

SKM 40GD123D



SEMITRANS® 6

IGBT modules

SKM 40GD123D

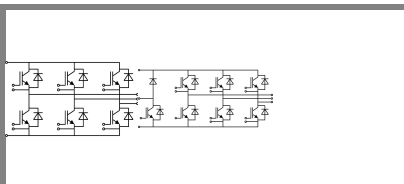
SKM 40GDL123D

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}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	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
$t_{d(on)}$	$R_{Gon} = 40\ \Omega$	$V_{CC} = 600\text{ V}$ $I_C = 25\text{ A}$	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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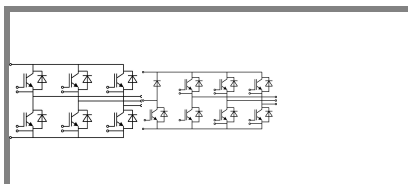
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Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 25 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	2	2,5	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,8		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}	$I_F = 25 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	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}	$I_F = \text{A}$	$T_j = \text{ }^\circ\text{C}$			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.

* 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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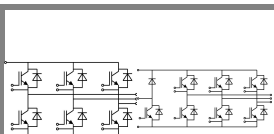
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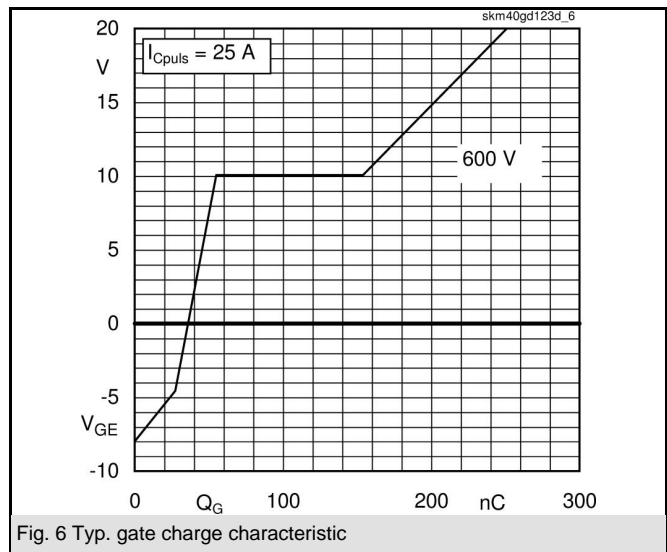
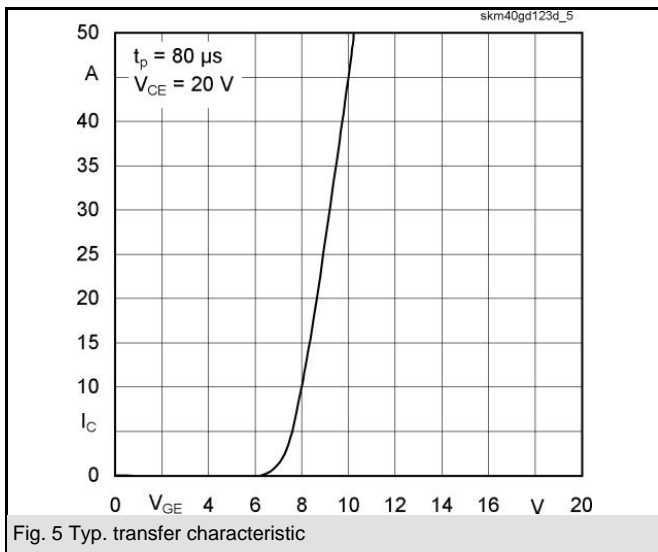
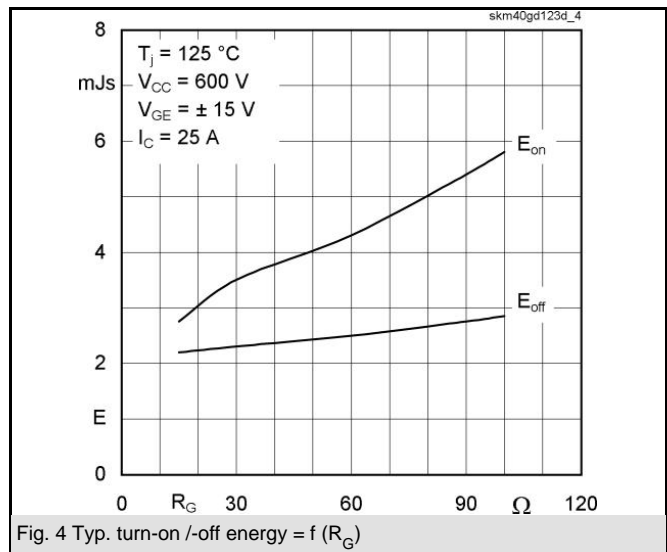
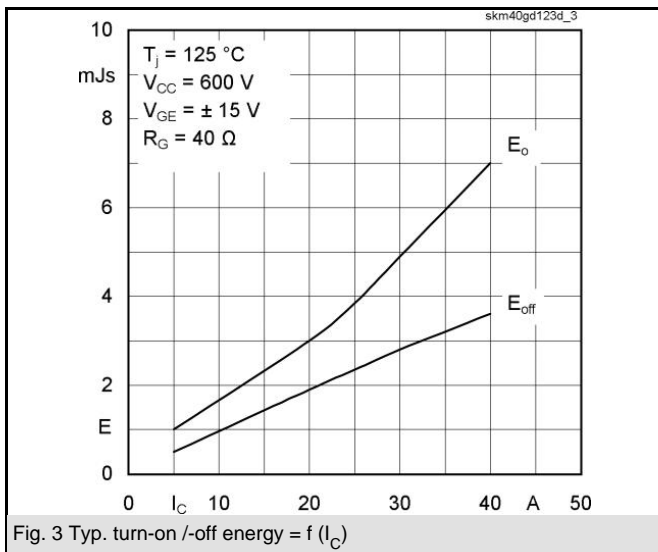
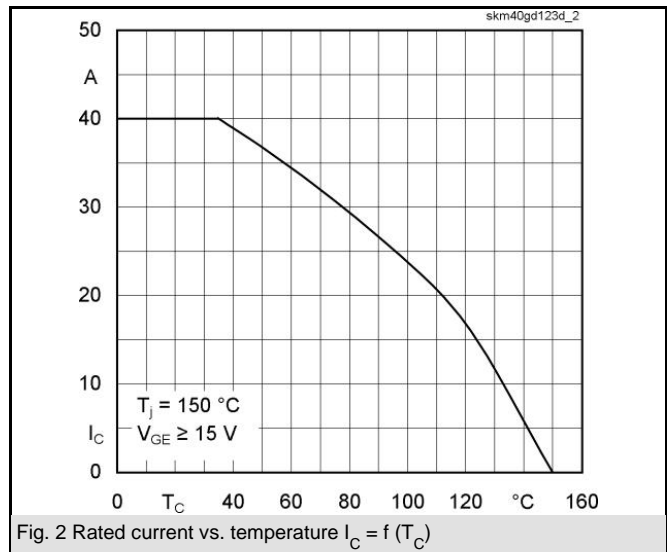
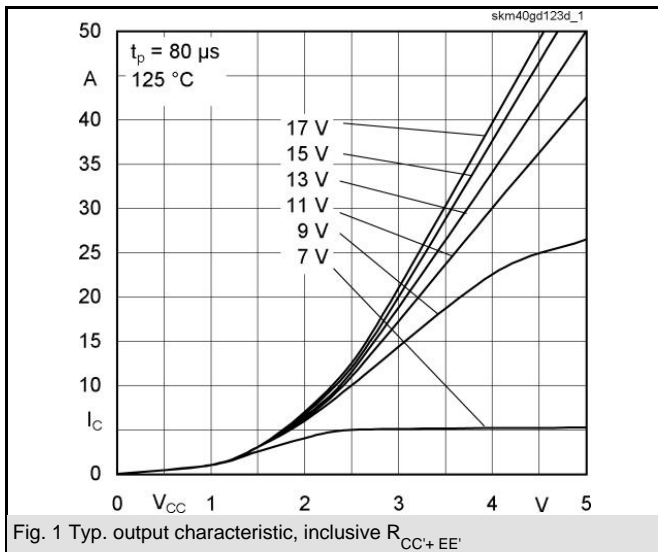
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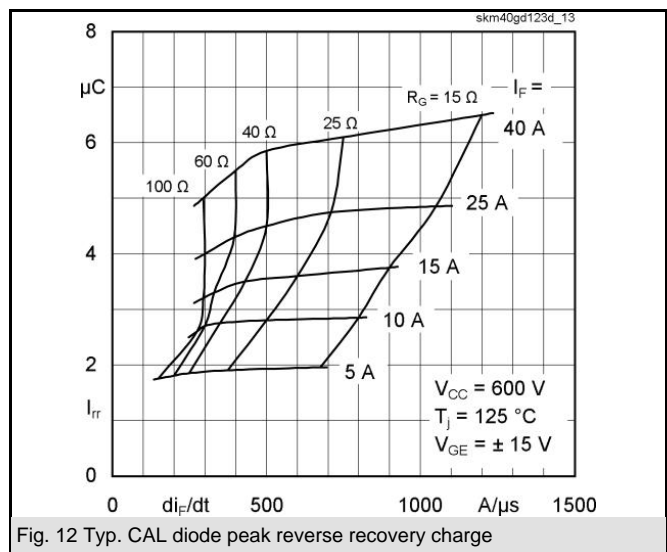
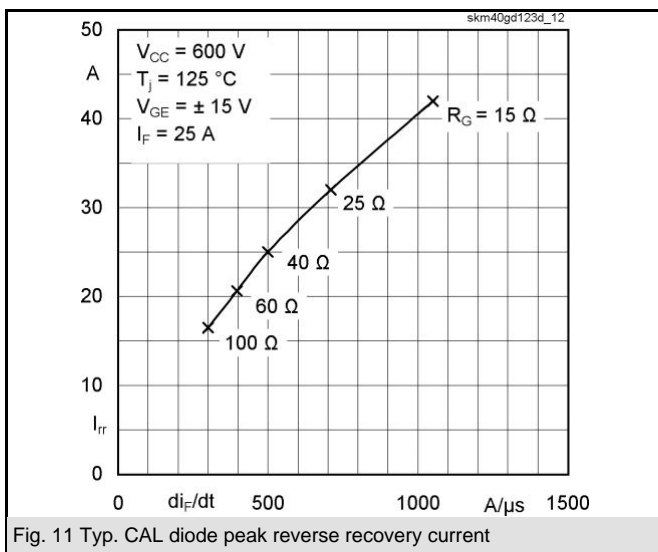
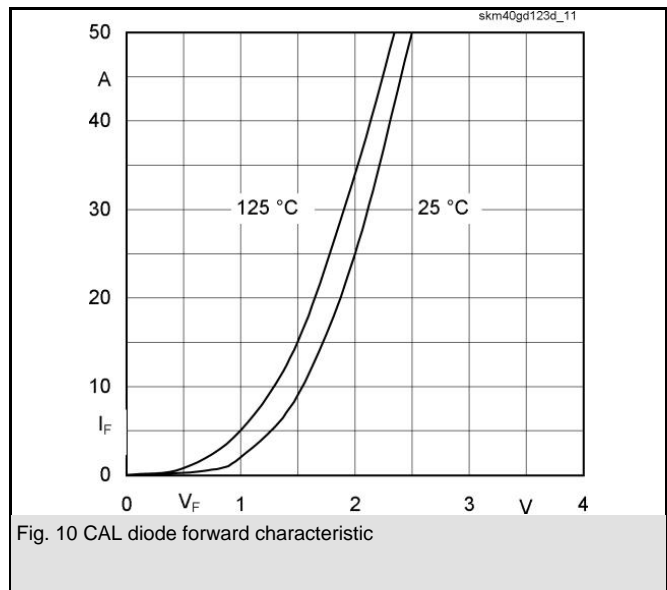
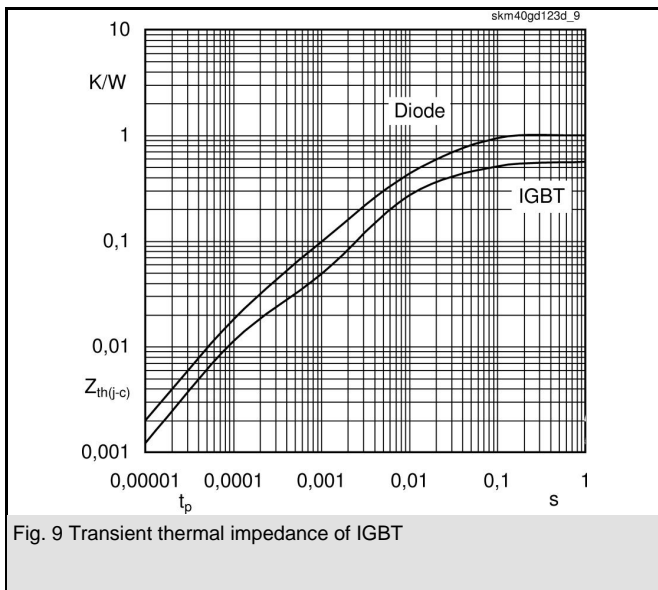
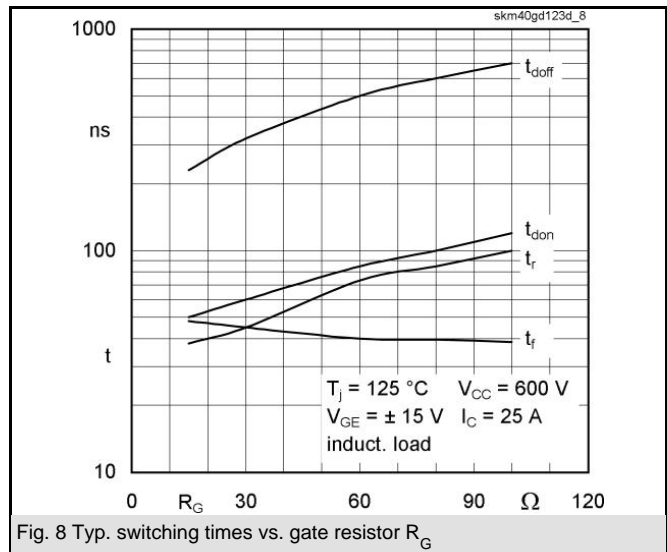
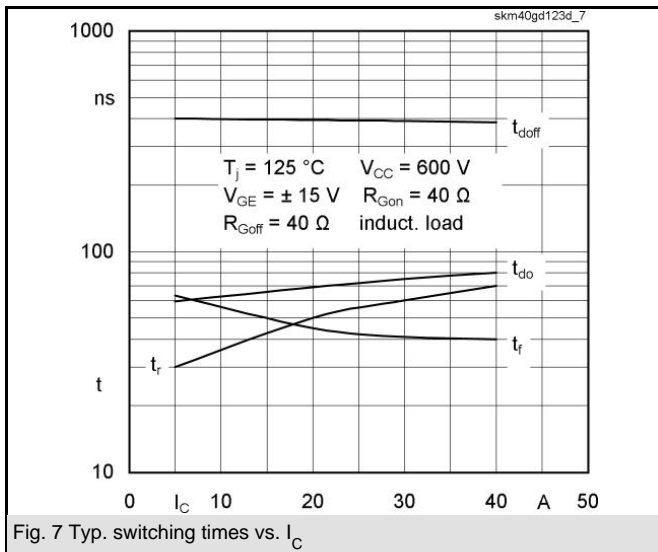


