



SEMITRANS® 2

Trench IGBT Modules

SKM 145GB066D

Preliminary Data

Features

- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

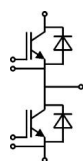
- AC inverter Drives
- UPS
- Electronic welders

Remarks

- Case temperature limited to $T_c = 125^\circ\text{C}$ max, recomm. $T_{op} = -40 \dots +150^\circ\text{C}$, product rel. results valid for $T_j \leq 150^\circ\text{C}$
- SC data: $t_p \leq 6\mu\text{s}$; $V_{GE} \leq 15\text{V}$; $T_j = 150^\circ\text{C}$; $V_{CC} \leq 360\text{V}$, use of soft R_G necessary!
- Take care of over-voltage caused by stray induct.

Absolute Maximum Ratings		T _{case} = 25°C, unless otherwise specified		
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		600	V
I _C	T _j = 175 °C	T _c = 25 °C	195	A
		T _c = 80 °C	150	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		300	A
V _{GES}			± 20	V
t _{psc}	V _{CC} = 360 V; V _{GE} ≤ 15 V; T _j = 150 °C V _{CES} < 600 V		6	μs
Inverse Diode				
I _F	T _j = 175 °C	T _c = 25 °C	150	A
		T _c = 80 °C	100	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		300	A
I _{FSM}	t _p = 10 ms; sin. T _j = 175 °C		880	A
Module				
I _{t(RMS)}			200	A
T _{vj}			- 40 ... + 175	°C
T _{stg}			- 40 ... + 125	°C
V _{isol}	AC, 1 min.		4000	V

Characteristics		T _{case} = 25°C, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
V _{GE(th)}	V _{GE} = V _{CE} , I _C = 2,4 mA	5	5,8	6,5	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES} T _j = 25 °C		0,08	0,25	mA
V _{CE0}	T _j = 25 °C T _j = 150 °C		0,9	1	V
			0,85	0,9	V
r _{CE}	V _{GE} = 15 V T _j = 25°C T _j = 150°C		3,7	6	mΩ
			5,7	8	mΩ
V _{CE(sat)}	I _{Cnom} = 150 A, V _{GE} = 15 V T _j = 25°C _{chiplev.} T _j = 150°C _{chiplev.}		1,45	1,9	V
			1,7	2,1	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz		9,25		nF
C _{oes}			0,6		nF
C _{res}			0,28		nF
Q _G	V _{GE} = -8V...+15V		1100		nC
R _{Gint}	T _j = °C		2		Ω
t _{d(on)}	R _{Gon} = 4,3 Ω	V _{CC} = 300V I _{Cnom} = 150A T _j = 150 °C V _{GE} = -8/+15V	150		ns
t _r			52		ns
E _{on}	8,5			mJ	
t _{d(off)}	R _{Goff} = 4,3 Ω		490		ns
t _f			46		ns
E _{off}			5,5		mJ
R _{th(j-c)}	per IGBT			0,3	K/W



