

SKM 40GD123D



SEMITRANS® 6

Standard IGBT modules

SKM 40GD123D

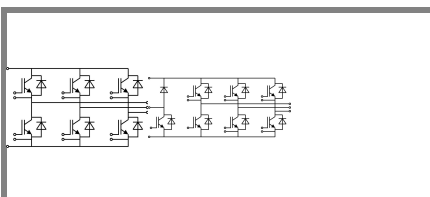
SKM 40GDL123D

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
- Pulse frequencies also above 15 kHz



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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values			Units
IGBT					
V_{CES}	$T_j = 25^\circ\text{C}$	1200			V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	40		A
		$T_{case} = 80^\circ\text{C}$	30		A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	50			A
V_{GES}		± 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			μs
Inverse Diode					
I_F	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	45		A
		$T_{case} = 80^\circ\text{C}$	30		A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	50			A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	350		A
Module					
$I_{t(RMS)}$		100			A
T_{vj}		- 40 ... + 150			$^\circ\text{C}$
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
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 1\text{ mA}$	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}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	44	56	$\text{m}\Omega$
		$T_j = 125^\circ\text{C}$	60	76	$\text{m}\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 25\text{ A}, V_{GE} = 15\text{ V}$	$T_j = ^\circ\text{C}_{chiplev.}$	2,5	3	V
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	1,6	2,1	nF
C_{oes}			0,25	0,3	nF
C_{res}			0,11	0,15	nF
$t_{d(on)}$	$R_{Gon} = 40\ \Omega$	$V_{CC} = 600\text{V}$ $I_{Cnom} = 25\text{A}$	70		ns
t_r			55		ns
E_{on}	$R_{Goff} = 40\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = -15\text{V}$	3,8		mJ
$t_{d(off)}$			400		ns
t_f			40		ns
E_{off}			2,3		mJ
$R_{th(j-c)}$	per IGBT			0,56	K/W

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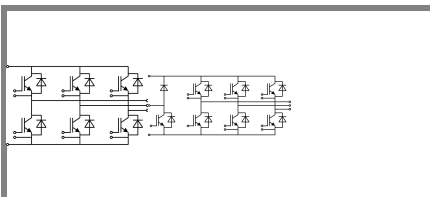
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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 25 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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		$T_j = 25 \text{ }^\circ\text{C}$	36	52	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$			mΩ
I_{RRM}	$I_{Fnom} = 25 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	25		A
Q_{rr}	$di/dt = 500 \text{ A}/\mu\text{s}$		4,5		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$		1,35		mJ
$R_{th(j-c)D}$	per diode			1	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = \text{A}; V_{GE} = \text{V}$	$T_j = \text{ }^\circ\text{C}_{chiplev.}$			V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$			V
		$T_j = 125 \text{ }^\circ\text{C}$			V
r_F		$T_j = 25 \text{ }^\circ\text{C}$			V
		$T_j = 125 \text{ }^\circ\text{C}$			V
I_{RRM}	$I_{Fnom} = \text{A}$	$T_j = \text{ }^\circ\text{C}$			A
Q_{rr}					μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
	per diode				K/W
Module					
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.

