



SEMITRANS® 3

Trench IGBT Module

SKM 400GB126D

SKM 400GAL126D

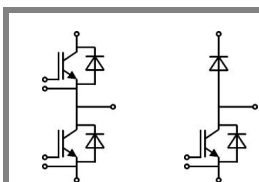
Preliminary Data

Features

- Homogeneous Si
- Trench = Trenchgate technology
- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_C$

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

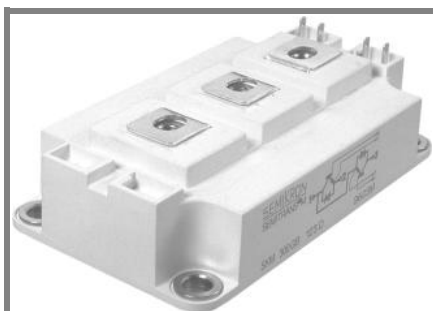


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Absolute Maximum Ratings			T _c = 25 °C, unless otherwise specified	
Symbol	Conditions		Values	Units
IGBT				
V _{CES}	T _j = 25 °C		1200	V
I _C	T _j = 150 °C	T _{case} = 25 °C	470	A
		T _{case} = 80 °C	330	A
I _{CRM}	I _{CRM} =2xI _{Cnom}		600	A
V _{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	400	A
		T _{case} = 80 °C	270	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		600	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	2200	A
Freewheeling Diode				
I _F	T _j = 150 °C	T _{case} = 25 °C	400	A
		T _{case} = 80 °C	270	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		600	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	2200	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 = 12 mA		5	5,8	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	1,2	V
		T _J = 125 °C		0,9		V
r _{CE}	V _{GE} = 15 V	T _J = 25°C		2,3	3,2	mΩ
		T _J = 125°C		3,7		mΩ
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V	T _J = 25°C _{chiplev.}		1,7	2,15	V
		T _J = 125°C _{chiplev.}		2		V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V	f = 1 MHz		23,1		nF
C _{oes}				1,9		nF
C _{res}				1,2		nF
Q _G	V _{GE} = -8V ... +20V			2800		nC
R _{Gint}	T _J = °C			2,5		Ω
t _{d(on)}	R _{Gon} = 2 Ω	V _{CC} = 600V I _C = 300A		330		ns
t _r				50		ns
E _{on}				29		mJ
t _{d(off)}	R _{Goff} = 2 Ω	T _J = 125 °C V _{GE} = ±15V		650		ns
t _f				110		ns
E _{off}				48		mJ
R _{th(j-c)}	per IGBT				0,08	K/W



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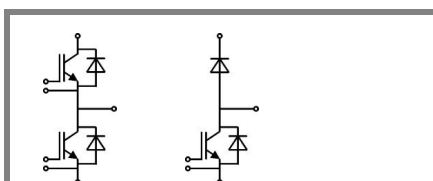
Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,6	1,8	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,6	1,8	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	1	1,1	V
		$T_j = 125 \text{ }^\circ\text{C}$	0,8	0,9	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	2	2,3	mΩ
		$T_j = 125 \text{ }^\circ\text{C}$	2,7	3	mΩ
I_{RRM}	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	390		A
Q_{rr}	$di/dt = 6300 \text{ A}/\mu\text{s}$		77		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		27		mJ
$R_{th(j-c)D}$	per diode			0,18	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}; V_{GE} = 0 \text{ V}$	$T_j = 25 \text{ }^\circ\text{C}_{chiplev.}$	1,6	1,8	V
		$T_j = 125 \text{ }^\circ\text{C}_{chiplev.}$	1,6	1,8	V
V_{F0}		$T_j = 25 \text{ }^\circ\text{C}$	1	1,1	V
		$T_j = 125 \text{ }^\circ\text{C}$	0,8	0,9	V
r_F		$T_j = 25 \text{ }^\circ\text{C}$	2	2,3	V
		$T_j = 125 \text{ }^\circ\text{C}$	2,7	3	V
I_{RRM}	$I_F = 300 \text{ A}$	$T_j = 125 \text{ }^\circ\text{C}$	390		A
Q_{rr}	$di/dt = 6300 \text{ A}/\mu\text{s}$		77		μC
E_{rr}	$V_{GE} = -15 \text{ V}; V_{CC} = 600 \text{ V}$		27		mJ
$R_{th(j-c)D}$	per diode			0,18	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip	$T_{case} = 25 \text{ }^\circ\text{C}$	0,35		mΩ
		$T_{case} = 125 \text{ }^\circ\text{C}$	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

