

SKM 400GA123D



SEMITRANS[®] 4

IGBT Modules

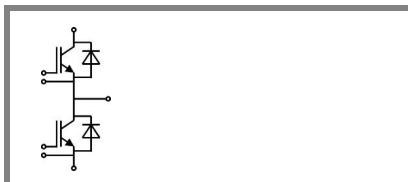
SKM 400GA123D

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 DBC Direct Copper Bonding Technology
- Large clearance (12 mm) and creepage distances (20 mm)

Typical Applications

- Switching (not for linear use)

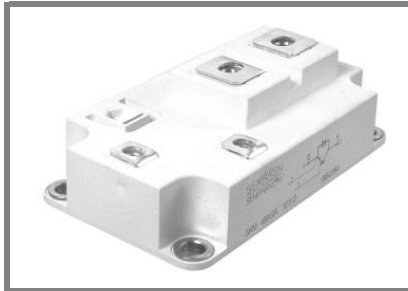


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Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values		Units
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1200		V
I_C	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	400	A
		$T_{case} = 80^\circ\text{C}$	360	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	600		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	$T_j = 150^\circ\text{C}$	$T_{case} = 25^\circ\text{C}$	390	A
		$T_{case} = 80^\circ\text{C}$	260	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	600		A
I_{FSM}	$t_p = 10\text{ ms}; \sin.$	$T_j = 150^\circ\text{C}$	2880	A
Module				
$I_{t(RMS)}$		500		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					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 12\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$	$T_j = 25^\circ\text{C}$		0,1	0,3
V_{CE0}		$T_j = 25^\circ\text{C}$		1,4	1,6
		$T_j = 125^\circ\text{C}$		1,6	1,8
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$		3,66	4,66
		$T_j = 125^\circ\text{C}$		5	6,33
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}, V_{GE} = 15\text{ V}$	$T_j = ^\circ\text{C}_{chiplev.}$		2,5	3
C_{ies}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$		22	30
C_{oes}				3,3	4
C_{res}				1,2	1,6
Q_G	$V_{GE} = -8\text{ V} - +20\text{ V}$			3000	nC
R_{Gint}	$T_j = ^\circ\text{C}$			1,25	Ω
$t_{d(on)}$	$R_{Gon} = 3,3\ \Omega$	$V_{CC} = 600\text{ V}$ $I_{Cnom} = 300\text{ A}$	200	400	ns
t_r			115	220	ns
E_{on}			38		mJ
$t_{d(off)}$	$R_{Goff} = 3,3\ \Omega$	$T_j = 125^\circ\text{C}$ $V_{GE} = \pm 15\text{ V}$	720	900	ns
t_f			80	100	ns
E_{off}			40		mJ
$R_{th(j-c)}$	per IGBT			0,045	K/W

