

SKM 200GB125D



SEMITRANS® 3

Ultra Fast IGBT Modules

SKM 200GB125D

SKM 200GAL125D

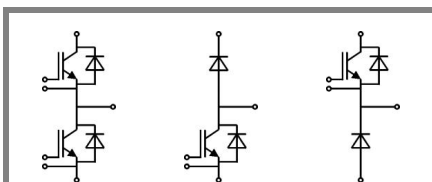
SKM 200GAR125D

Features

- N channel , homogeneous Si
- Low inductance case
- Short tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Fast & soft inverse CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology
- Large clearance (13 mm) and creepage distance (20 mm)

Typical Applications

- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at $f_{sw} > 20$ kHz



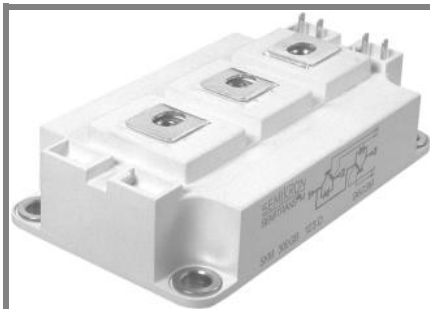
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Absolute Maximum Ratings			T _c = 25 °C, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _{case} = 25 °C	200	A
		T _{case} = 80 °C	160	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		300	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 600 V; V _{GE} ≤ 20 V; T _j = 125 °C V _{CES} < 1200 V		10	µs
Inverse Diode				
I _F	T _j = 150 °C	T _{case} = 25 °C	200	A
		T _{case} = 80 °C	130	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	1440	A
Freewheeling Diode				
I _F	T _j = °C	T _c = 25 °C	200	A
		T _c = 80 °C	130	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms;	T _j = 150 °C	1440	A
Module				
I _{t(RMS)}			500	A
T _{vj}			- 40...+ 150	°C
T _{stg}			- 40...+ 125	°C
V _{isol}	AC, 1 min.		4000	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 = 6 mA		4,5	5,5	6,5	V	
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES}	T _j = 25 °C		0,15	0,45	mA	
V _{CE0}	T _j = 25 °C			1,5	1,75	V	
	T _j = 125 °C					V	
r _{CE}	V _{GE} = 15 V			12	14	mΩ	
	T _j = 125°C					mΩ	
V _{CE(sat)}	I _{Cnom} = 150 A, V _{GE} = 15 V			3,3	3,85	V	
C _{ies}	V _{CE} = 25, V _{GE} = 0 V		f = 1 MHz		10	13	nF
C _{oes}					1,5	2	nF
C _{res}					0,8	1,2	nF
Q _G	V _{GE} = 0V - +20V			1300		nC	
R _{Gint}	T _j = °C			2,5		Ω	
t _{d(on)}	R _{Gon} = 4 Ω	V _{CC} = 600V I _{Cnom} = 150A	75			ns	
t _r			36			ns	
E _{on}			14			mJ	
t _{d(off)}	R _{Goff} = 4 Ω	T _j = 125 °C V _{GE} = ±15V	420			ns	
t _f			25			ns	
E _{off}						mJ	
R _{th(j-c)}	per IGBT				0,09	K/W	



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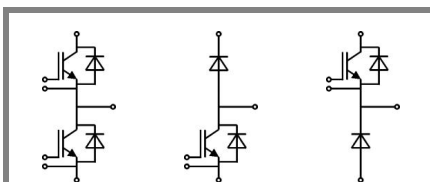
Typical Applications

- Switched mode power supplies at $f_{sw} > 20$ kHz
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at $f_{sw} > 20$ kHz

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.