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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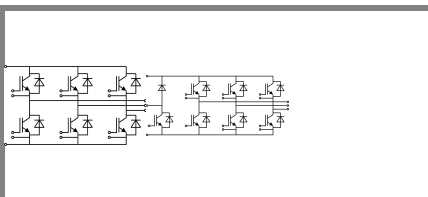
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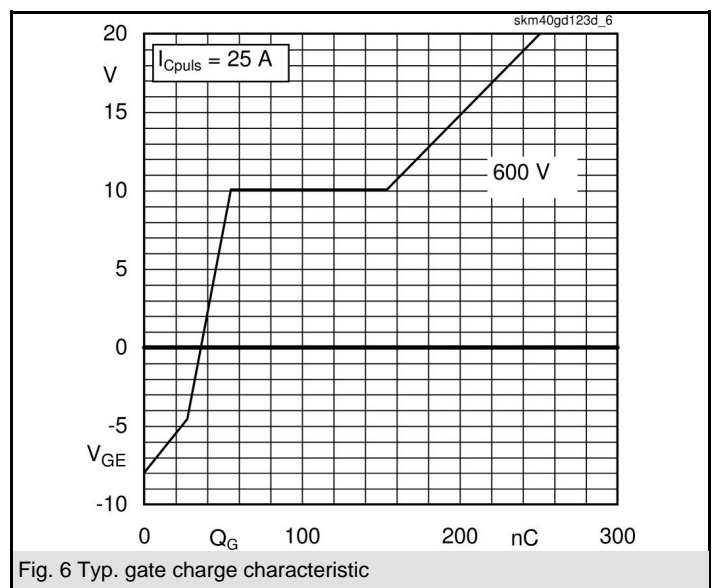
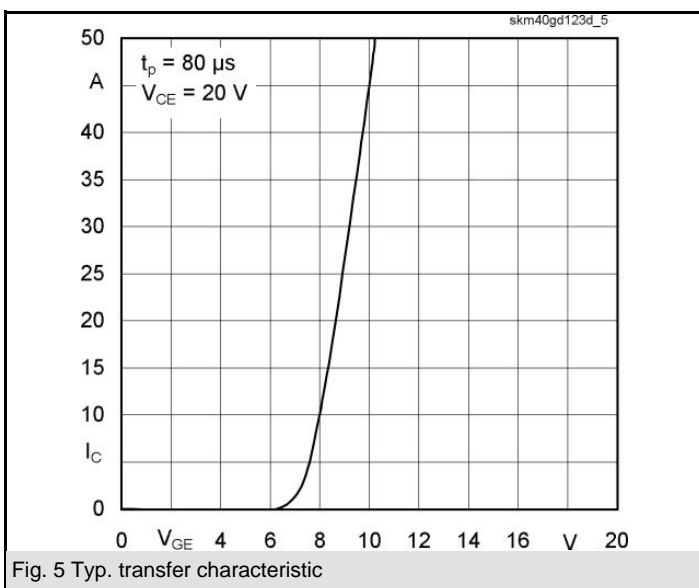
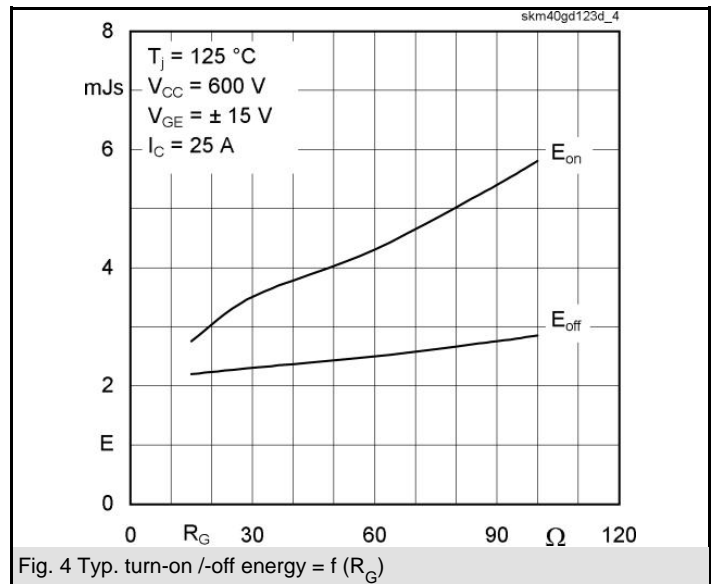
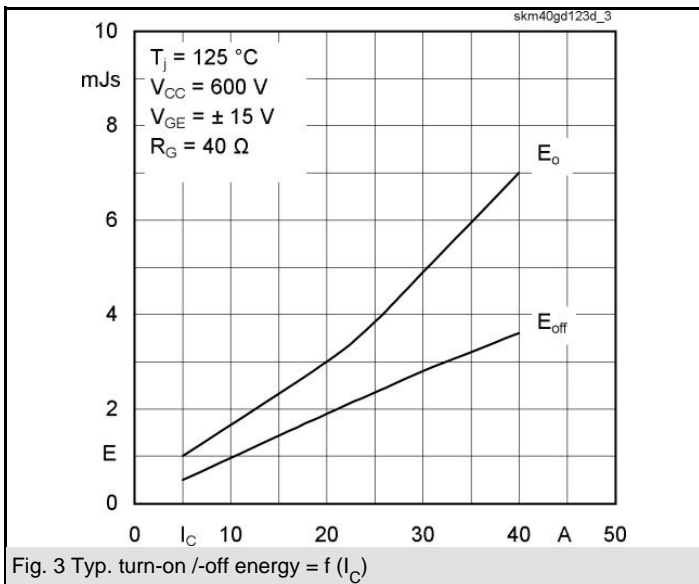