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Characteristics

Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	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		$T_j = 25 \text{ }^\circ\text{C}$	3	4,3	m Ω
		$T_j = 125 \text{ }^\circ\text{C}$			m Ω
I_{RRM}	$I_{Fnom} = 300 \text{ A}$	$T_j = 25 \text{ }^\circ\text{C}$	85		A
Q_{rr}	$di/dt = 2000 \text{ A}/\mu\text{s}$		13		μC
E_{rr}	$V_{GE} = 0 \text{ V}; V_{CC} = 600 \text{ V}$				mJ
$R_{th(j-c)D}$	per diode			0,125	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}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,18		m Ω
		$T_{case} = 125 \text{ }^\circ\text{C}$	0,22		m Ω
$R_{th(c-s)}$	per module			0,038	K/W
M_s	to heat sink M6		3	5	Nm
M_t	to terminals M6 (M4)		2,5 (1,1)	5 (2)	Nm
w				330	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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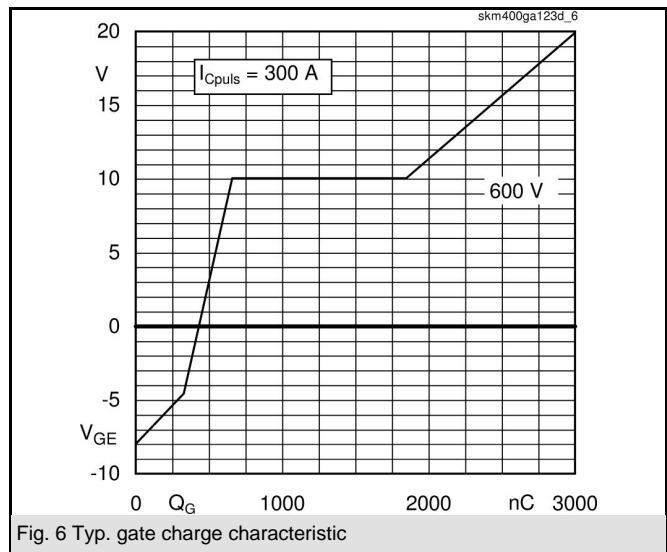
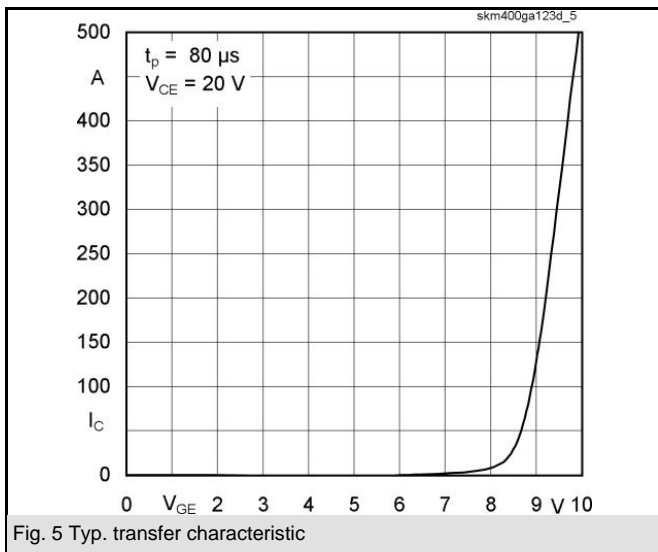
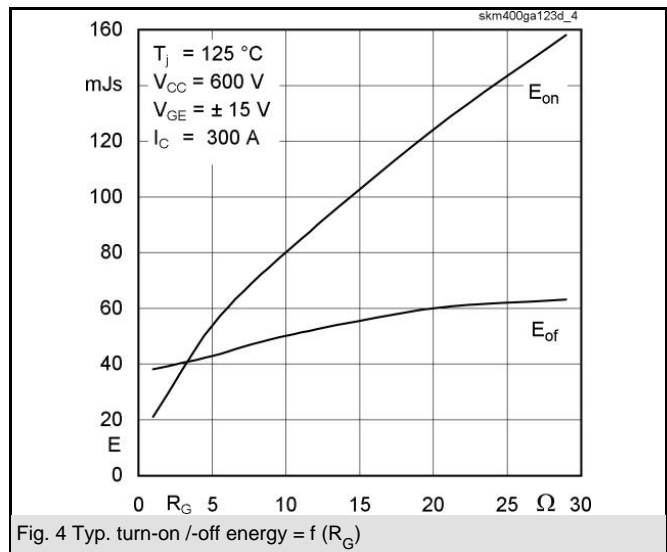
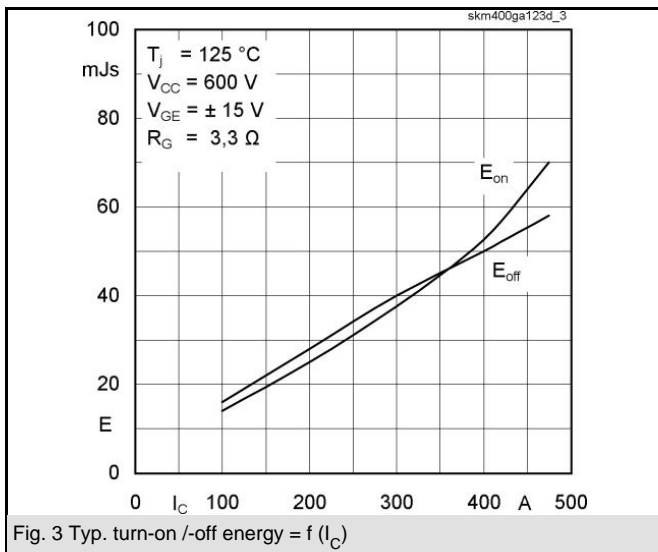
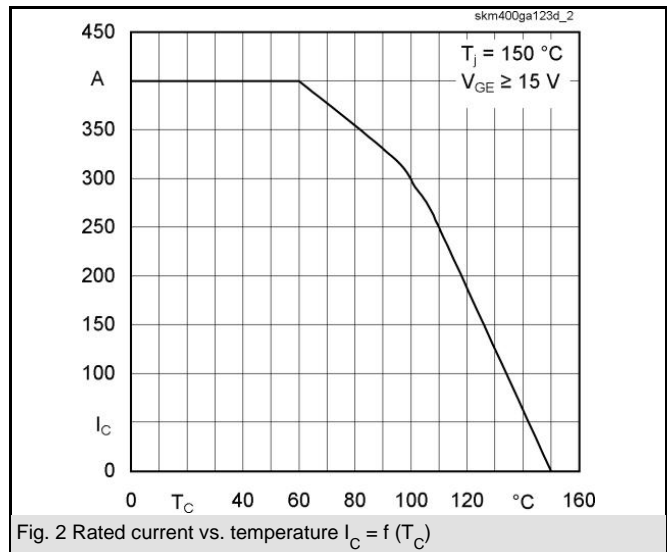
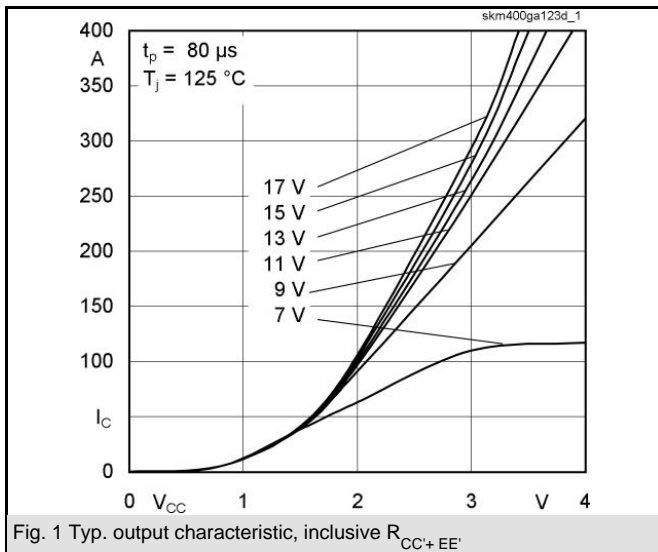
Typical Applications