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Z_{th}		Values	Units
Symbol	Conditions		
$Z_{th(j-c)I}$			
R_i	$i = 1$	260	mk/W
R_i	$i = 2$	250	mk/W
R_i	$i = 3$	38	mk/W
R_i	$i = 4$	12	mk/W
τ_{u_i}	$i = 1$	0,0447	s
τ_{u_i}	$i = 2$	0,0079	s
τ_{u_i}	$i = 3$	0,0015	s
τ_{u_i}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$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



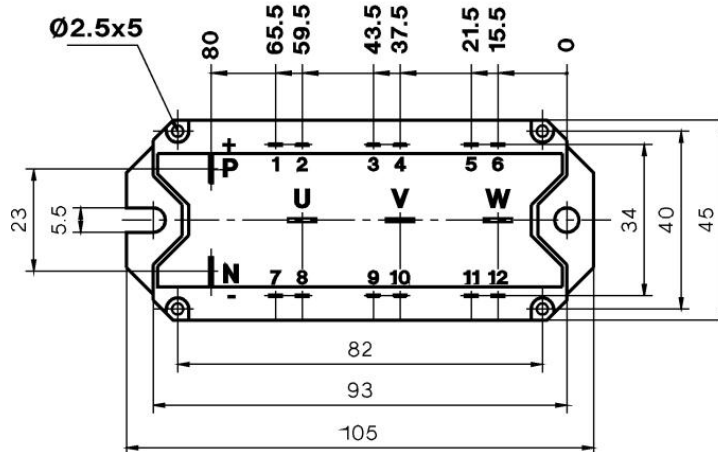
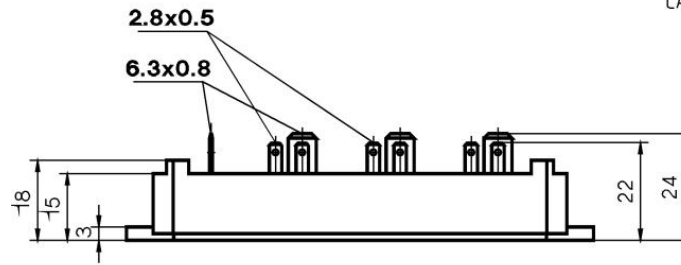


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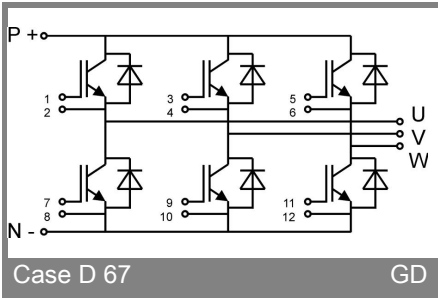
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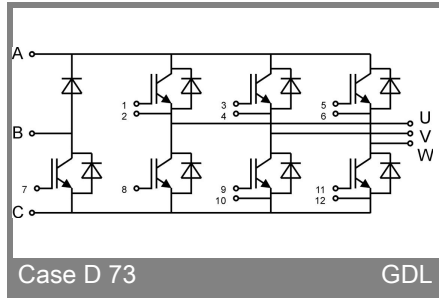


Case D 67



Case D 67

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Case D 73

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