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 150$ 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	6	8,7	mΩ
		$T_j = 125$ °C			mΩ
I_{RRM}	$I_{Fnom} = 150$ A	$T_j = 125$ °C	230		A
Q_{rr}	$di/dt = 5500$ A/μs		24		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V				mJ
$R_{th(j-c)D}$	per diode			0,25	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 150$ 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	6	8,7	V
		$T_j = 125$ °C			V
I_{RRM}	$I_{Fnom} = 150$ A	$T_j = 125$ °C	230		A
Q_{rr}	$di/dt = 5500$ A/μs		24		μC
E_{rr}	$V_{GE} = 0$ V; $V_{CC} = 600$ V				mJ
$R_{th(j-c)FD}$	per diode			0,25	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25$ °C	0,35		mΩ
		$T_{case} = 125$ °C	0,5		mΩ
$R_{th(c-s)}$	per module			0,038	K/W
M_s	to heat sink M6		3	5	Nm
M_t	to terminals M6		2,5	5	Nm
w				325	g



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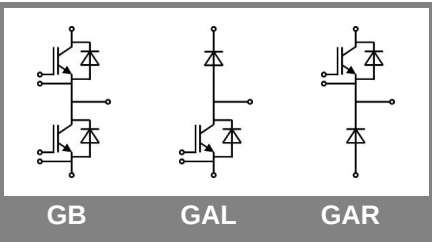
Features

