

SKM 40GD123D



SEMITRANS® 6

Standard IGBT modules

SKM 40GD123D

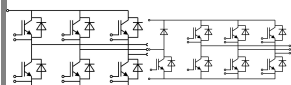
SKM 40GDL123D

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			$T_c = 25\text{ }^{\circ}\text{C}$, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V_{CES}	$T_j = 25\text{ }^{\circ}\text{C}$		1200	V
I_C	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	40	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	30	A
I_{CRM}	$I_{CRM}=2\times I_{Cnom}$		50	A
V_{GES}			± 20	V
t_{psc}	$V_{CC} = 600\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125\text{ }^{\circ}\text{C}$ $V_{CES} < 1200\text{ V}$		10	μs
Inverse Diode				
I_F	$T_j = 150\text{ }^{\circ}\text{C}$	$T_{case} = 25\text{ }^{\circ}\text{C}$	45	A
		$T_{case} = 80\text{ }^{\circ}\text{C}$	30	A
I_{FRM}	$I_{FRM}=2\times I_{Fnom}$		50	A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150\text{ }^{\circ}\text{C}$	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 °C, unless otherwise specified			
Symbol	Conditions		min.	typ.	max.	Units
IGBT						
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 1 mA		4,5	5,5	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C			0,3	0,9	mA
V _{CE0}	T _j = 25 °C			1,4	1,6	V
	T _j = 125 °C			1,6	1,8	V
