

SKM 100GB176D



SEMITRANS® 2

Trench IGBT Modules

SKM 100GB176D

Preliminary Data

Features

- Homogeneous Si
- 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 mains 575 - 750 V AC
- Public transport (auxiliary syst.)



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Absolute Maximum Ratings		$T_{case} = 25^\circ\text{C}$, unless otherwise specified		
Symbol	Conditions	Values	Units	
IGBT				
V_{CES}	$T_j = 25^\circ\text{C}$	1700	V	
I_C	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	125	A
		$T_c = 80^\circ\text{C}$	90	A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	150	A	
V_{GES}		± 20	V	
t_{psc}	$V_{CC} = 1200\text{ V}; V_{GE} \leq 20\text{ V}; T_j = 125^\circ\text{C}$ $V_{CES} < 1700\text{ V}$	10	μs	
Inverse Diode				
I_F	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	100	A
		$T_c = 80^\circ\text{C}$	70	A
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	150	A	
I_{FSM}	$t_p = 10\text{ ms}; \text{sin.}$	$T_j = 150^\circ\text{C}$	720	A
Module				
$I_{t(RMS)}$		200	A	
T_{vj}		- 40 ... +150	$^\circ\text{C}$	
T_{stg}		- 40 ... +125	$^\circ\text{C}$	
V_{isol}	AC, 1 min.	4000	V	

Characteristics		$T_{case} = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}, I_C = 3\text{ mA}$	5,2	5,8	6,4	V
I_{CES}	$V_{GE} = 0\text{ V}, V_{CE} = V_{CES}$		0,1	0,3	mA
V_{CE0}		$T_j = 25^\circ\text{C}$	1	1,2	V
		$T_j = 125^\circ\text{C}$	0,9	1,1	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}$	13	16,7	m Ω
		$T_j = 125^\circ\text{C}$	20	24	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 75\text{ A}, V_{GE} = 15\text{ V}$	$T_j = 25^\circ\text{C}_{chiplev.}$	2	2,45	V
		$T_j = 125^\circ\text{C}_{chiplev.}$	2,4	2,9	V
C_{res}	$V_{CE} = 25, V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	5,7		nF
C_{oes}			0,28		nF
C_{res}			0,22		nF
Q_G	$V_{GE} = -8\text{V}/+15\text{V}$		620		nC
R_{Gint}	$T_j = 25^\circ\text{C}$		8,5		Ω
$t_{d(on)}$	$R_{Gon} = 4,2\ \Omega$ $di/dt = 1680\text{ A}/\mu\text{s}$	$V_{CC} = 1200\text{V}$ $I_{Cnom} = 75\text{A}$	280		ns
t_r			40		ns
E_{on}			44		mJ
$t_{d(off)}$	$R_{Goff} = 4,2\ \Omega$ $di/dt = 490\text{ A}/\mu\text{s}$	$T_j = 125^\circ\text{C}$ $V_{GE} = -15\text{V}$ $L_s = 20\text{ nH}$	680		ns
t_f			140		ns
E_{off}			28,5		mJ
$R_{th(j-c)}$	per IGBT			0,24	K/W