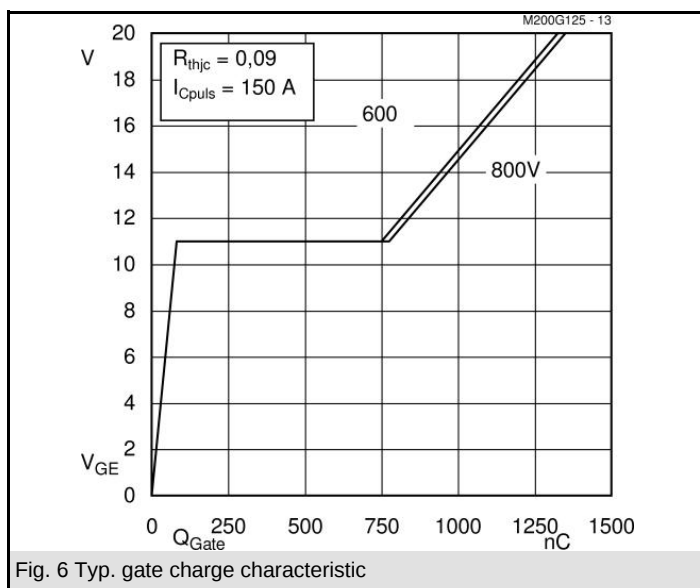
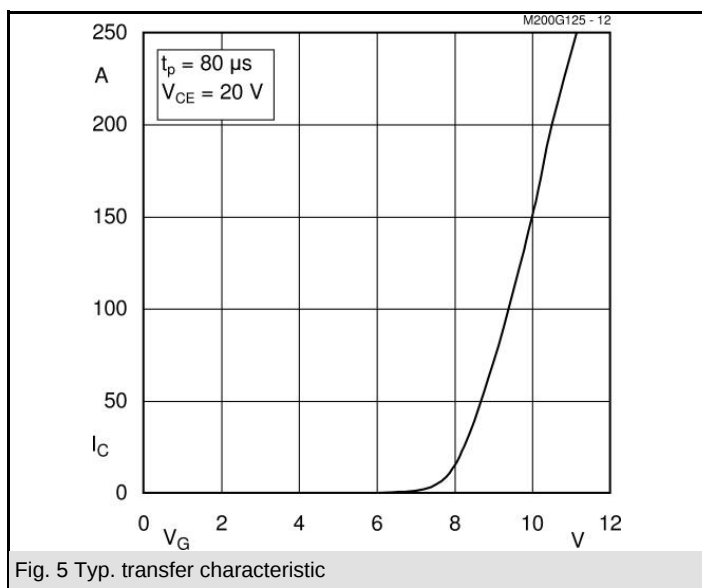
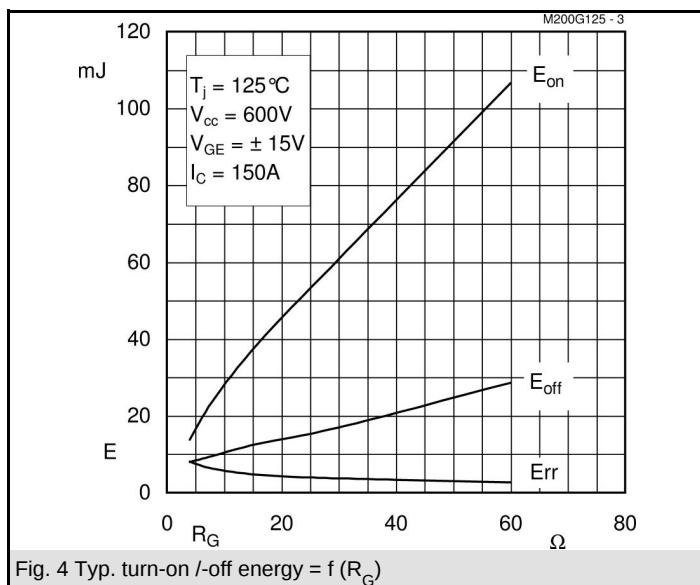
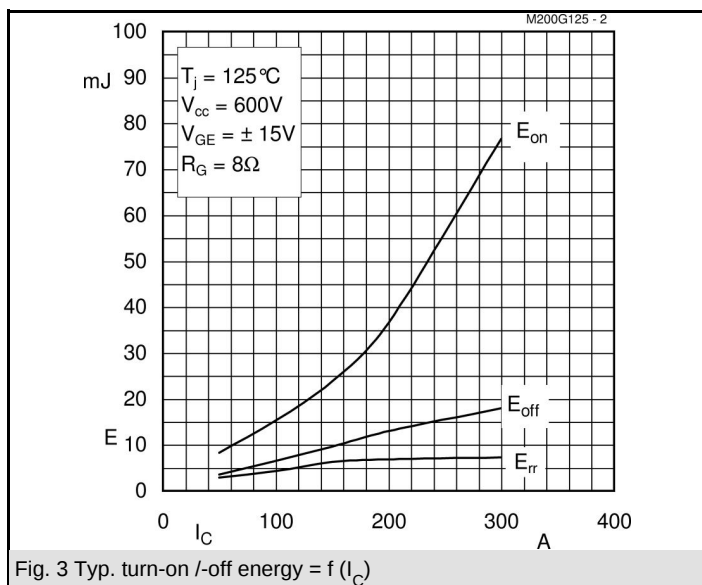
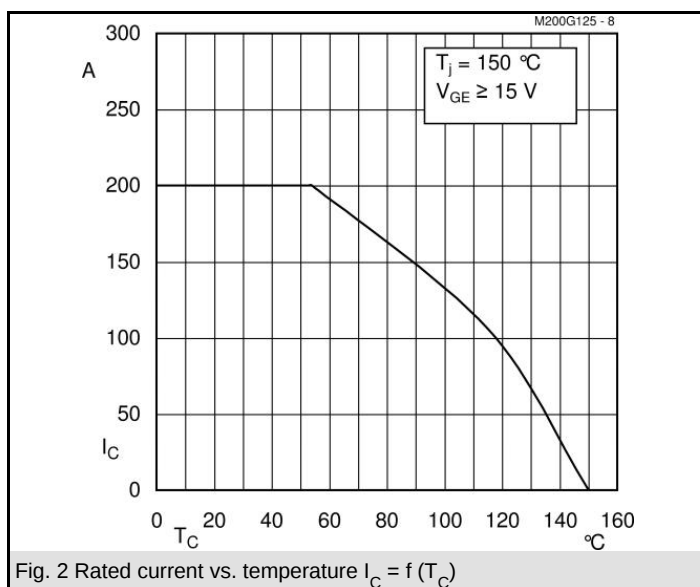
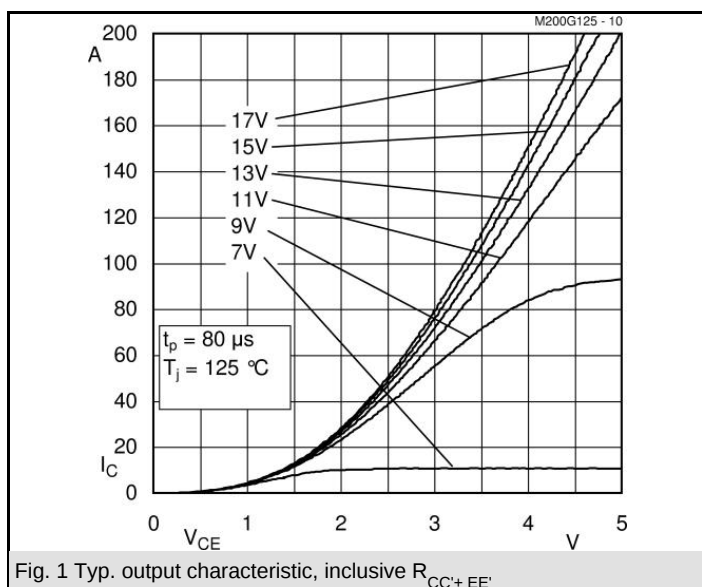
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Z _{th}			
Symbol	Conditions	Values	Units
Z _{th(j-c)I}			
R _i	i = 1	60	mk/W
R _i	i = 2	23	mk/W
R _i	i = 3	5,9	mk/W
R _i	i = 4	1,1	mk/W
tau _i	i = 1	0,0744	s
tau _i	i = 2	0,0087	s
tau _i	i = 3	0,002	s
tau _i	i = 4	0,0015	s
Z _{th(j-c)D}			
R _i	i = 1	160	mk/W
R _i	i = 2	67	mk/W
R _i	i = 3	20	mk/W
R _i	i = 4	3	mk/W
tau _i	i = 1	0,0536	s
tau _i	i = 2	0,0034	s
tau _i	i = 3	0,077	s
tau _i	i = 4	0,0003	s