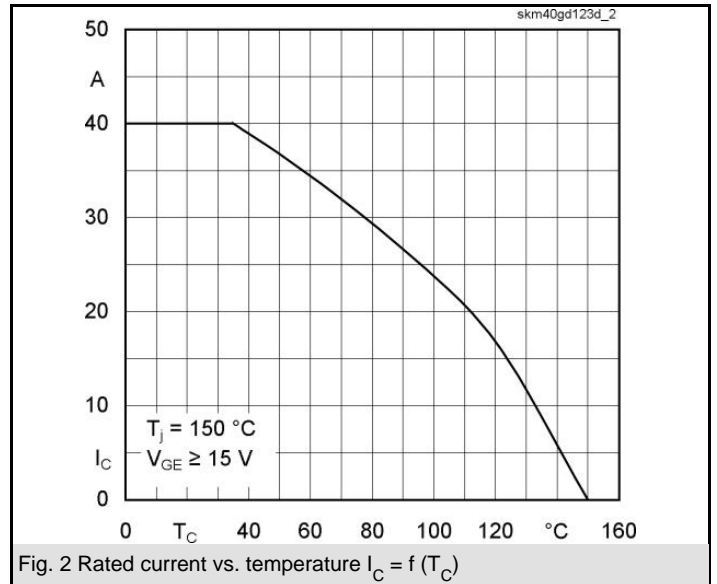
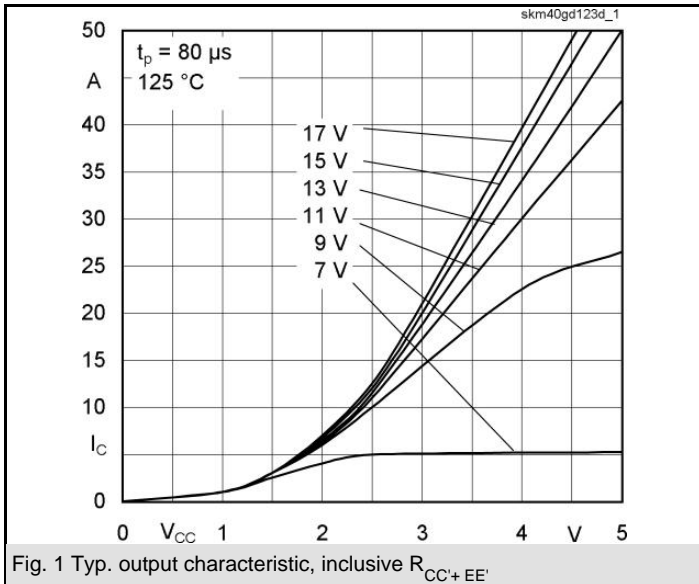
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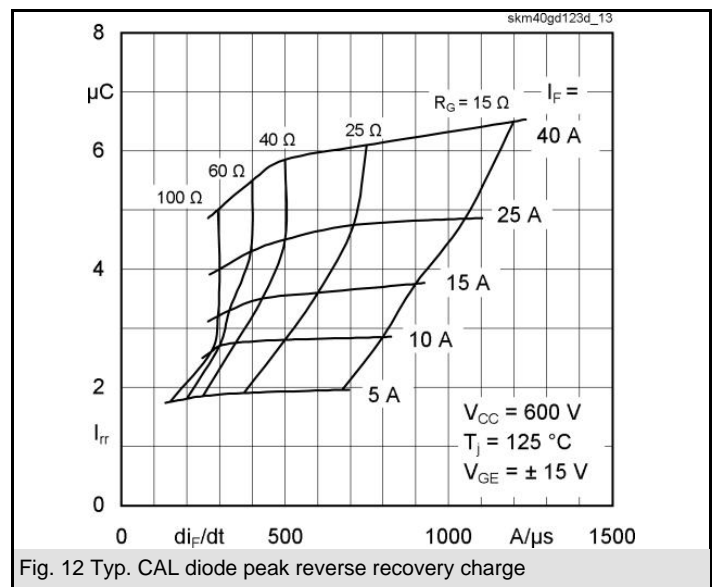