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Characteristics			min.	typ.	max.	Units
Symbol	Conditions					
Inverse Diode						
$V_F = V_{EC}$	$I_{Fnom} = 75 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$		1,6	1,9	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$		1,6	1,9	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$		1,1	1,3	V
		$T_j = 125 \text{ }^\circ\text{C}$		0,9	1,1	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$		6,7	8	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$		9,3	11	mΩ
I_{RRM}	$I_{Fnom} = 75 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$		78,5		A
Q_{rr}	$di/dt = 1650 \text{ A}/\mu\text{s}$	$L_S = 20 \text{ nH}$		29,6		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 1200 \text{ V}$			21,4		mJ
$R_{th(j-c)D}$	per diode				0,45	K/W
Module						
L_{CE}					30	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$		0,75		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$		1		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					160	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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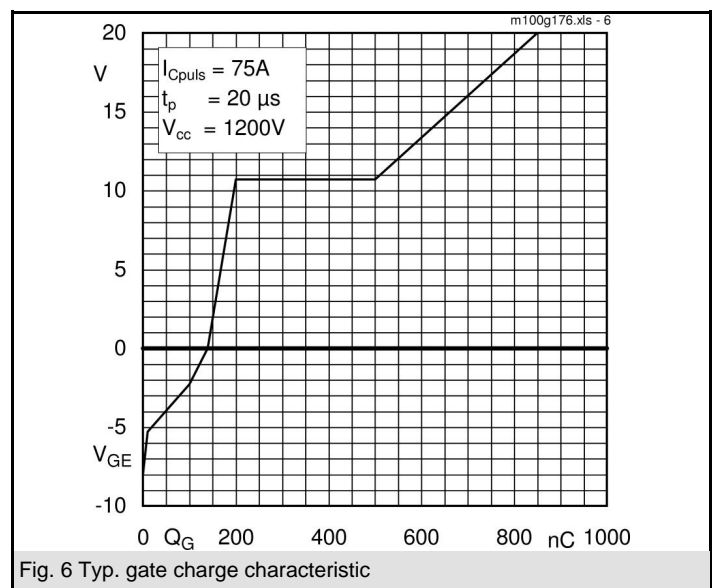
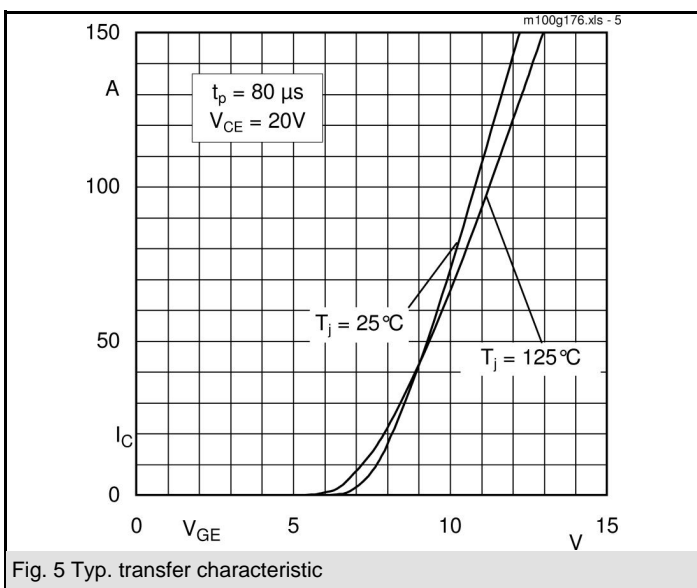
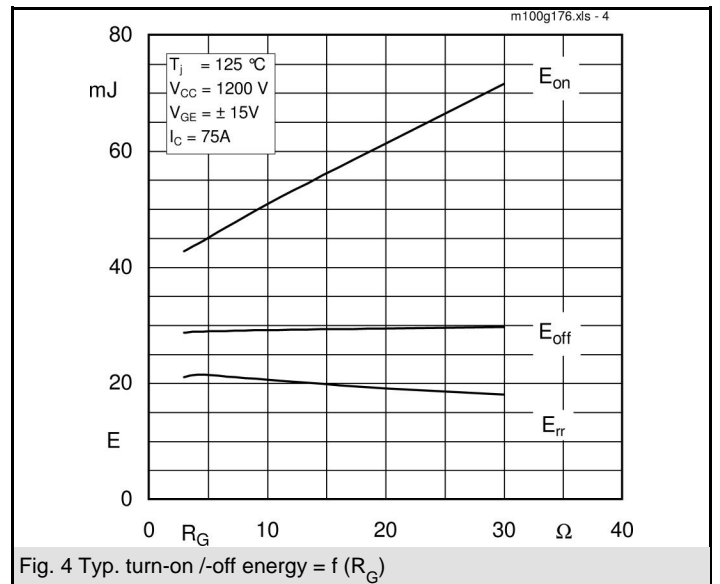
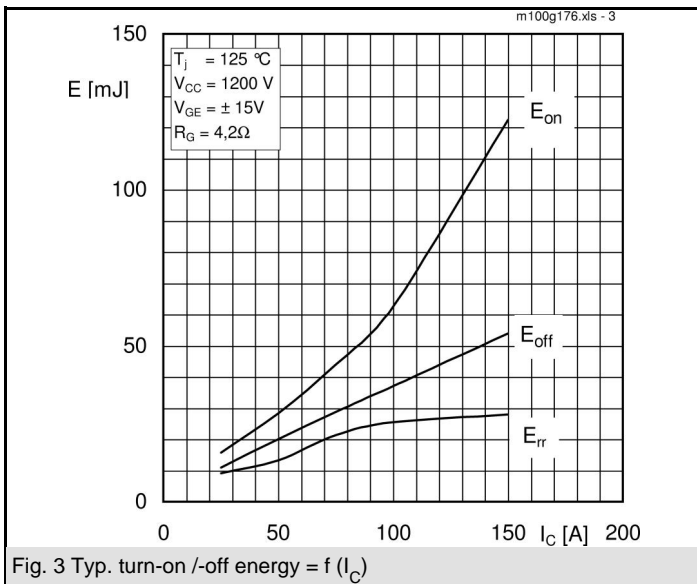
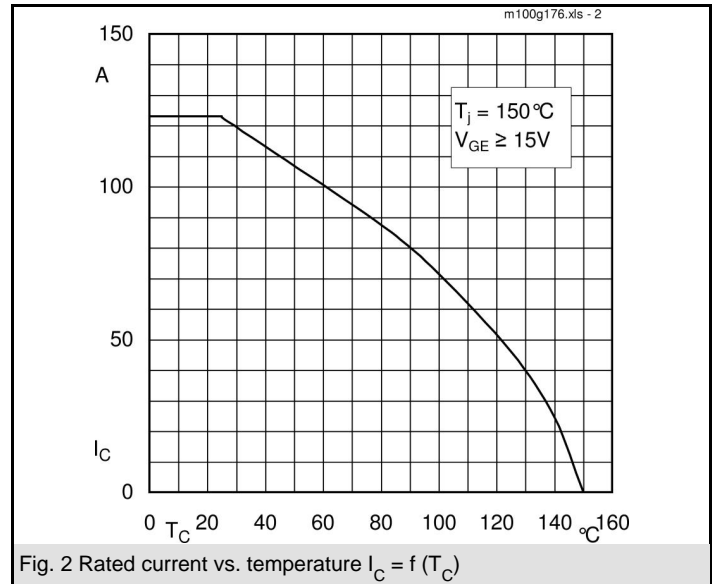
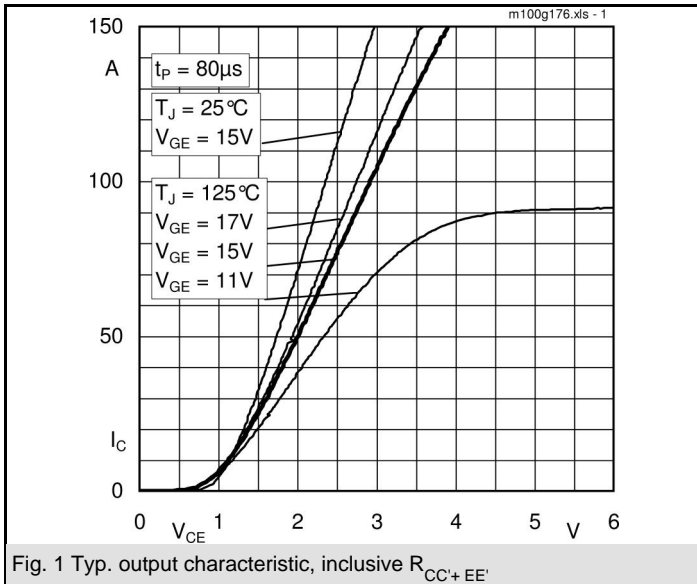
Typical Applications