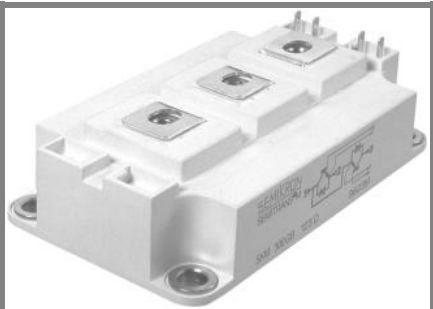
This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, Chapter IX.

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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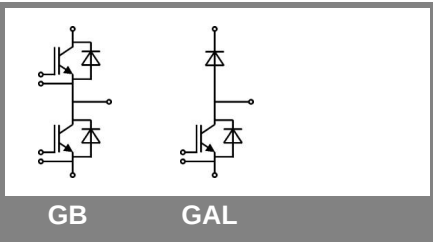
Features

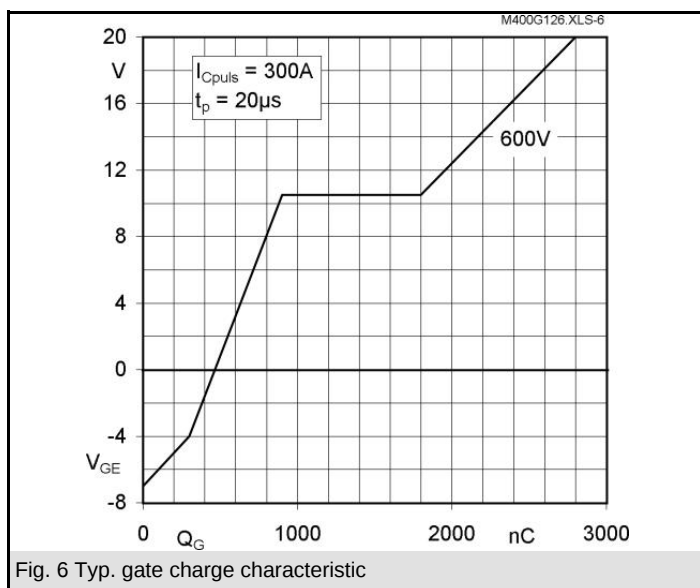
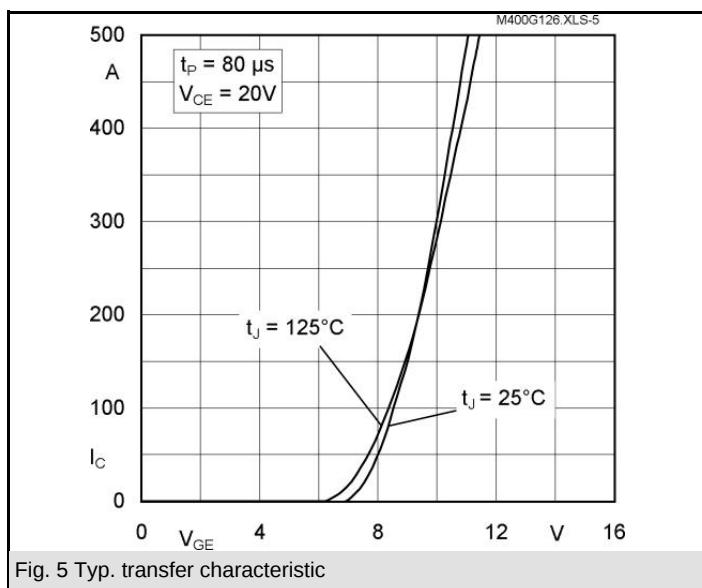
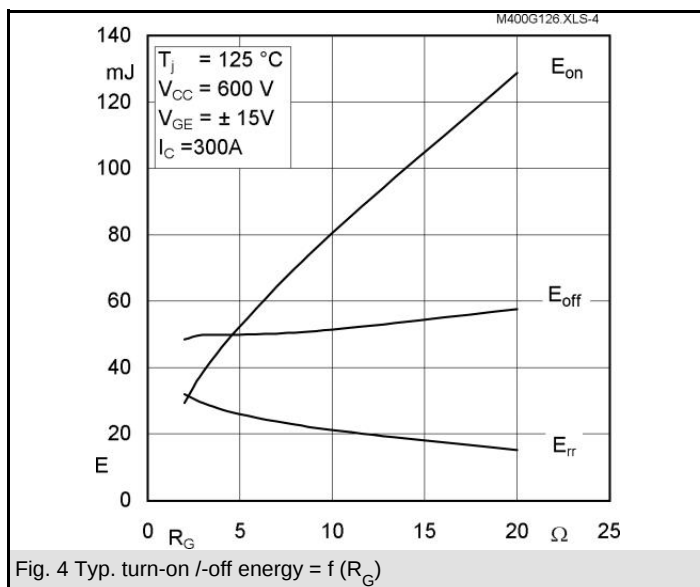
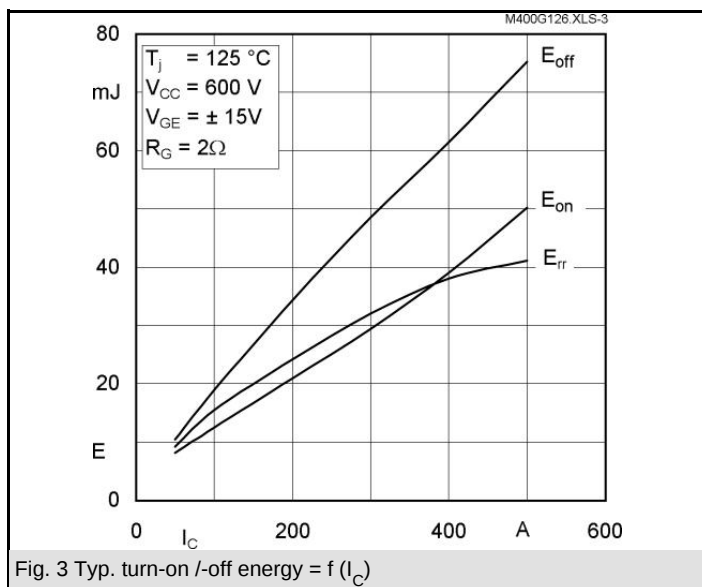
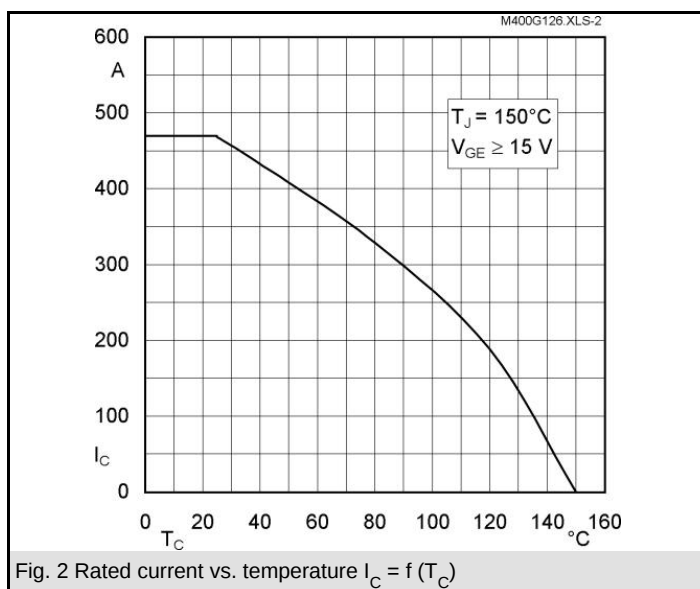
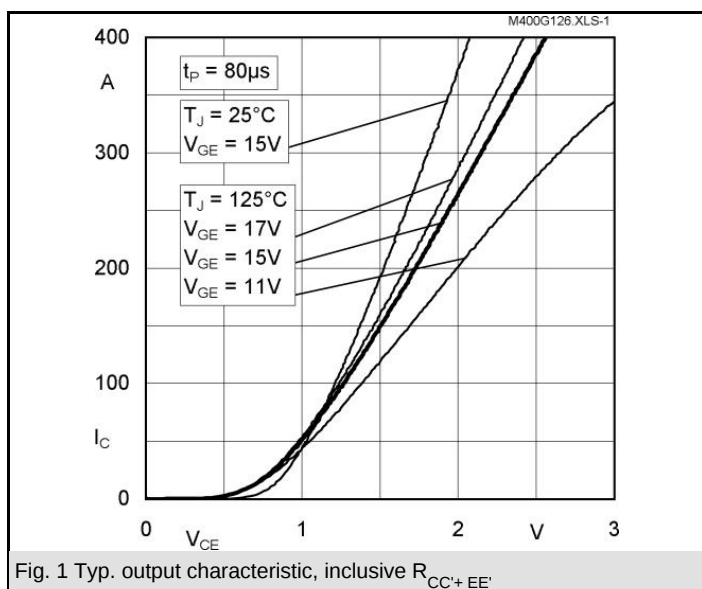
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