SKM 22GD123D

SEMITRANS® 6

IGBT modules

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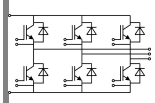
Features

- 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 x 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



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Absolute Maximum Ratings	T_c = 25 °C, unless otherwise specified			
Symbol	**Conditions**		**Values**	**Units**
IGBT				
V_{CES}	T_j = 25 °C		1200	V
I_C	T_j = 150 °C	T_{case} = 25 °C	25	A
		T_{case} = 80 °C	15	A
I_{CRM}	I_{CRM}=2xI_{Cnom}		50	A
V_{GES}			± 20	V
t_{psc}	V_{CC} = 600 V; $V_{GE} \leq$ 20 V; V_{CES} < 1200 V	T_j = 125 °C	10	µs
Inverse Diode				
I_F	T_j = 150 °C	T_{case} = 25 °C	25	A
		T_{case} = 80 °C	15	A
I_{FRM}	I_{FRM}=2xI_{Fnom}		50	A
I_{FSM}	t_p = 10 ms; sin.	T_j = 150 °C	200	A
Module				
$I_{t(RMS)}$			100	A
T_{vj}			- 40 ... + 175	°C
T_{stg}			- 40...+ 125	°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		73,33	93,33	mΩ
		T_j = 125°C		100	126,66	mΩ
$V_{CE(sat)}$	I_{Cnom} = 15 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		nF
C_{oes}				0,15		nF
C_{res}				0,07		nF
$t_{d(on)}$	R_{Gon} = 52 Ω	V_{CC} = 600V		40		ns
t_r		I_C= 25A		35		ns
E_{on}		T_j = 125 °C		2		mJ
$t_{d(off)}$	R_{Goff} = 52 Ω	V_{GE} = -15V		350		ns
t_f				70		ns
E_{off}				1,4		mJ
$R_{th(j-c)}$	per IGBT				0,86	K/W

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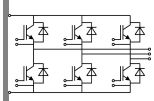

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Characteristics						
Symbol	**Conditions**		**min.**	**typ.**	**max.**	**Units**
Inverse Diode						
$V_F = V_{EC}$	I_{Fnom} = 15 A; V_{GE} = 0 V	T_j = 25 °$C_{chiplev.}$		2	2,5	V
		T_j = 125 °$C_{chiplev.}$		1,8		V
V_{F0}		T_j = 25 °C		1,1	1,2	V
		T_j = 125 °C				V
r_F		T_j = 25 °C		60	87	mΩ
		T_j = 125 °C				mΩ
I_{RRM}	I_F = 15 A	T_j = 125 °C		16		A
Q_{rr}				2,7		µC
E_{rr}	V_{GE} = 0 V; V_{CC} = 600 V			0,95		mJ
$R_{th(j-c)D}$	per diode				1,5	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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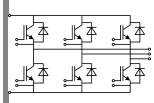

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Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	i = 1	560	mk/W
R_i	i = 2	220	mk/W
R_i	i = 3	67	mk/W
R_i	i = 4	13	mk/W
tau_i	i = 1	0,056	s
tau_i	i = 2	0,0078	s
tau_i	i = 3	0,017	s
tau_i	i = 4	0,0001	s
$Z_{th(j-c)D}$			
R_i	i = 1	800	mk/W
R_i	i = 2	400	mk/W
R_i	i = 3	270	mk/W
R_i	i = 4	30	mk/W
tau_i	i = 1	0,0761	s
tau_i	i = 2	0,0013	s
tau_i	i = 3	0,011	s
tau_i	i = 4	0,002	s