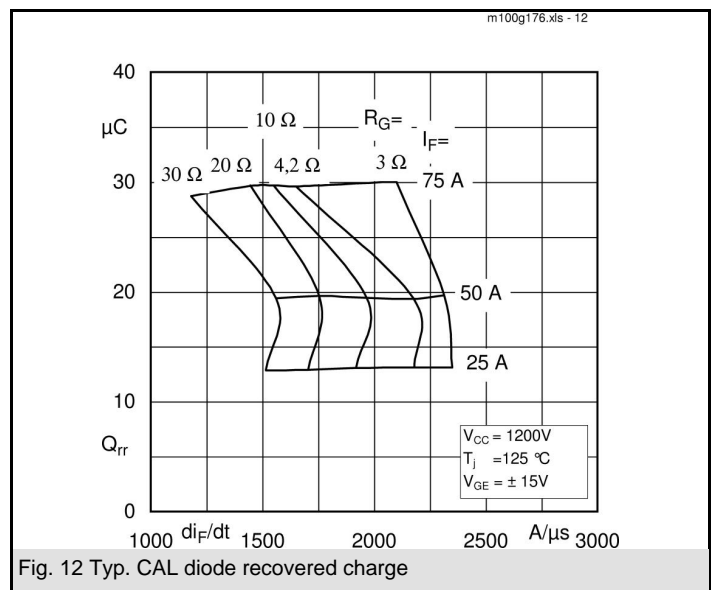
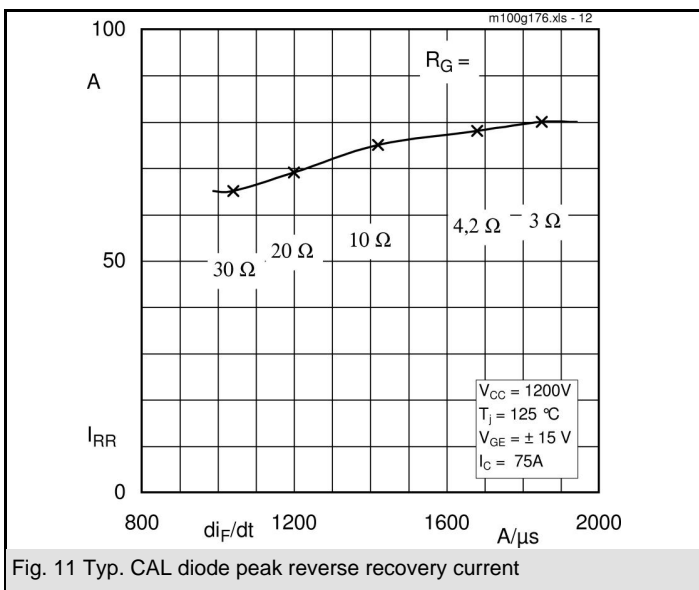
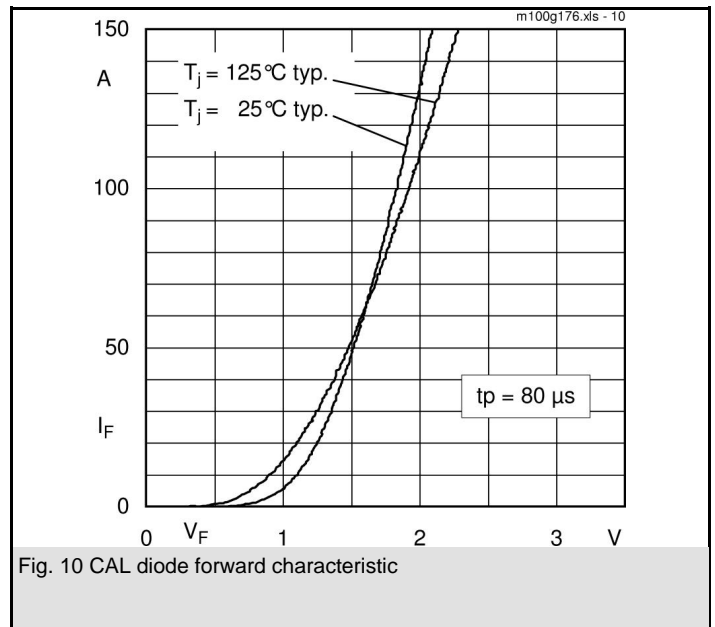
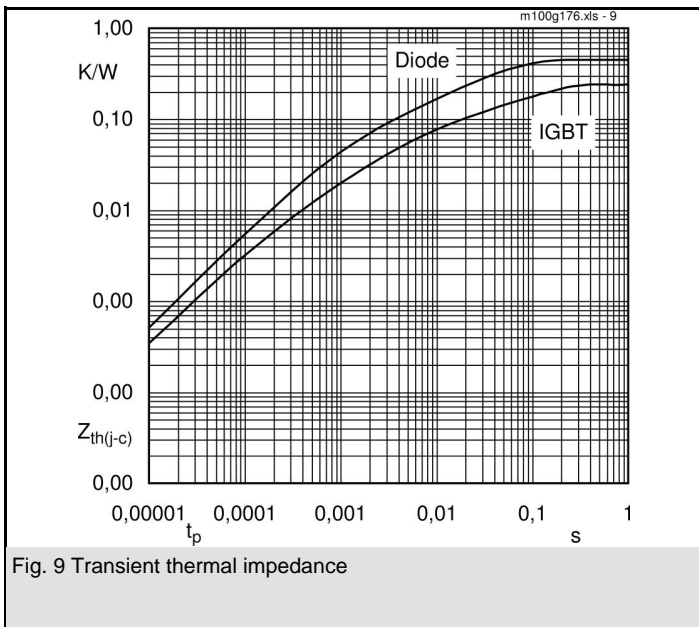
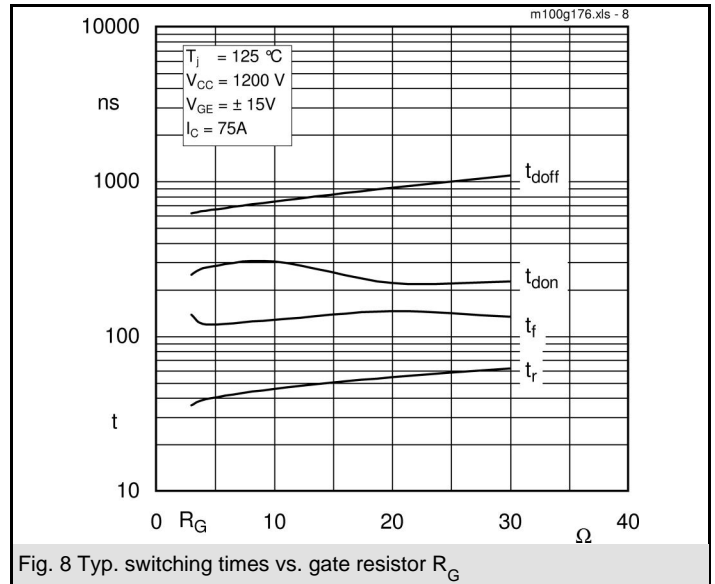
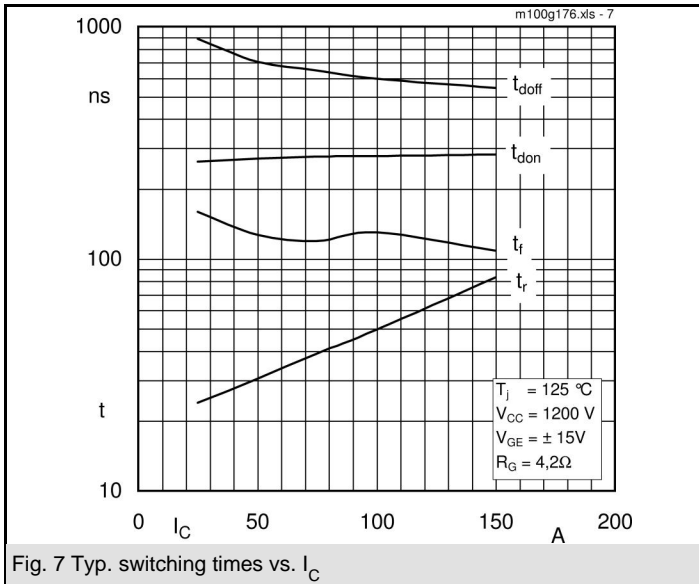
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Z_{th}				
Symbol	Conditions	Values		Units
$Z_{th(j-c)I}$				
$R_{\theta j-c}$	$i = 1$	160		mk/W
$R_{\theta j-c}$	$i = 2$	60		mk/W
$R_{\theta j-c}$	$i = 3$	16,5		mk/W
$R_{\theta j-c}$	$i = 4$	3,5		mk/W
$\tau_{\theta j-c}$	$i = 1$	0,1056		s
$\tau_{\theta j-c}$	$i = 2$	0,009		s
$\tau_{\theta j-c}$	$i = 3$	0,0011		s
$\tau_{\theta j-c}$	$i = 4$	0,0005		s
$Z_{th(j-c)D}$				
$R_{\theta j-cD}$	$i = 1$	270		mk/W
$R_{\theta j-cD}$	$i = 2$	139		mk/W
$R_{\theta j-cD}$	$i = 3$	37		mk/W
$R_{\theta j-cD}$	$i = 4$	4		mk/W
$\tau_{\theta j-cD}$	$i = 1$	0,0475		s
$\tau_{\theta j-cD}$	$i = 2$	0,0104		s
$\tau_{\theta j-cD}$	$i = 3$	0,0011		s
$\tau_{\theta j-cD}$	$i = 4$	0,0003		s