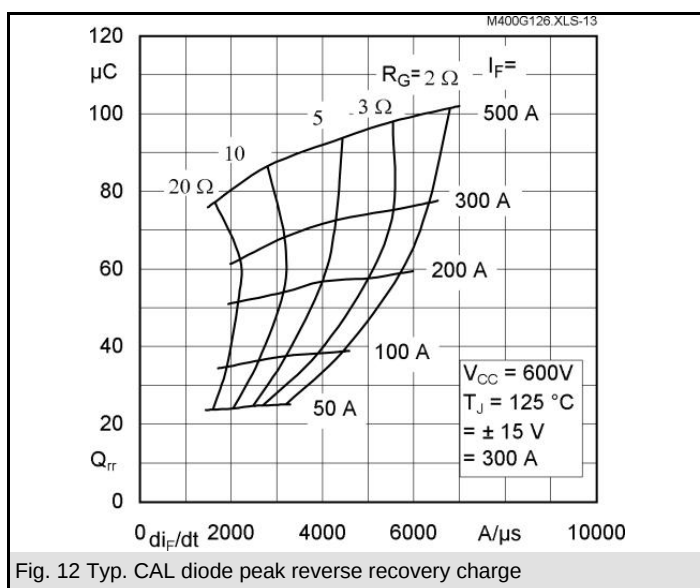
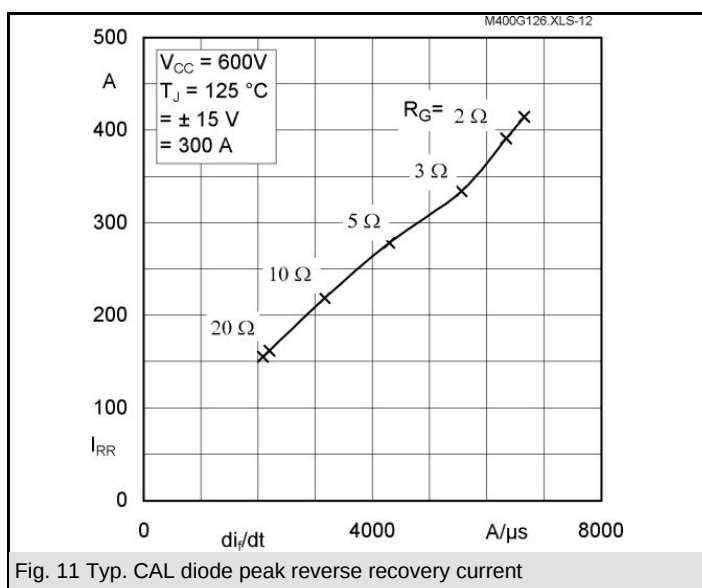
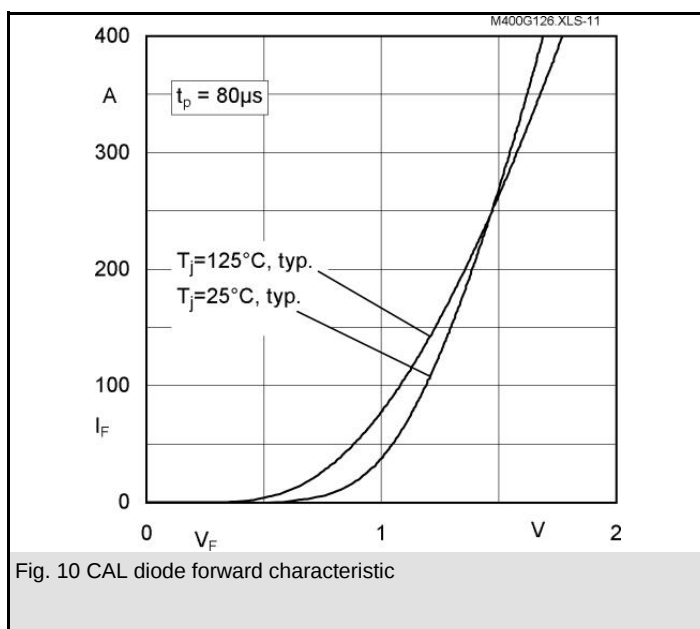
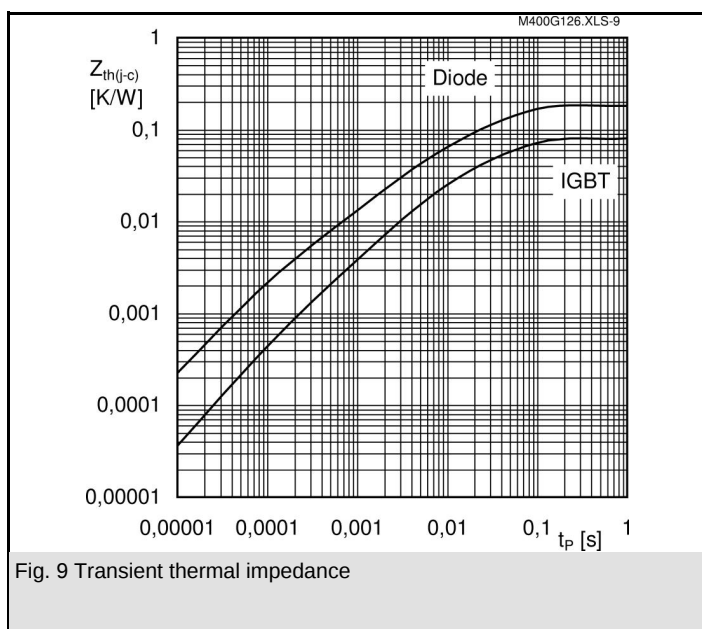
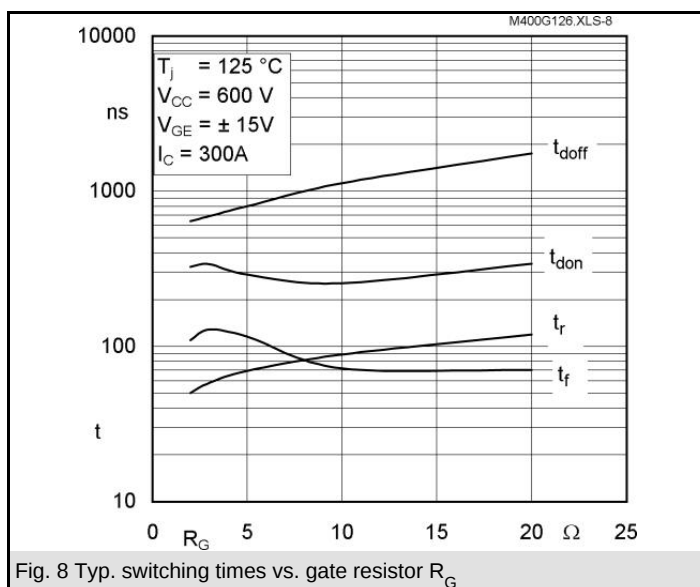
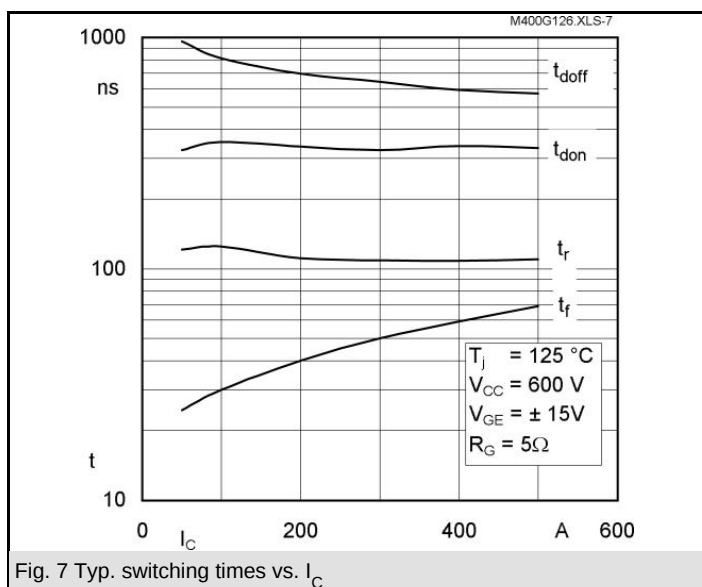
Typical Applications