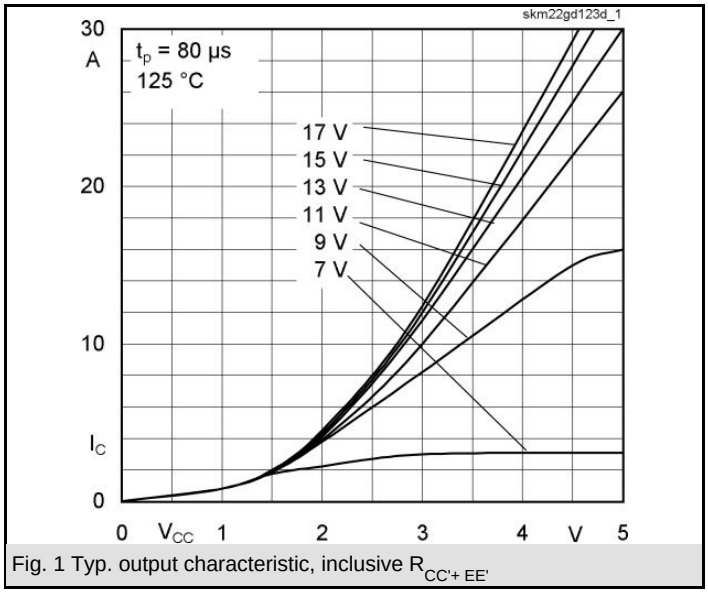

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

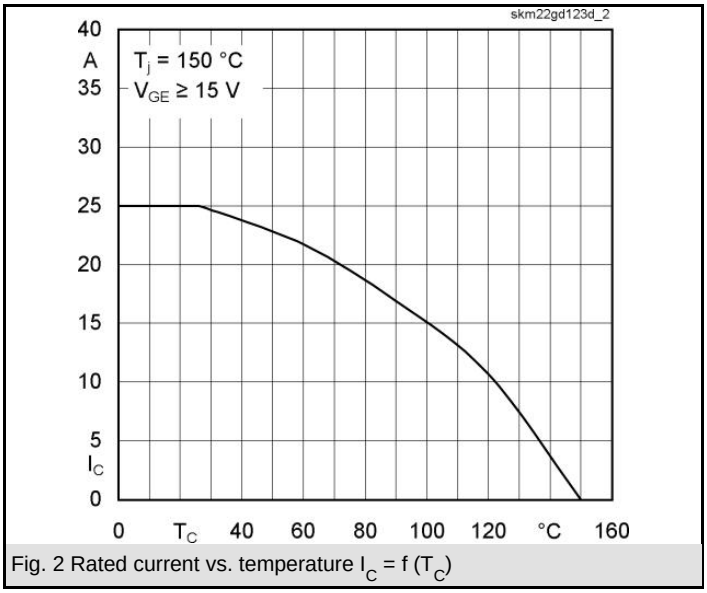

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

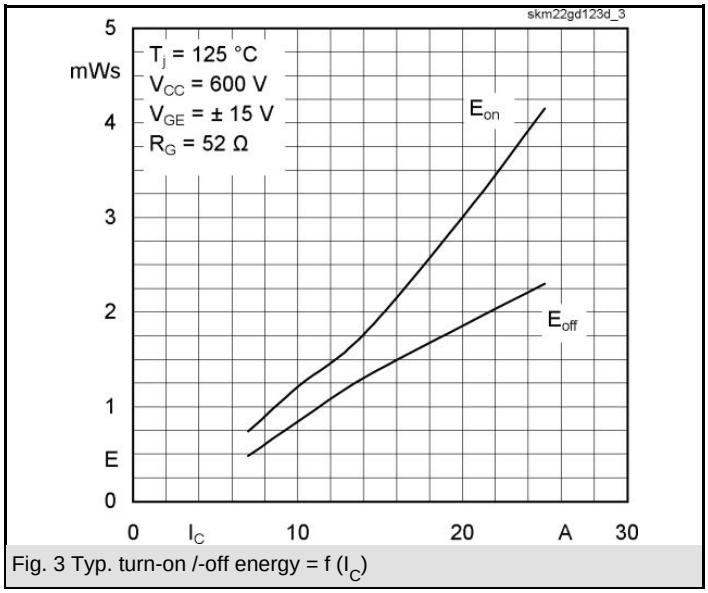

Fig. 3 Typ. turn-on /-off energy = f (I_C)