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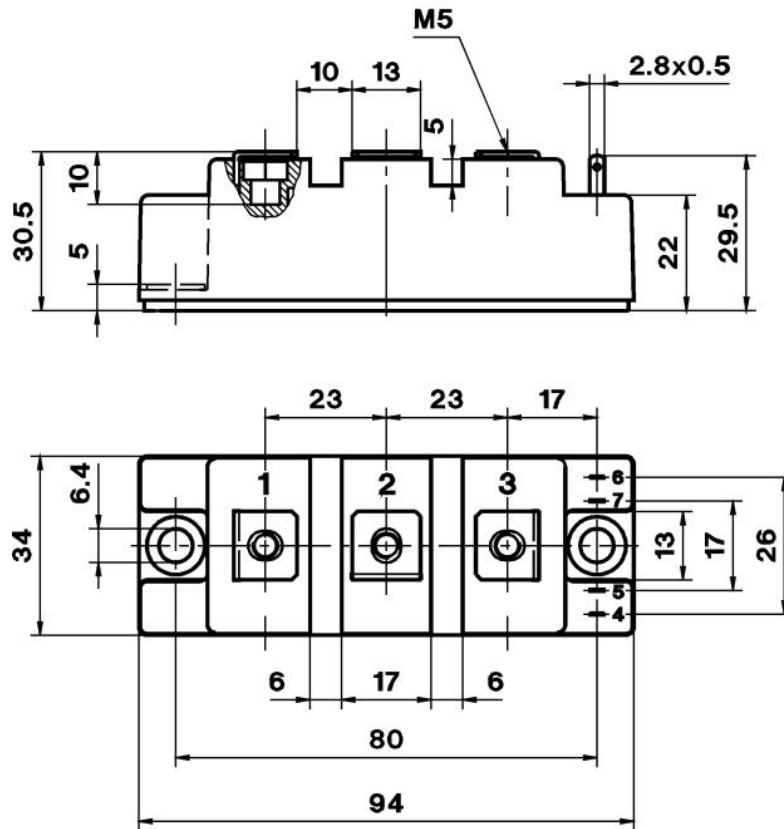


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UL Recognized

CASED61

File no. E 63 532



Case D 61



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