r _{CE}	V _{GE} = 15 V T _j = 25°C			44	56	mΩ
	T _j = 125°C			60	76	mΩ
V _{CE(sat)}	I _{Cnom} = 25 A, V _{GE} = 15 V T _j = °C _{chiplev.}			2,5	3	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 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 Ω	V _{CC} = 600V I _{Cnom} = 25A T _j = 125 °C V _{GE} = -15V		70		ns
t _r				55		ns
E _{on}			3,8		mJ	
t _{d(off)}	R _{Goff} = 40 Ω			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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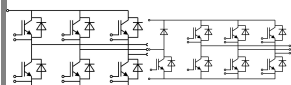
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 25\text{ A}; V_{GE} = 0\text{ V}$	$T_j = 25\text{ }^{\circ}\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125\text{ }^{\circ}\text{C}_{chiplev.}$	1,8		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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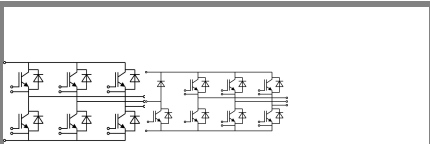
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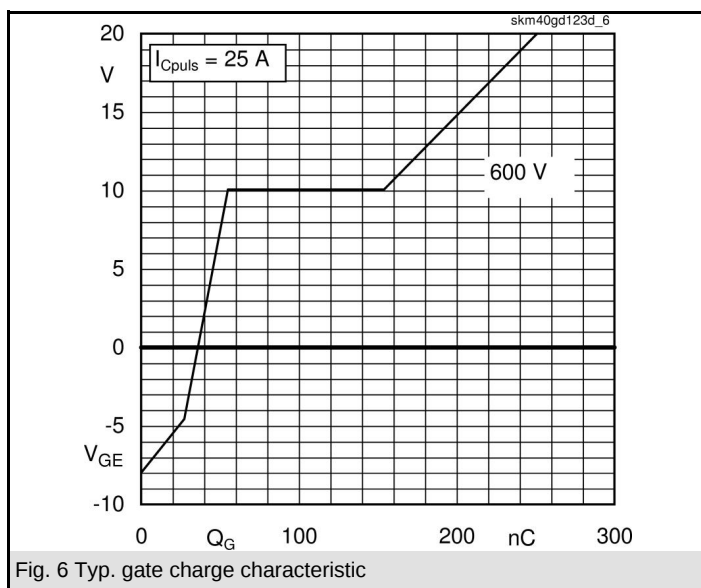
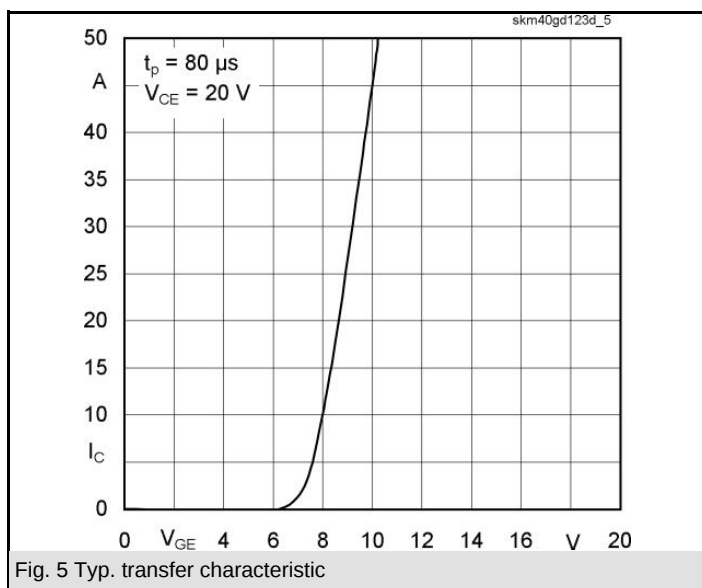
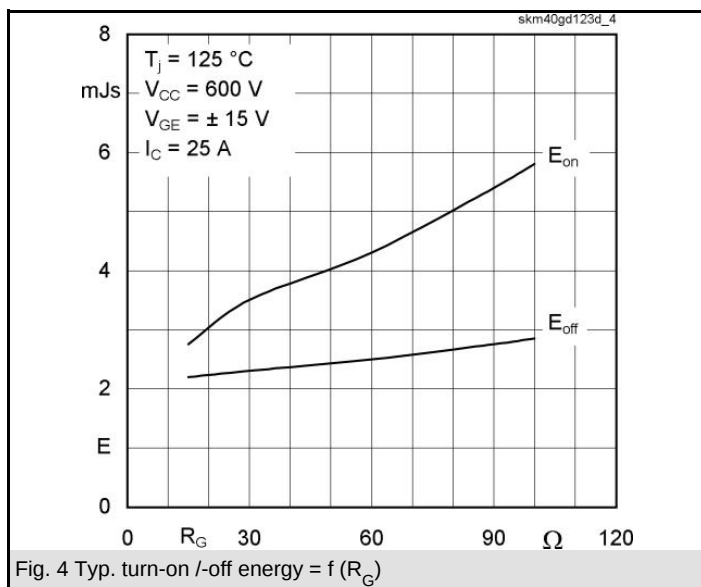
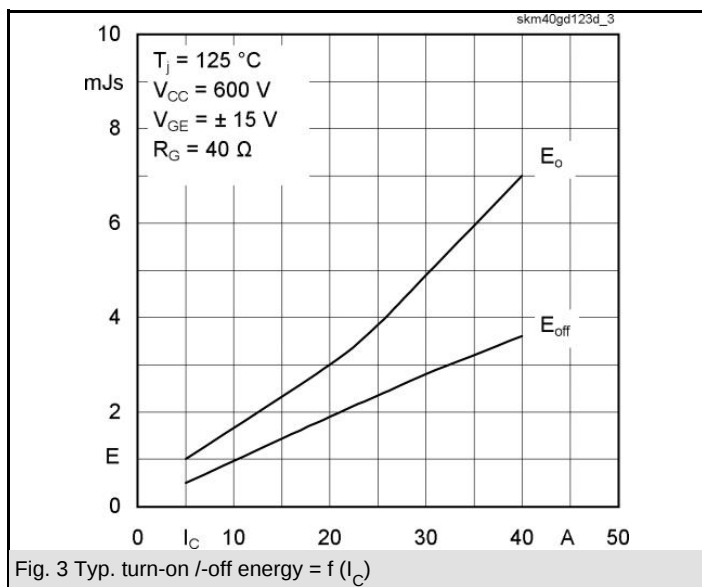
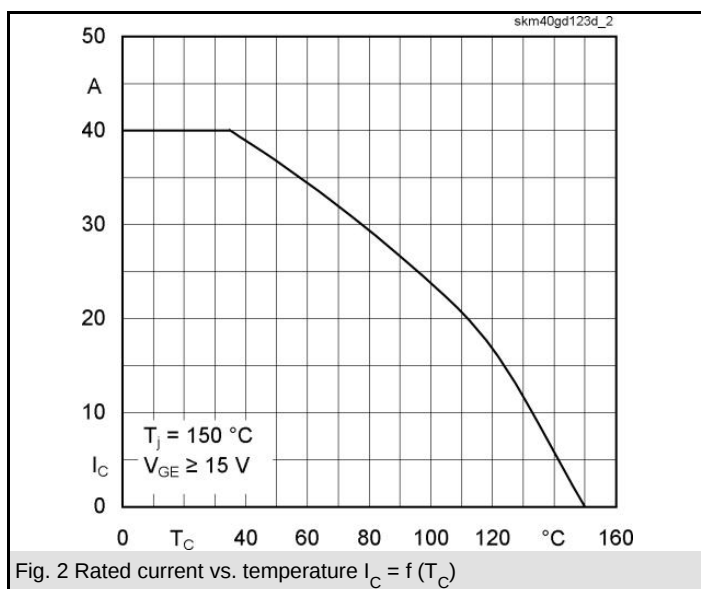
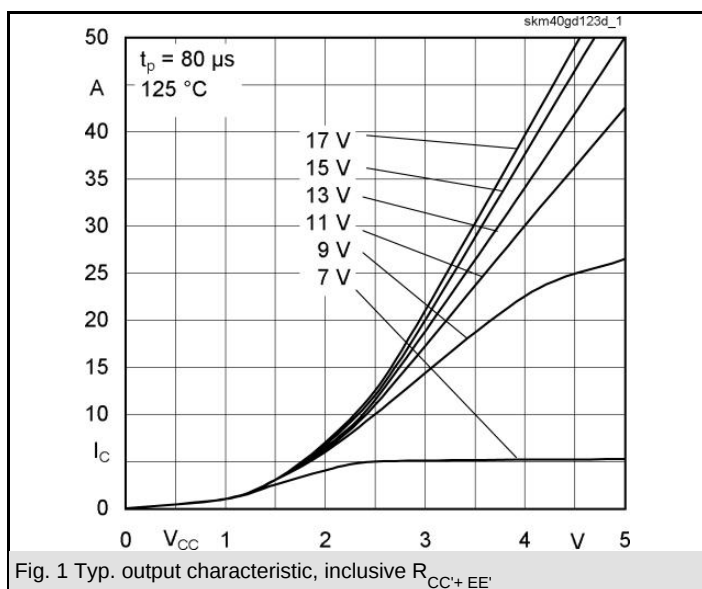
Typical Applications