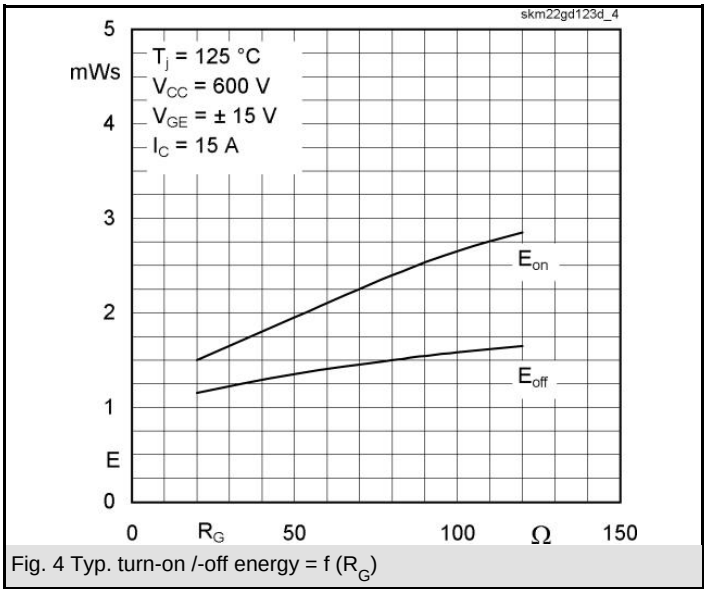

Fig. 4 Typ. turn-on /-off energy = f (R_G)