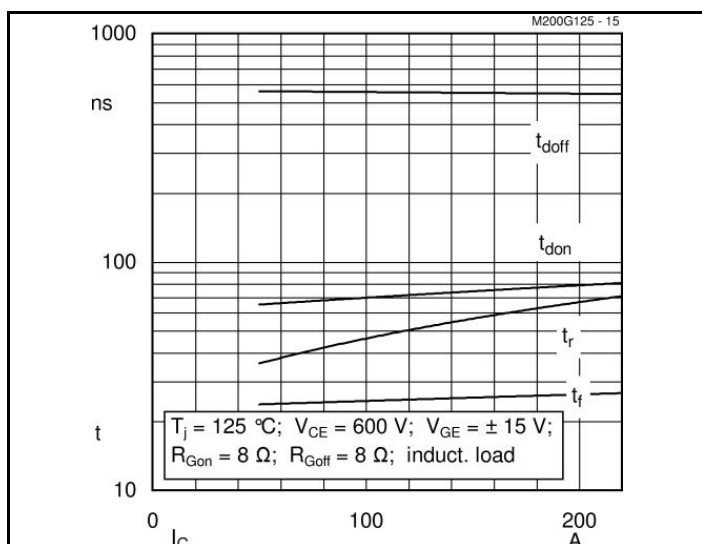


Fig. 7 Typ. switching times vs. I_C

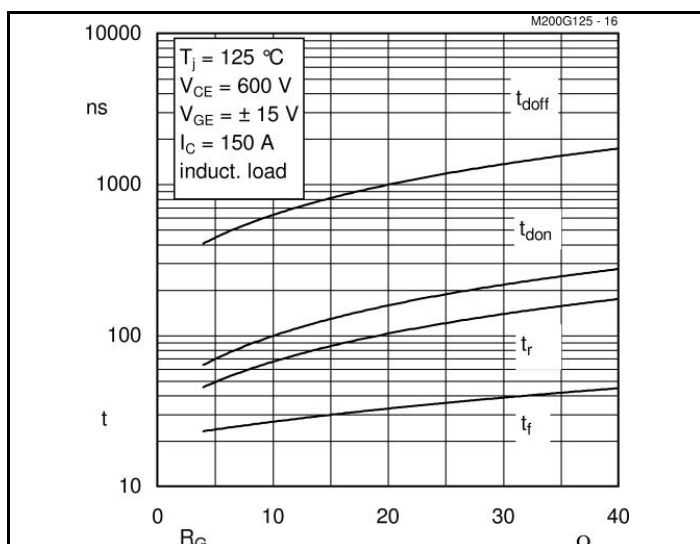


Fig. 8 Typ. switching times vs. gate resistor R_G

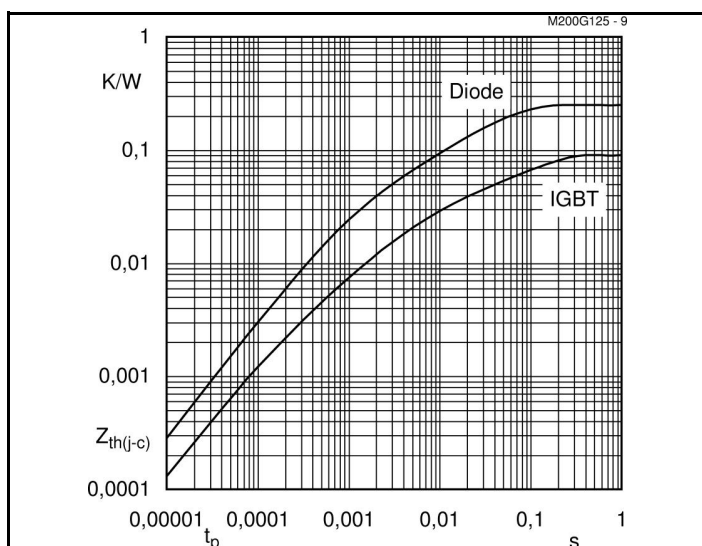


Fig. 9 Transient thermal impedance

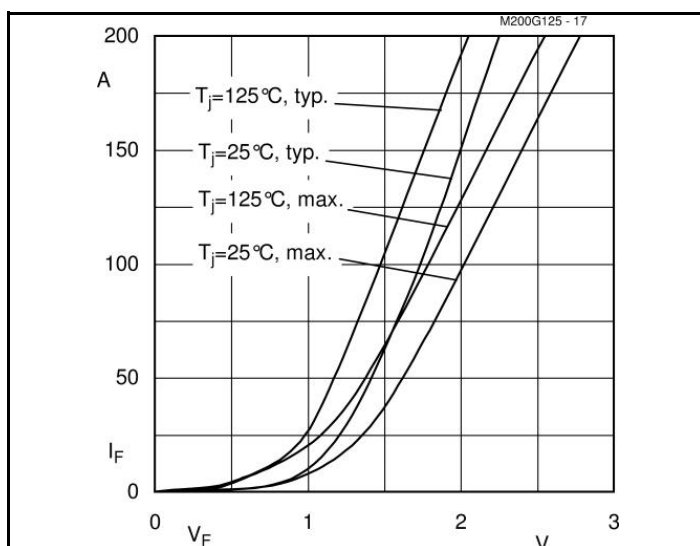


Fig. 10 CAL diode forward characteristic

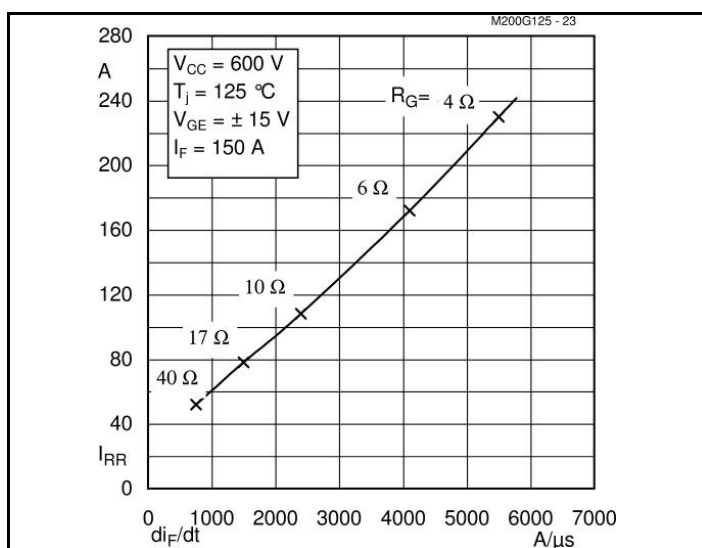