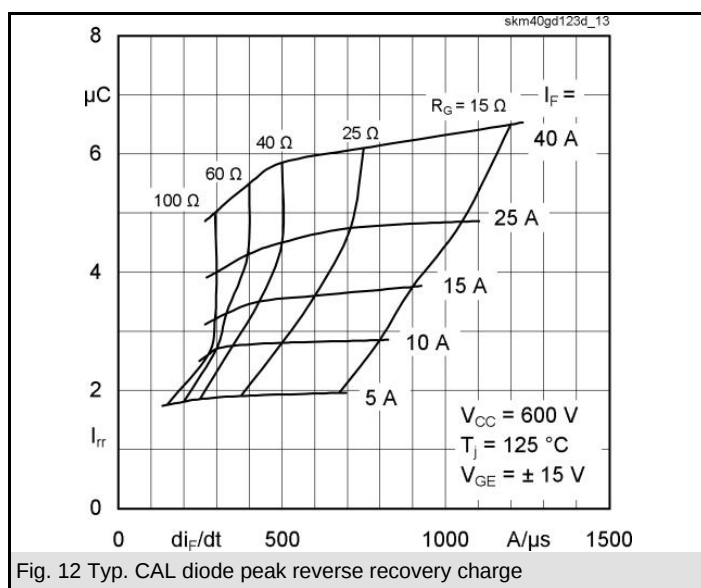
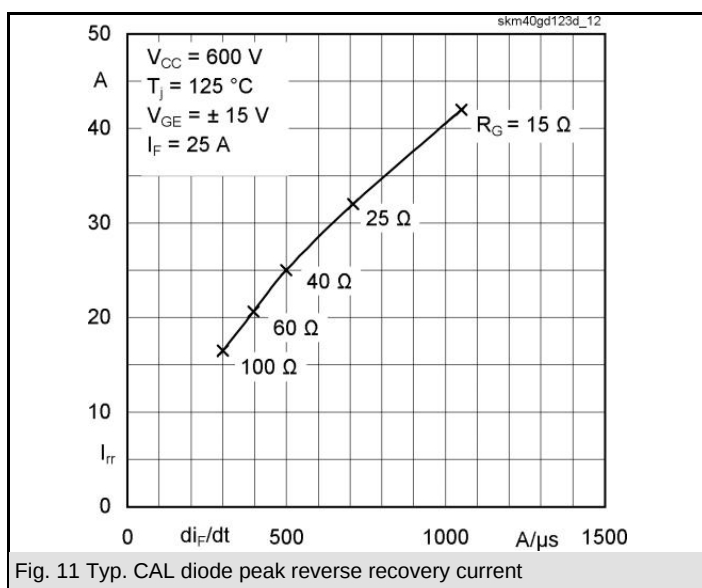
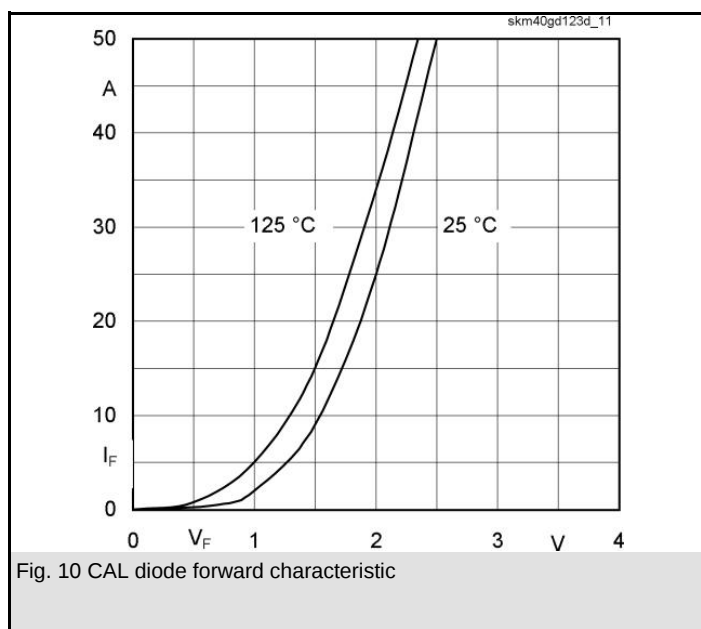
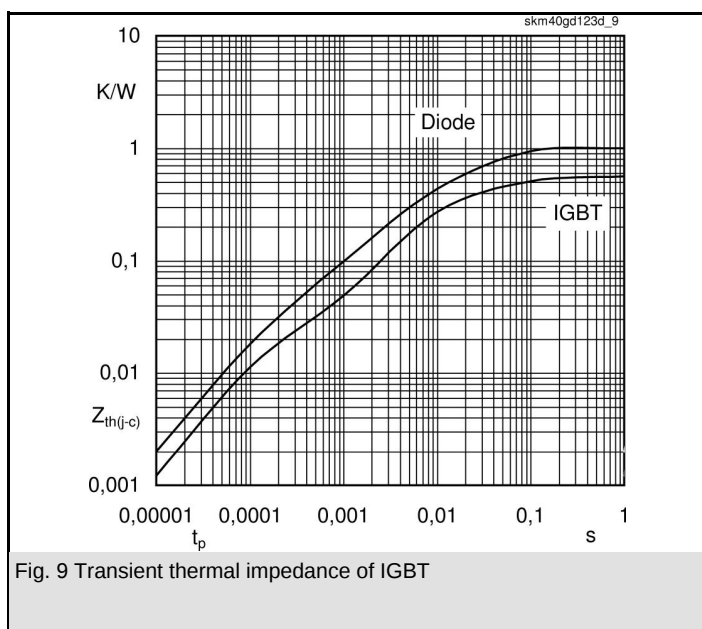