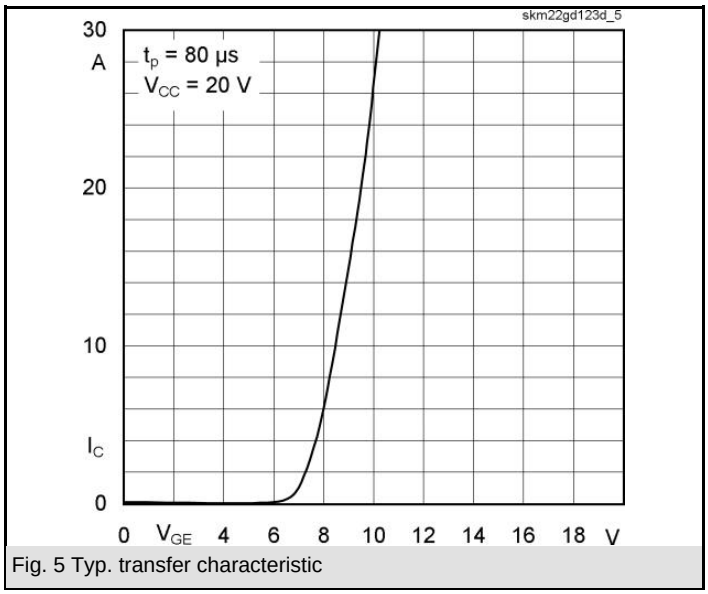

Fig. 5 Typ. transfer characteristic

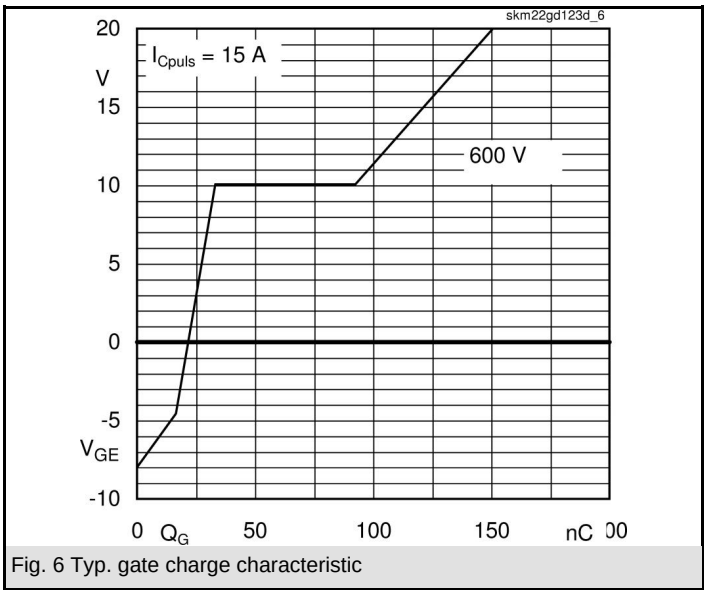

Fig. 6 Typ. gate charge characteristic

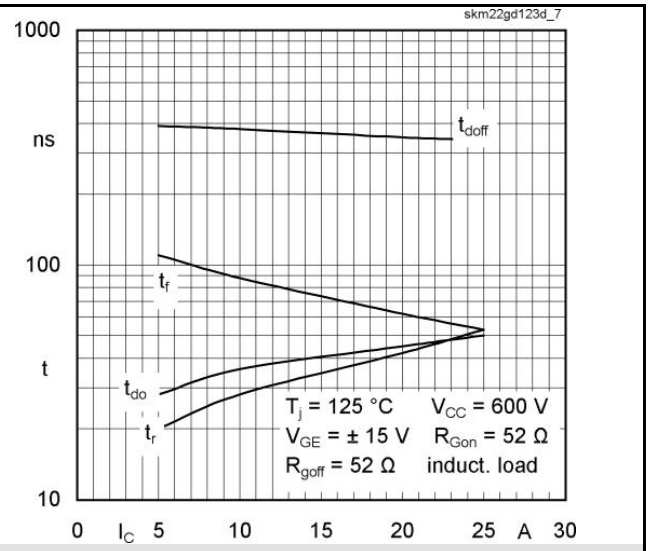

Fig. 7 Typ. switching times vs. I_C

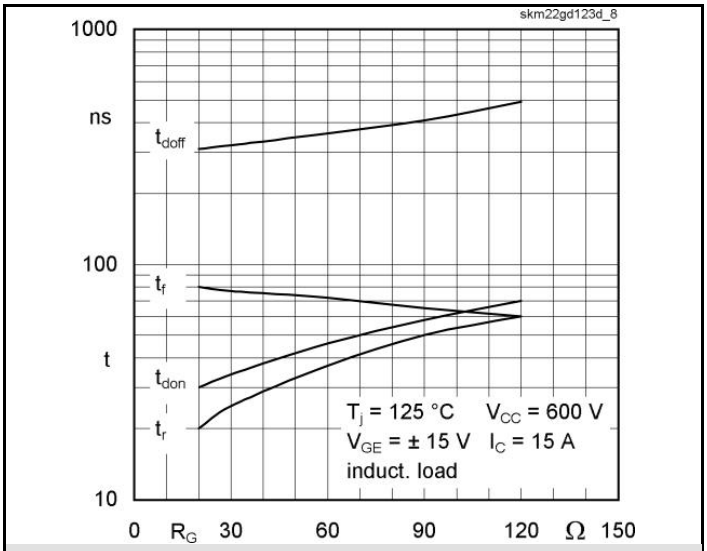