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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.} T _j = 150 °C _{chiplev.}		1,4	1,6	V V
V _{F0}		T _j = 25 °C		0,95	1	V
r _F		T _j = 25 °C		3	4	mΩ
I _{RRM}	I _{Fnom} = 150 A	T _j = 150 °C		90		A
Q _{rr}	di/dt = 2100 A/μs			20		μC
E _{rr}	V _{GE} = -8 V; V _{CC} = 300 V			3,5		mJ
R _{th(j-c)D}	per diode				0,5	K/W
Module						
L _{CE}					30	nH
R _{CC'+EE'}	res., terminal-chip	T _{case} = 25 °C T _{case} = 125 °C		0,75 1		mΩ mΩ
R _{th(c-s)}	per module				0,05	K/W
M _s	to heat sink M6		3		5	Nm
M _t	to terminals M5		2,5		5	Nm
w					150	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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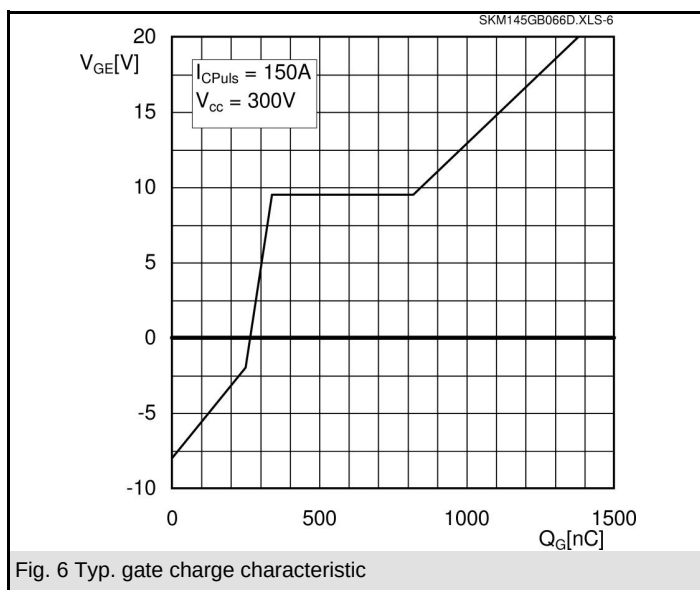
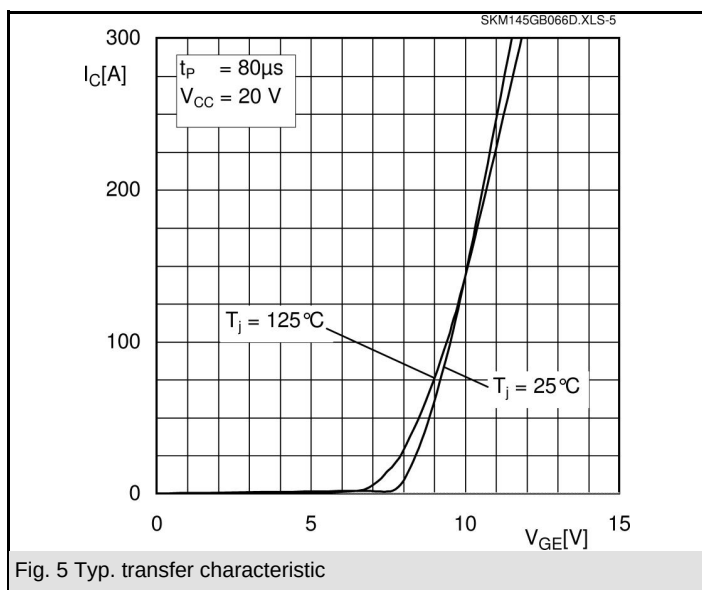
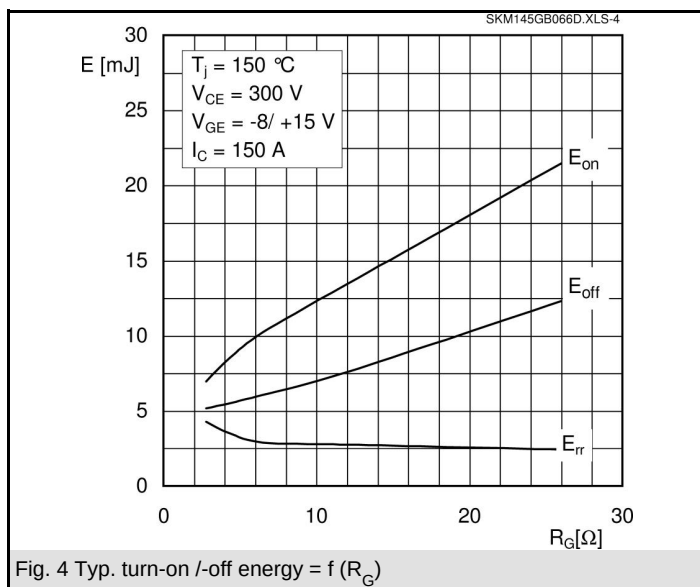
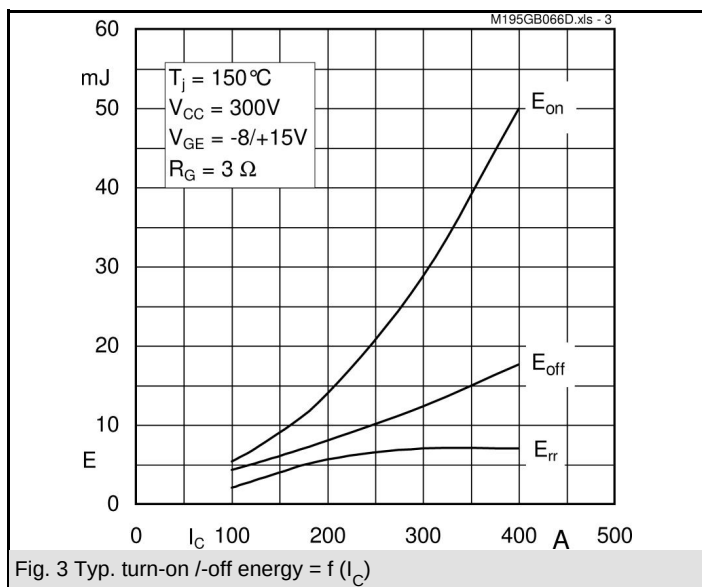
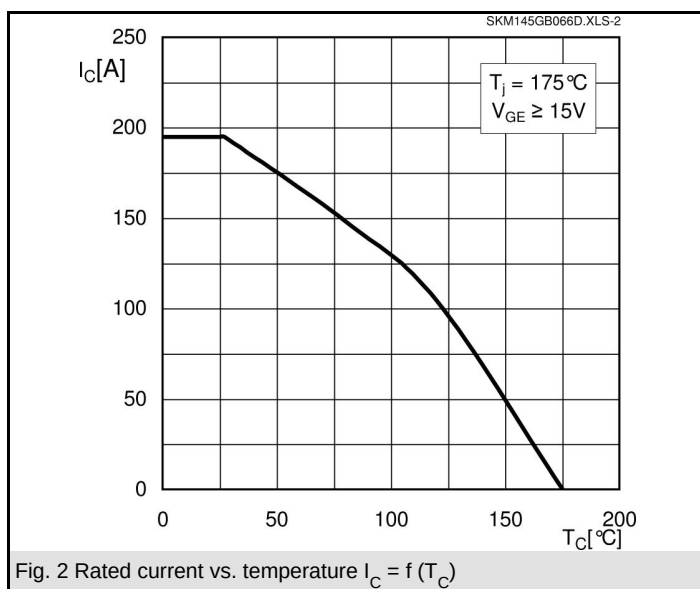
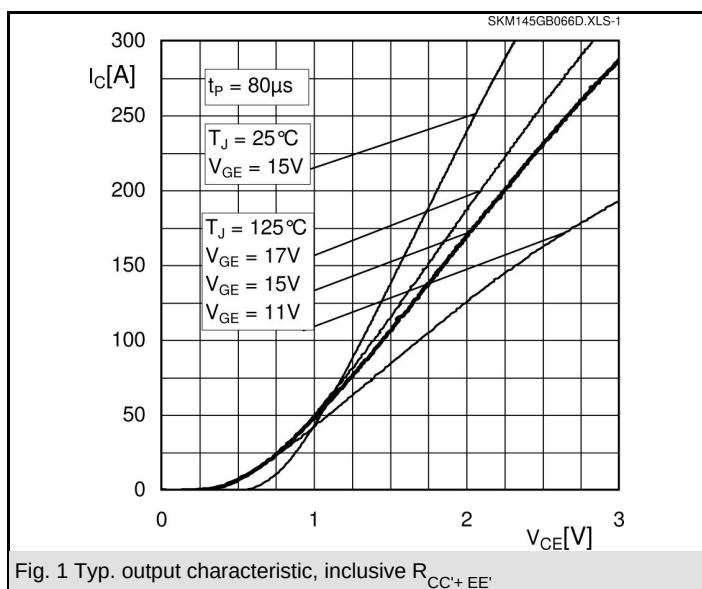
Remarks