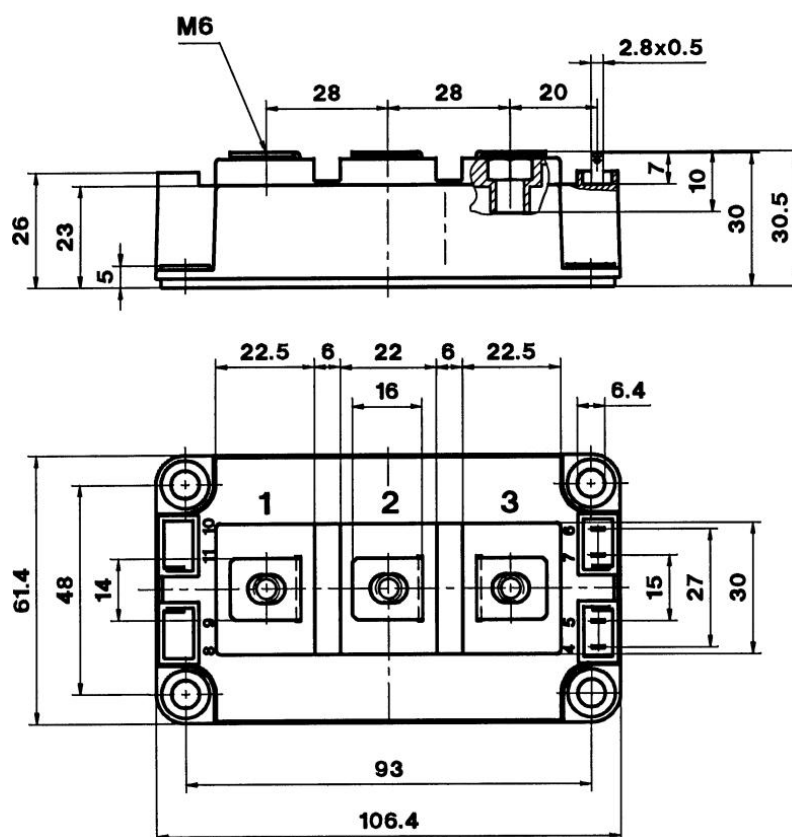
- AC inverter drives
- UPS
- Electronic welders