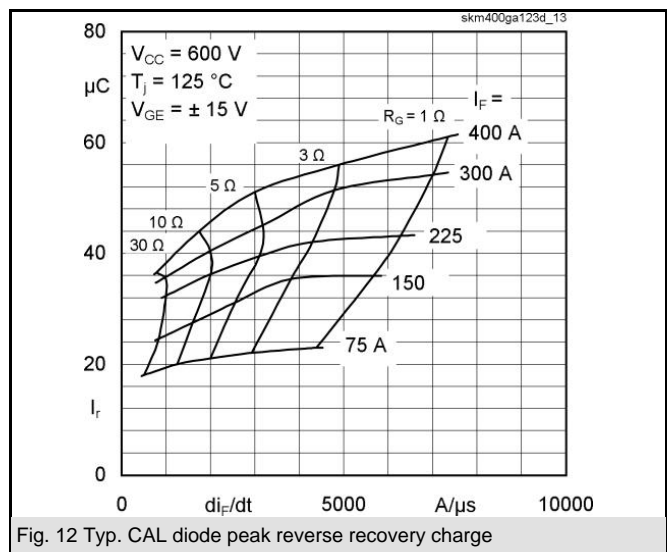
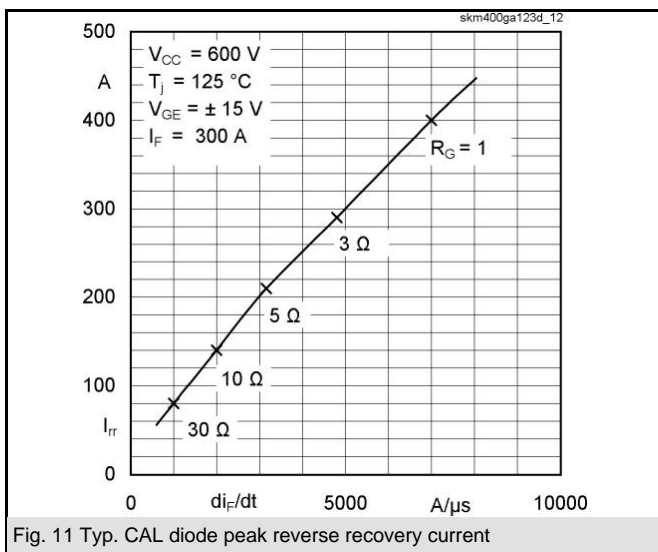
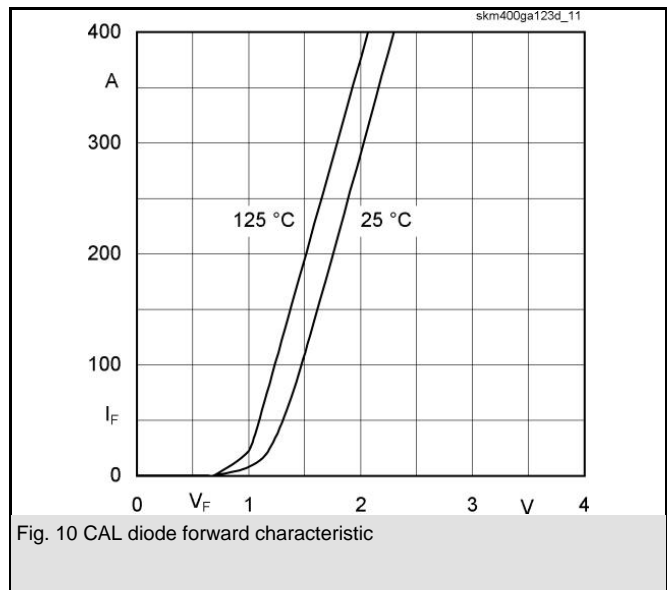
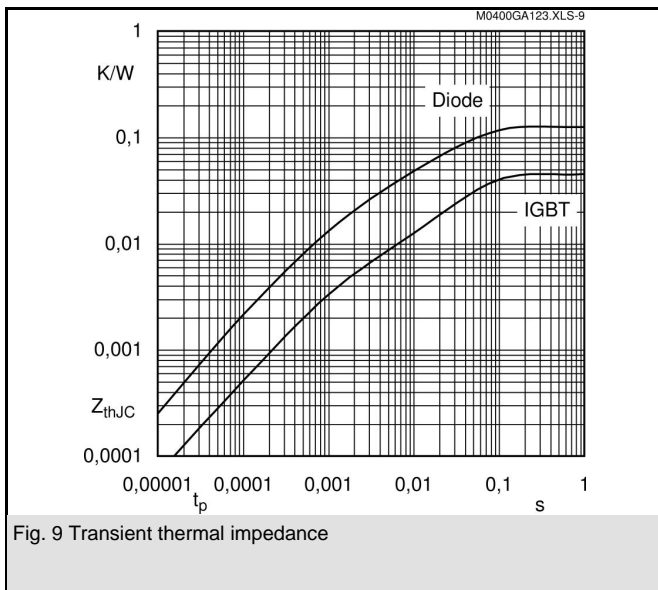
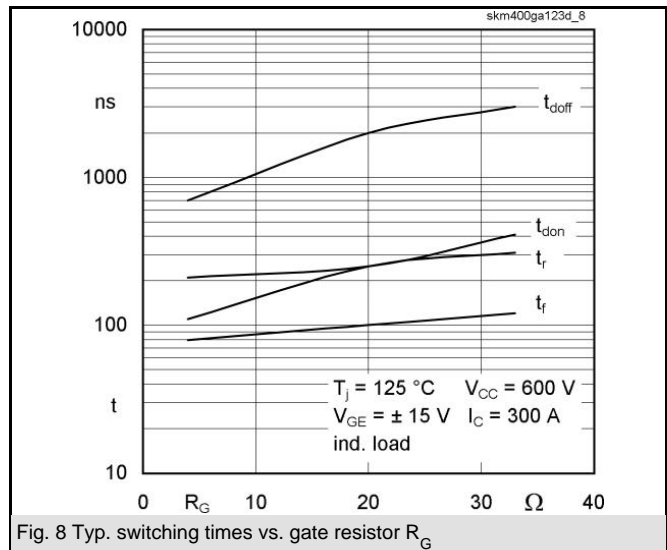
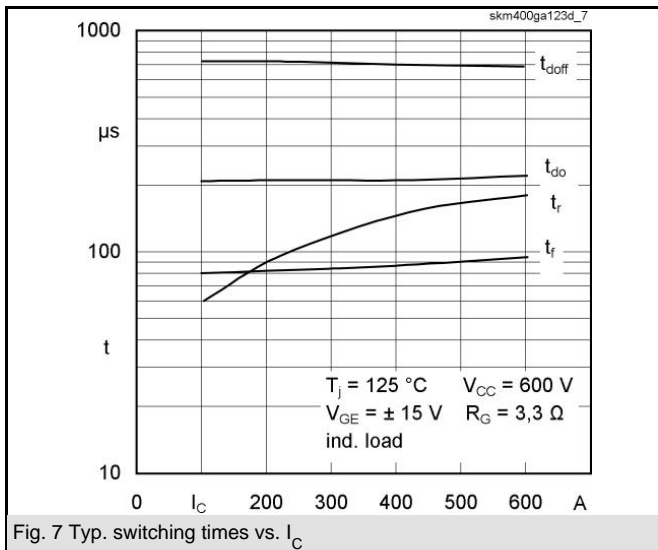
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Z_{th}		Conditions	Values	Units
Z_{th(j-c)I}				
R _i	i = 1		33	mk/W
R _i	i = 2		8,8	mk/W
R _i	i = 3		2,6	mk/W
R _i	i = 4		0,6	mk/W
tau _i	i = 1		0,05	s
tau _i	i = 2		0,009	s
tau _i	i = 3		0,0024	s
tau _i	i = 4		0,0001	s
Z_{th(j-c)D}				
R _i	i = 1		85	mk/W
R _i	i = 2		31	mk/W
R _i	i = 3		7,8	mk/W
R _i	i = 4		1,2	mk/W
tau _i	i = 1		0,0537	s
tau _i	i = 2		0,0086	s
tau _i	i = 3		0,003	s
tau _i	i = 4		0,0001	s