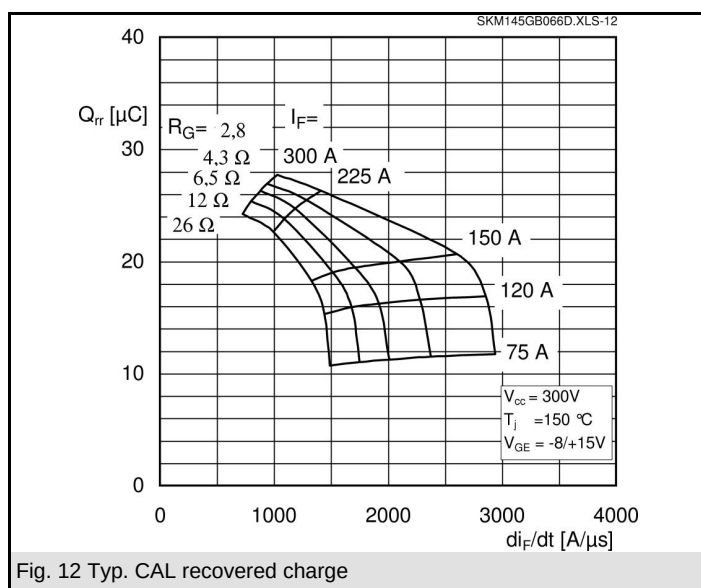
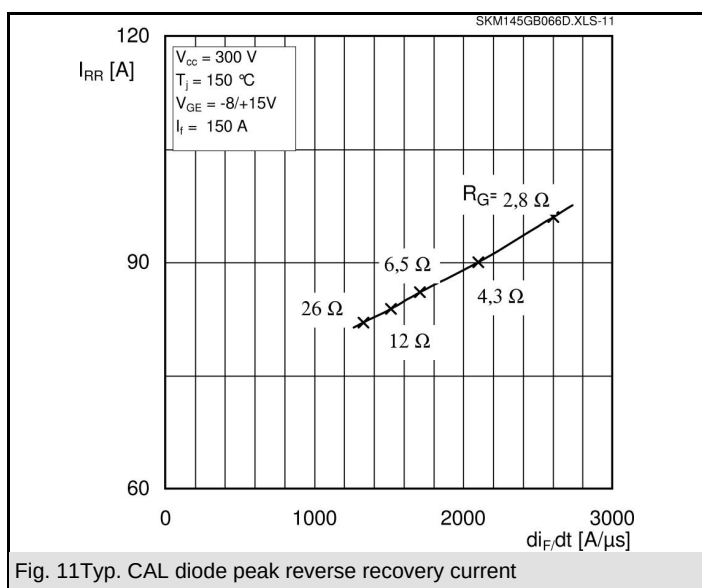
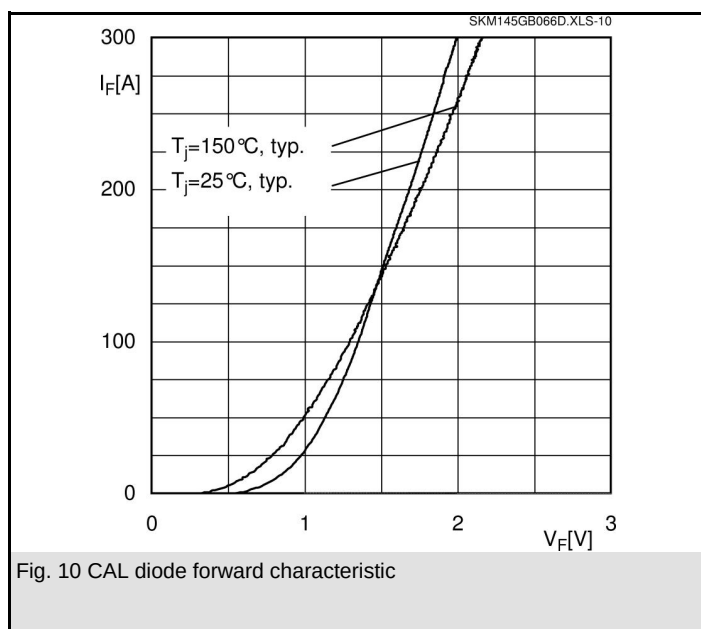
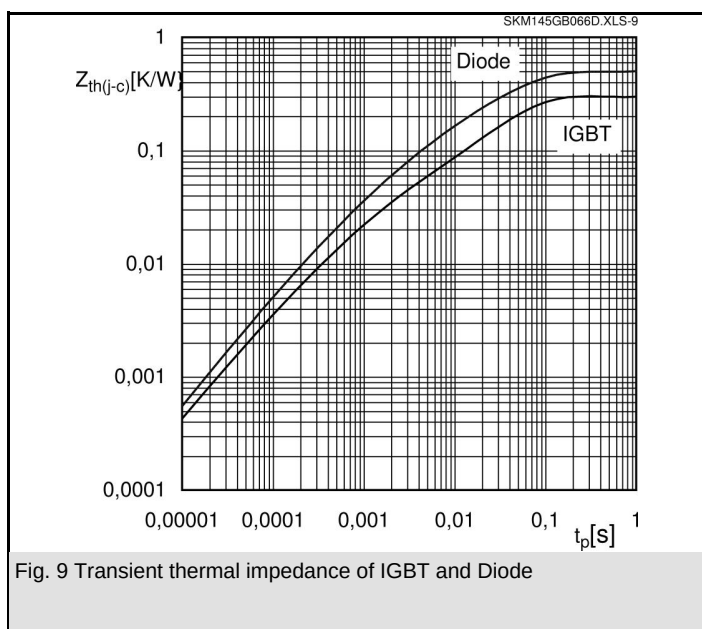
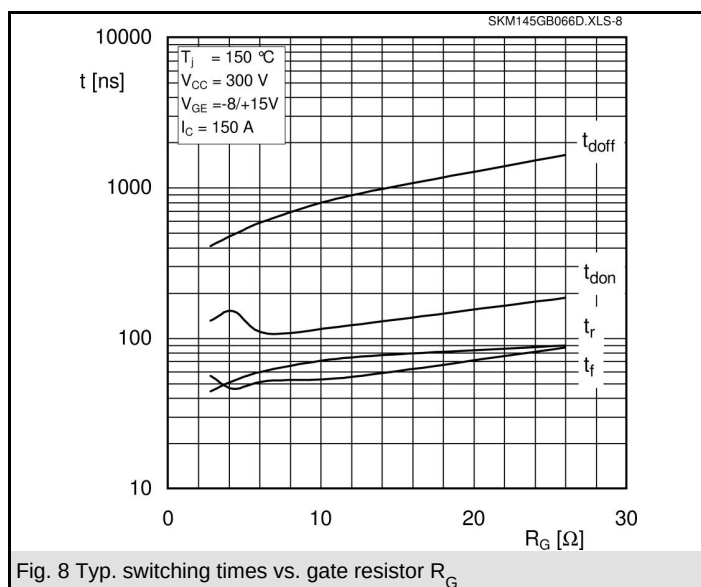
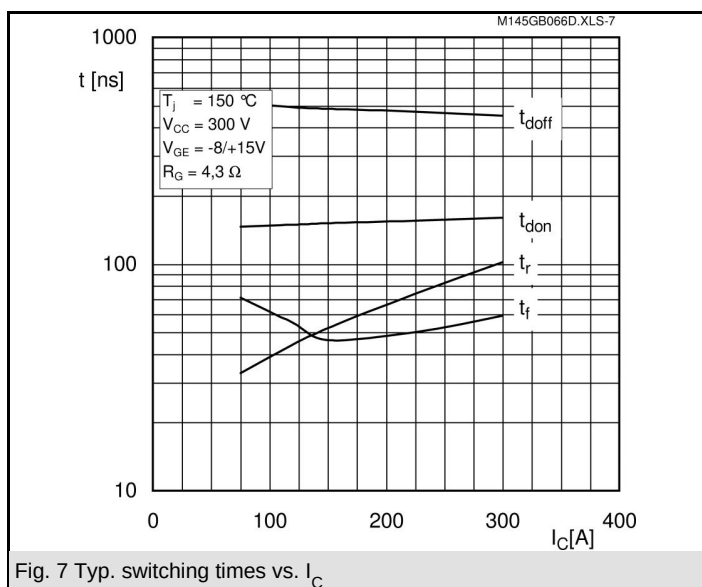
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Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	220	mk/W
R_i	$i = 2$	60	mk/W
R_i	$i = 3$	16,5	mk/W
R_i	$i = 4$	3,5	mk/W
τ_{u_i}	$i = 1$	0,0447	s
τ_{u_i}	$i = 2$	0,0223	s
τ_{u_i}	$i = 3$	0,0015	s
τ_{u_i}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	330	mk/W
R_i	$i = 2$	137	mk/W
R_i	$i = 3$	28	mk/W
R_i	$i = 4$	5	mk/W
τ_{u_i}	$i = 1$	0,05	s
τ_{u_i}	$i = 2$	0,0129	s
τ_{u_i}	$i = 3$	0,002	s
τ_{u_i}	$i = 4$	0,0002	s