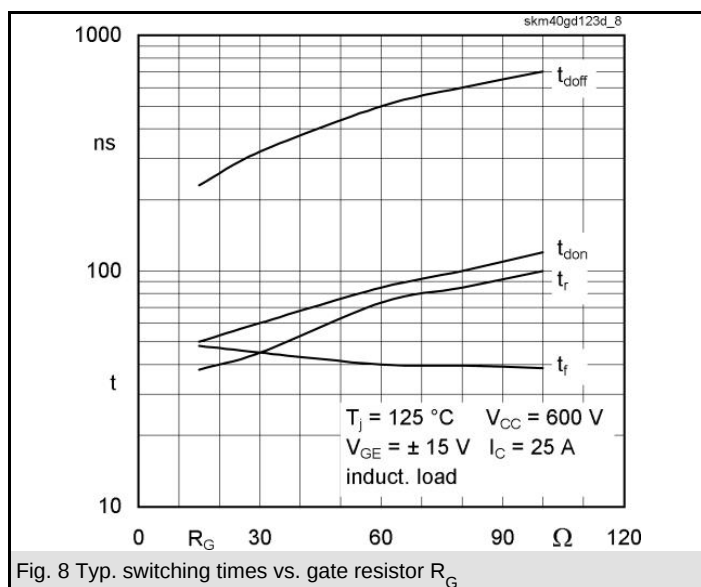
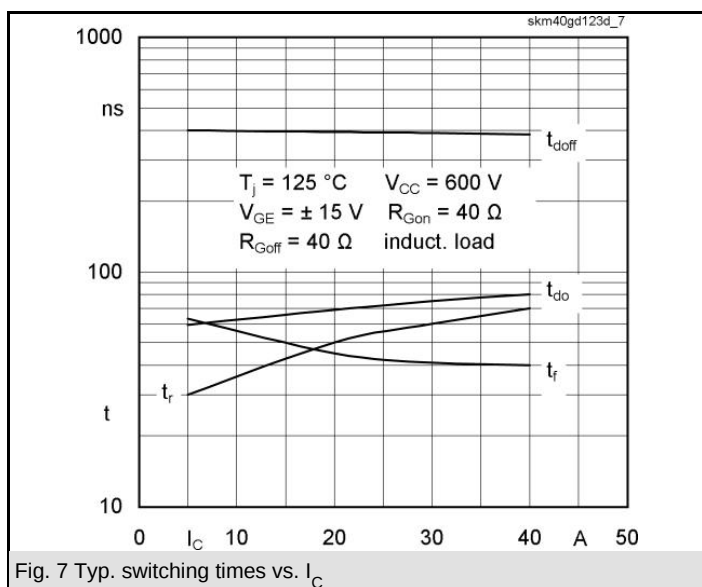
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- Pulse frequencies also above 15 kHz