Fig. 11 Typ. CAL diode peak reverse recovery current

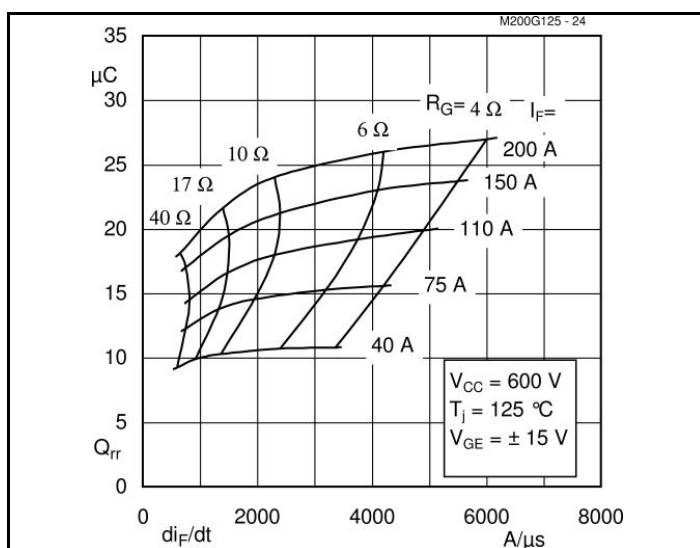
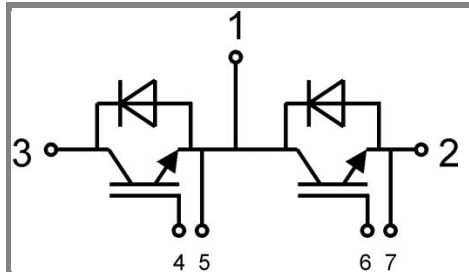


Fig. 12 Typ. CAL diode peak reverse recovery charge

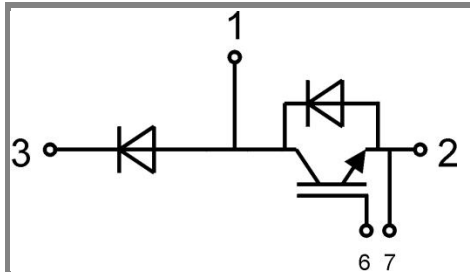


Case D 56



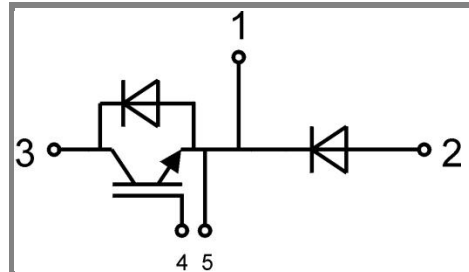
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Case D 56



GAL

Case D 57 (→ D 56)



GAR

Case D 58 (→ D 56)