Fig. 8 Typ. switching times vs. gate resistor R_G

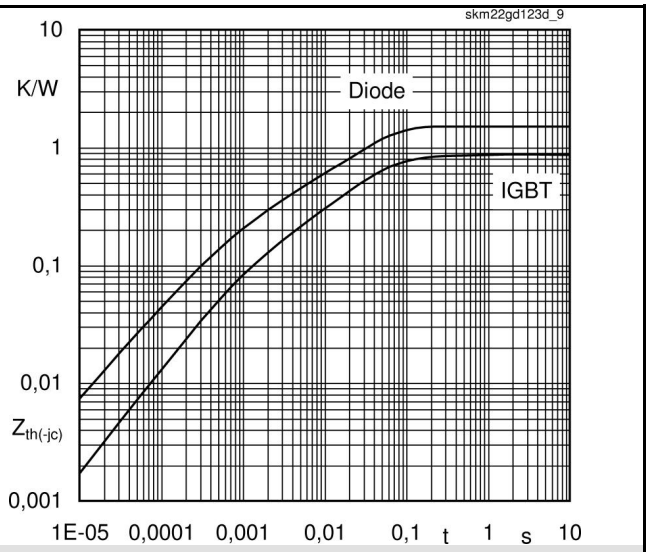

Fig. 9 Transient thermal impedance

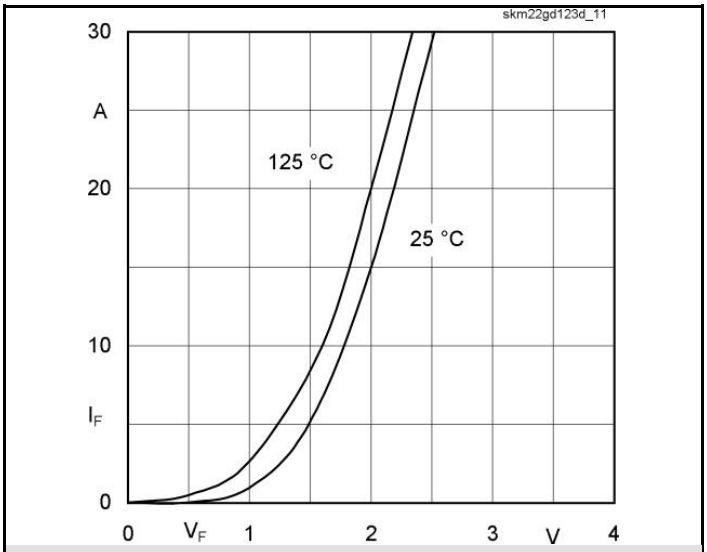

Fig. 10 CAL diode forward characteristic

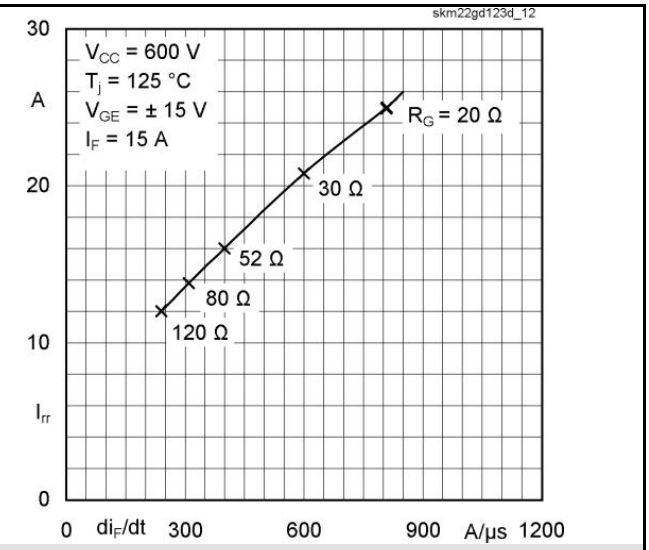

Fig. 11 Typ. CAL diode peak reverse recovery current