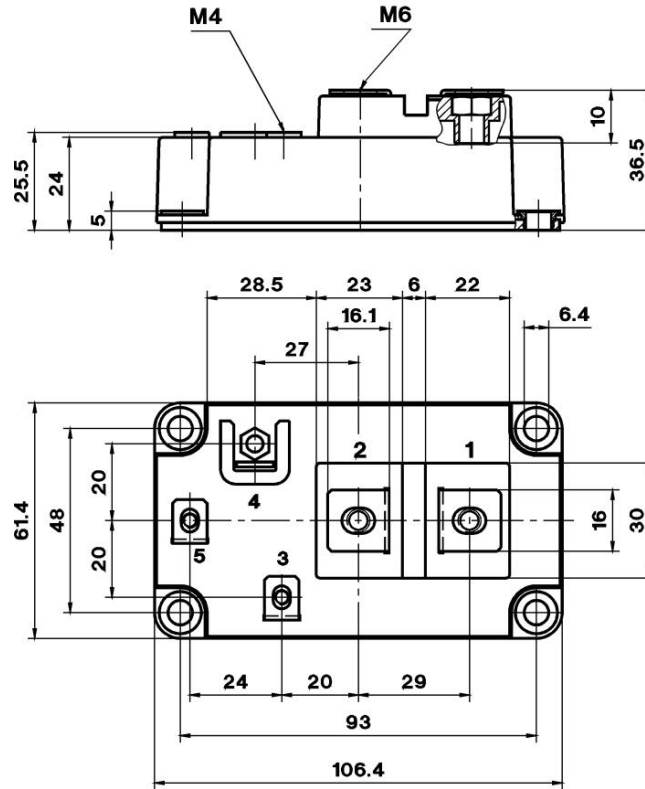


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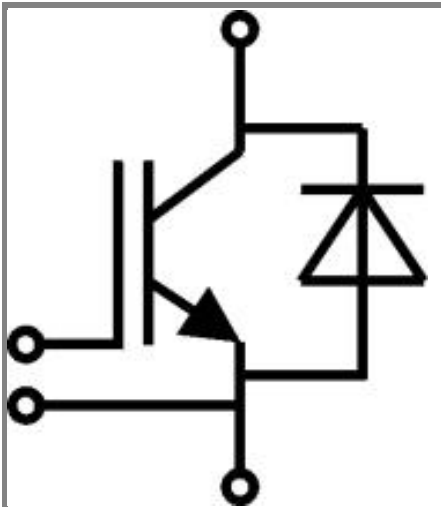
UL Recognized

CASED59

File 63 532



Case D 59



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Case D 59