b>				
$R_{\theta j-c}$	$i = 1$		800	mk/W
$R_{\theta j-c}$	$i = 2$		400	mk/W
$R_{\theta j-c}$	$i = 3$		270	mk/W
$R_{\theta j-c}$	$i = 4$		30	mk/W
$\tau_{th(j-c)}$	$i = 1$		0,0761	s
$\tau_{th(j-c)}$	$i = 2$		0,0013	s
$\tau_{th(j-c)}$	$i = 3$		0,011	s
$\tau_{th(j-c)}$	$i = 4$		0,002	s



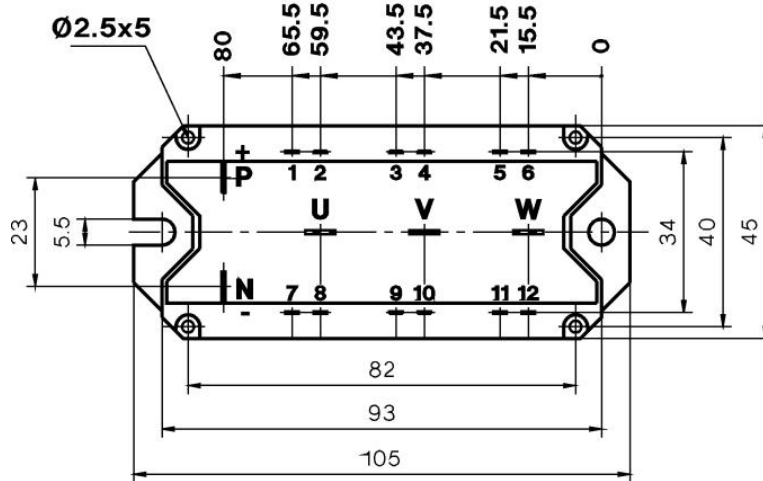
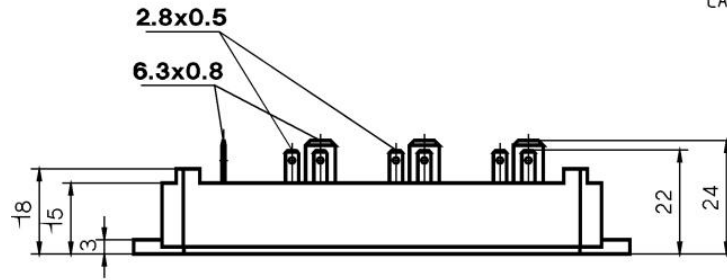


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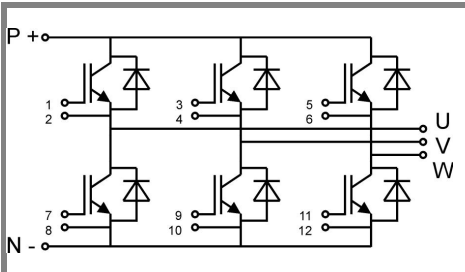
UL Recognized

CASED67

File 63 532



Case D 67



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Case D 67