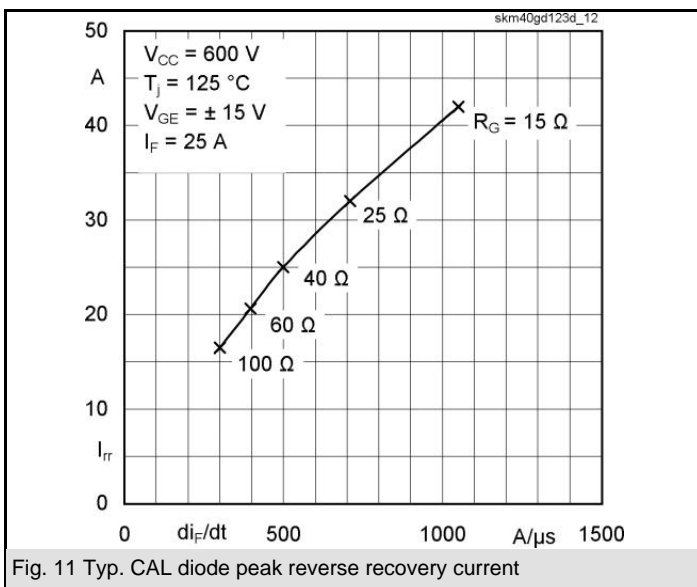
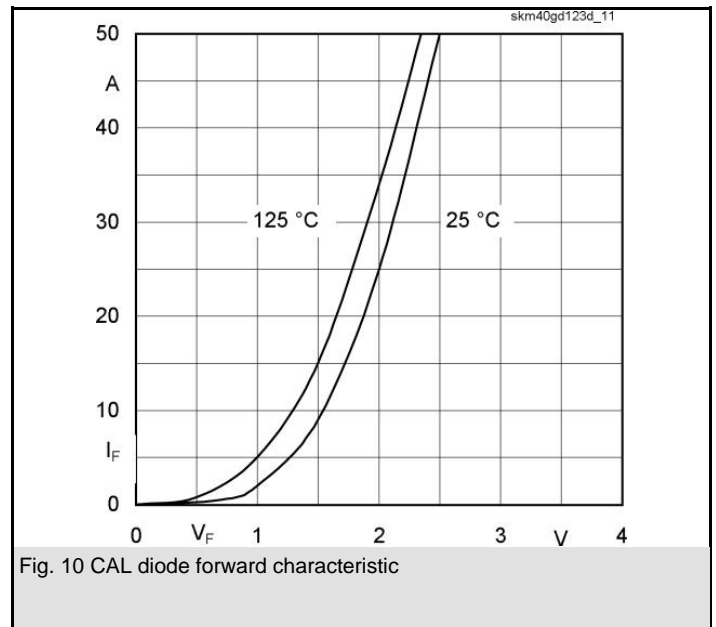
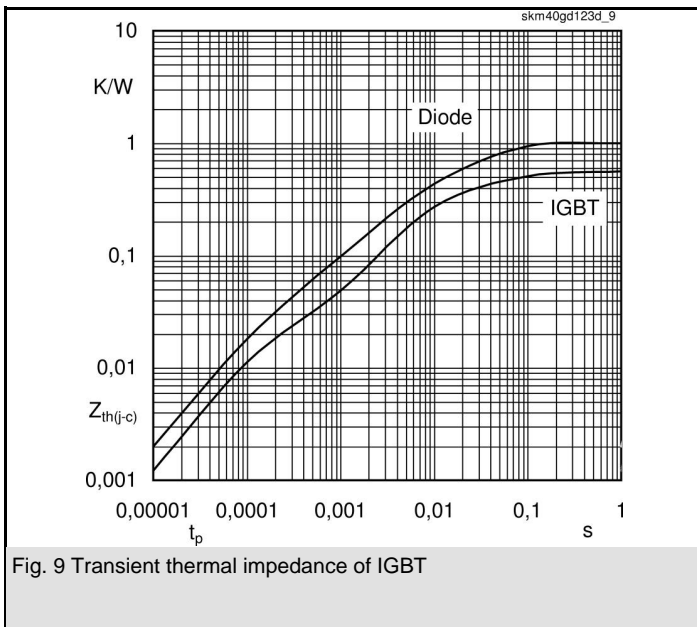
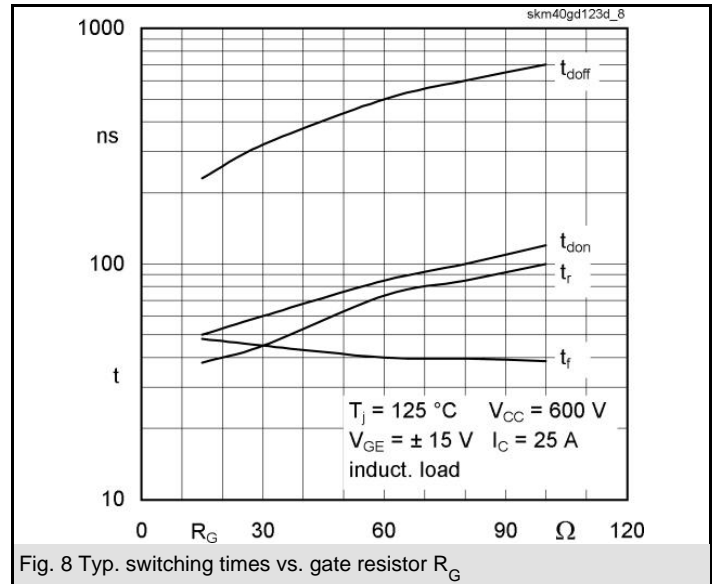
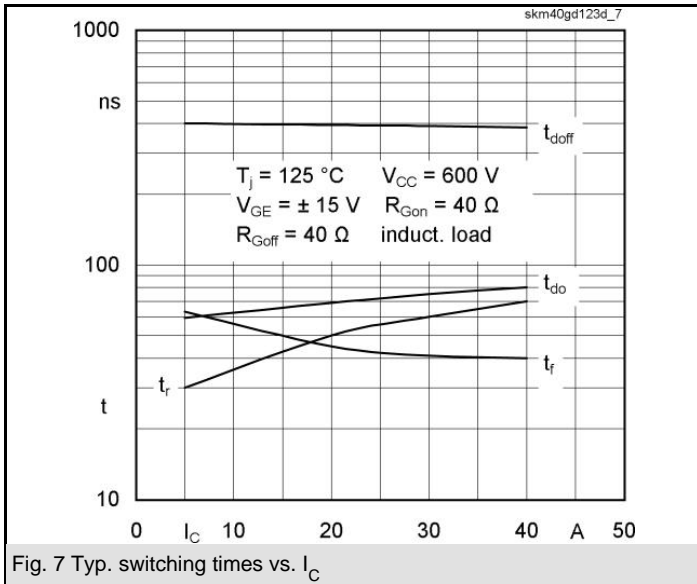