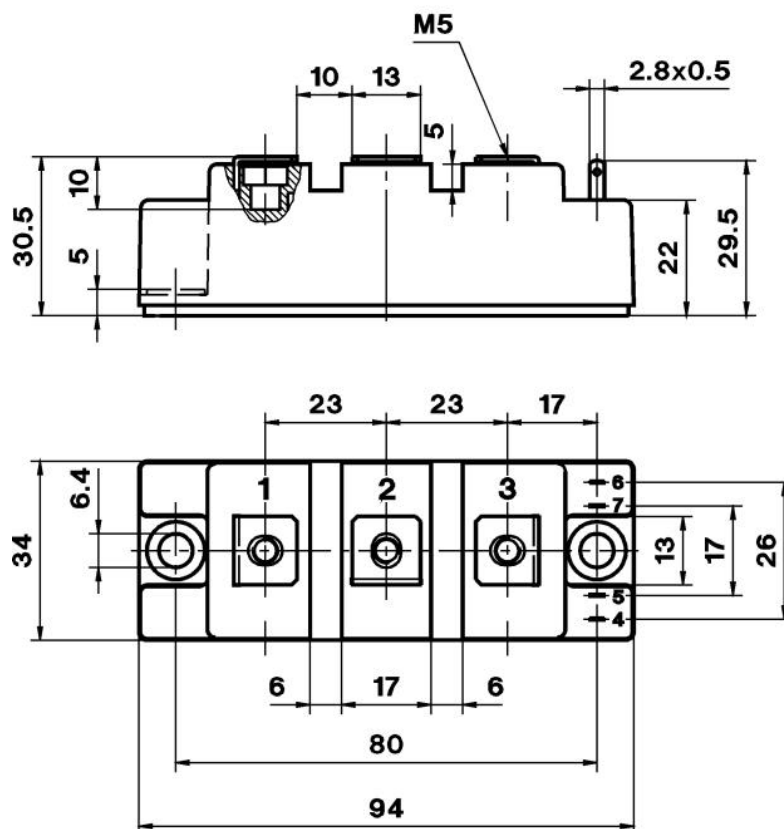


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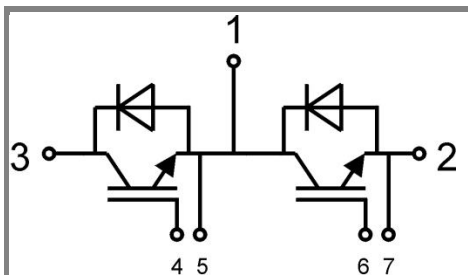




CASED61



Case D 61



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Case D61