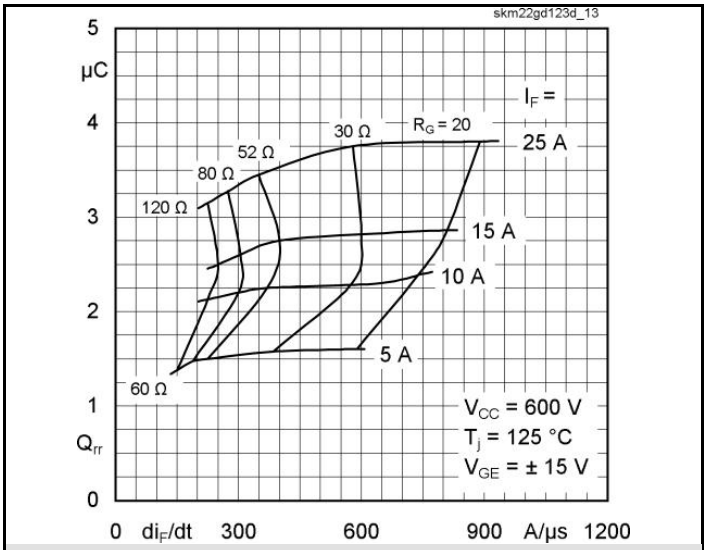

Fig. 12 Typ. CAL diode peak reverse recovery charge

SKM 22GD123D

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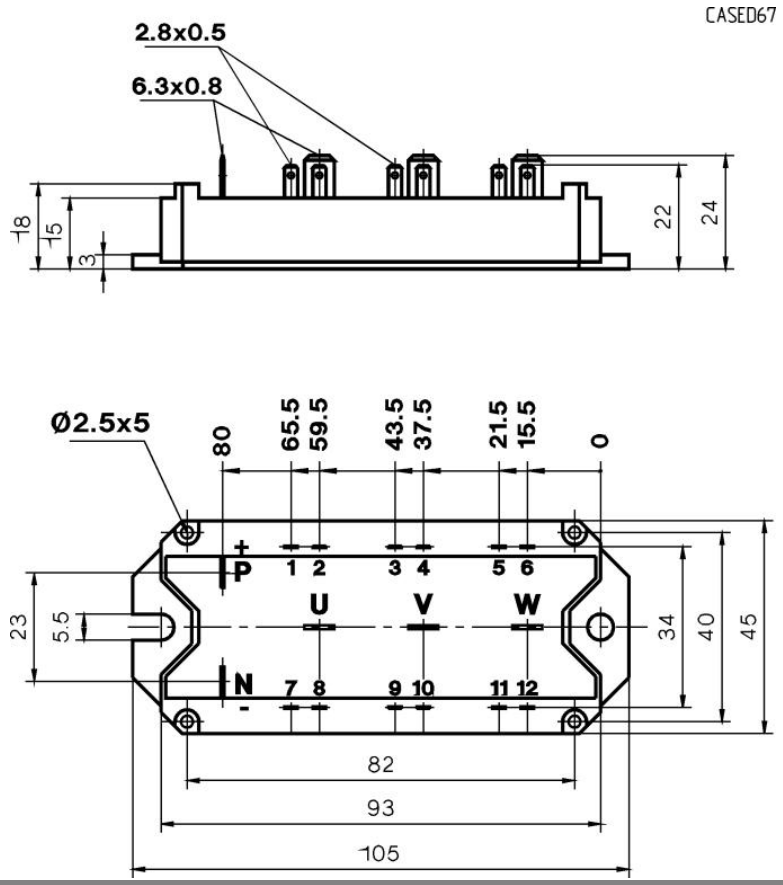
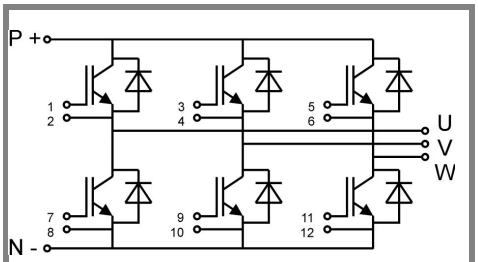


Case D 67



GD Case D 67