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Z_{th}		Values	Units
Symbol	Conditions		
$Z_{th(j-c)I}$			
$R_{\theta j-c}$	$i = 1$	260	mk/W
$R_{\theta j-c}$	$i = 2$	250	mk/W
$R_{\theta j-c}$	$i = 3$	38	mk/W
$R_{\theta j-c}$	$i = 4$	12	mk/W
$\tau_{th(j-c)}$	$i = 1$	0,0447	s
$\tau_{th(j-c)}$	$i = 2$	0,0079	s
$\tau_{th(j-c)}$	$i = 3$	0,0015	s
$\tau_{th(j-c)}$	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
$R_{\theta j-c}$	$i = 1$	580	mk/W
$R_{\theta j-c}$	$i = 2$	330	mk/W
$R_{\theta j-c}$	$i = 3$	73	mk/W
$R_{\theta j-c}$	$i = 4$	17	mk/W
$\tau_{th(j-c)}$	$i = 1$	0,054	s
$\tau_{th(j-c)}$	$i = 2$	0,0089	s
$\tau_{th(j-c)}$	$i = 3$	0,0018	s
$\tau_{th(j-c)}$	$i = 4$	0,0002	s



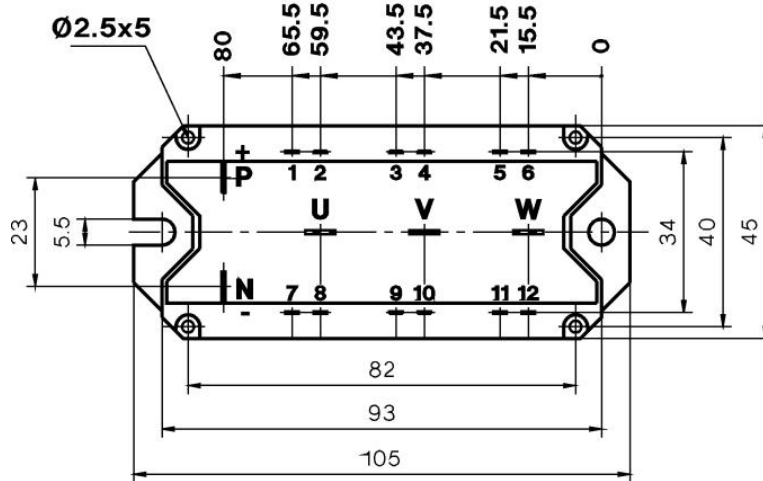
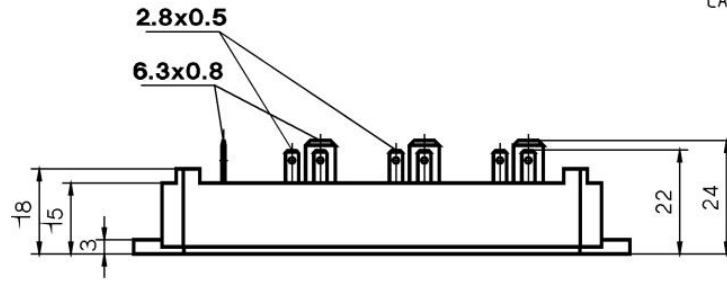


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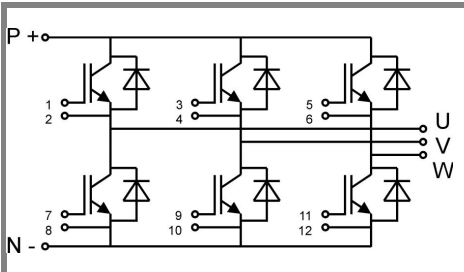
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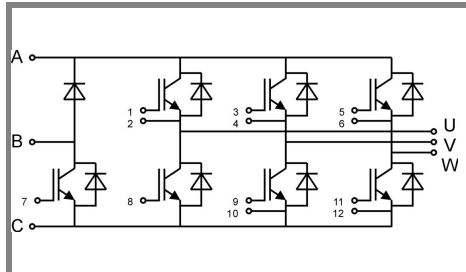


Case D 67



Case D 67

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Case D 73

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