Z_{th}			
Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	55	mk/W
R_i	$i = 2$	21	mk/W
R_i	$i = 3$	3,6	mk/W
R_i	$i = 4$	0,4	mk/W
τ_{a_i}	$i = 1$	0,0393	s
τ_{a_i}	$i = 2$	0,0171	s
τ_{a_i}	$i = 3$	0,002	s
τ_{a_i}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	120	mk/W
R_i	$i = 2$	48	mk/W
R_i	$i = 3$	10	mk/W
R_i	$i = 4$	2	mk/W
τ_{a_i}	$i = 1$	0,0262	s
τ_{a_i}	$i = 2$	0,0417	s
τ_{a_i}	$i = 3$	0,0012	s
τ_{a_i}	$i = 4$	0,001	s

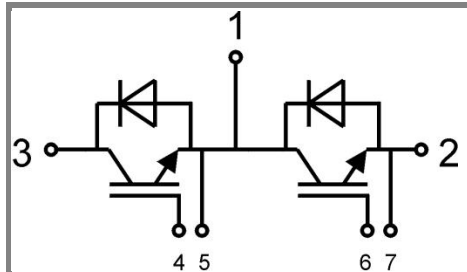






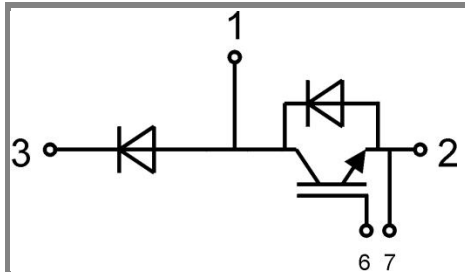


Case D 56



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Case D 56



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Case D 57 (→ D 56)