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



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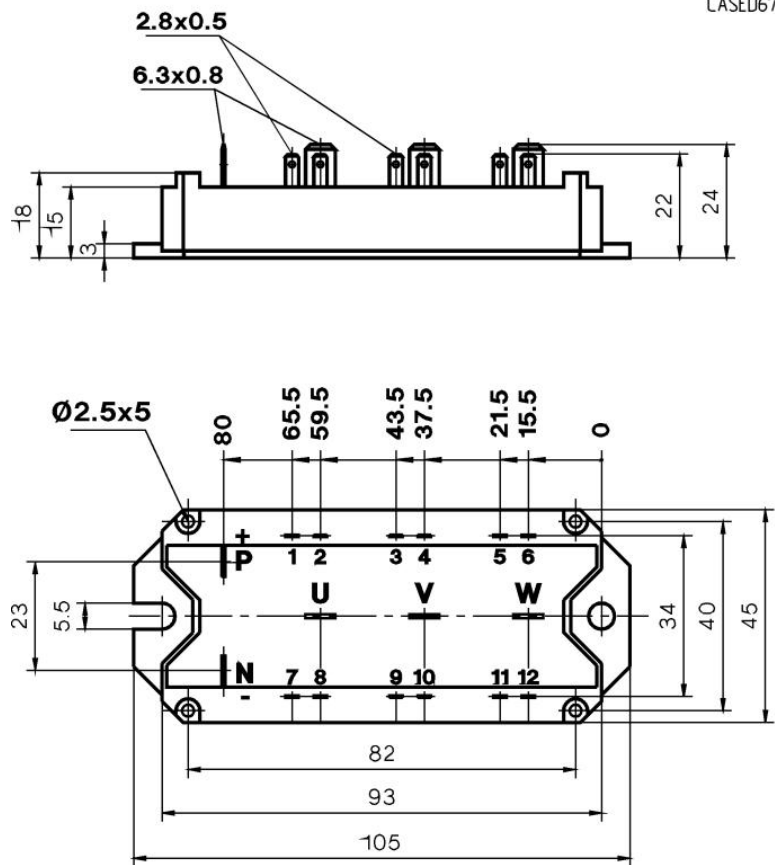


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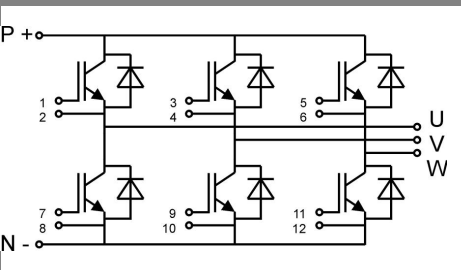
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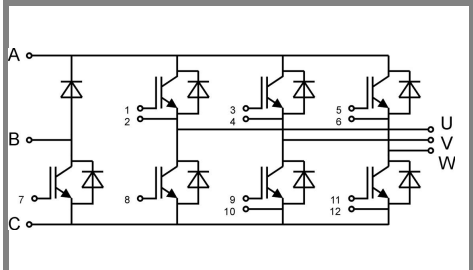


Case D 67



Case D 67

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Case D 73

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