

SKM 400GB125D



SEMITRANS® 3

Ultra Fast IGBT Modules

SKM 400GB125D

SKM 400GAL125D

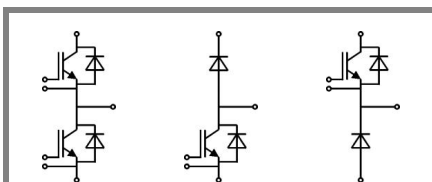
SKM 400GAR125D

Features

- 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 DBC Direct Copper Bonding Technology
- Large clearance (13 mm) and creepage distances (20 mm)

Typical Applications

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



GB

GAL

GAR

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	400	A
		T _{case} = 80 °C	300	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	390	A
		T _{case} = 80 °C	260	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		600	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	2880	A
Freewheeling Diode				
I _F	T _j = 150 °C	T _{case} = 25 °C	390	A
		T _{case} = 80 °C	260	A
I _{FRM}	I _{FRM} =2xI _{Fnom}		600	A
I _{FSM}	t _p = 10 ms; sin.	T _j = 150 °C	2880	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		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			V	
			T _j = 125 °C			V	
r _{CE}	V _{GE} = 15 V		T _j = 25°C		6,3	mΩ	
			T _j = 125°C		7,6	mΩ	
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V		T _j = 25°C _{chiplev.}		3,3	3,85	V
			T _j = 125°C _{chiplev.}		4	4,55	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V f = 1 MHz				22	30	nF
C _{oes}					3,3	4	nF
C _{res}					1,2	1,6	nF
Q _G	V _{GE} = 0V - +20V				2650		nC
R _{Gint}	T _j = °C				1,25		Ω
t _{d(on)}	R _{Gon} = 2 Ω		V _{CC} = 600V I _C = 300A		70		ns
t _r					50		ns
E _{on}					17		mJ
t _{d(off)}	R _{Goff} = 2 Ω		T _j = 125 °C V _{GE} = ±15V		500		ns
t _f					32		ns
E _{off}					18		mJ
R _{th(j-c)}	per IGBT				0,05		K/W



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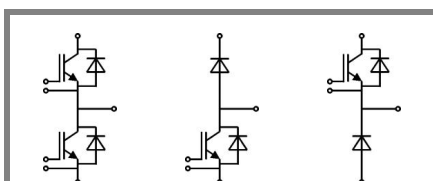
Typical Applications

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

Characteristics					
Symbol	Conditions	min.	typ.	max.	Units
Inverse Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}; V_{GE} = 0\text{ V}$ $T_j = 25\text{ °C}_{chiplev.}$ $T_j = 125\text{ °C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$		1,1	1,2	V V
r_F	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$		3	4,3	mΩ mΩ
I_{RRM}	$I_F = 300\text{ A}$ $T_j = 125\text{ °C}$		350		A
Q_{rr}	$di/dt = 8300\text{ A/μs}$		45		μC
E_{rr}	$V_{GE} = 0\text{ V}; V_{CC} = 600\text{ V}$		16		mJ
$R_{th(j-c)D}$	per diode			0,125	K/W
Freewheeling Diode					
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}; V_{GE} = 0\text{ V}$ $T_j = 25\text{ °C}_{chiplev.}$ $T_j = 125\text{ °C}_{chiplev.}$		2 1,8	2,5	V V
V_{F0}	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$		1,1	1,2	V V
r_F	$T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$		3	4,3	V V
I_{RRM}	$I_F = 300\text{ A}$ $T_j = 125\text{ °C}$		350		A
Q_{rr}	$di/dt = 8300\text{ A/μs}$		45		μC
E_{rr}	$V_{GE} = 0\text{ V}; V_{CC} = 600\text{ V}$		16		mJ
$R_{th(j-c)FD}$	per diode			0,125	K/W
Module					
L_{CE}			15	20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_{case} = 25\text{ °C}$ $T_{case} = 125\text{ °C}$		0,35 0,5		mΩ 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.

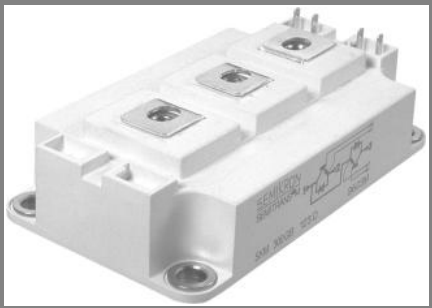


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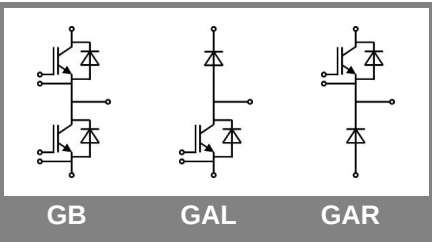
Features

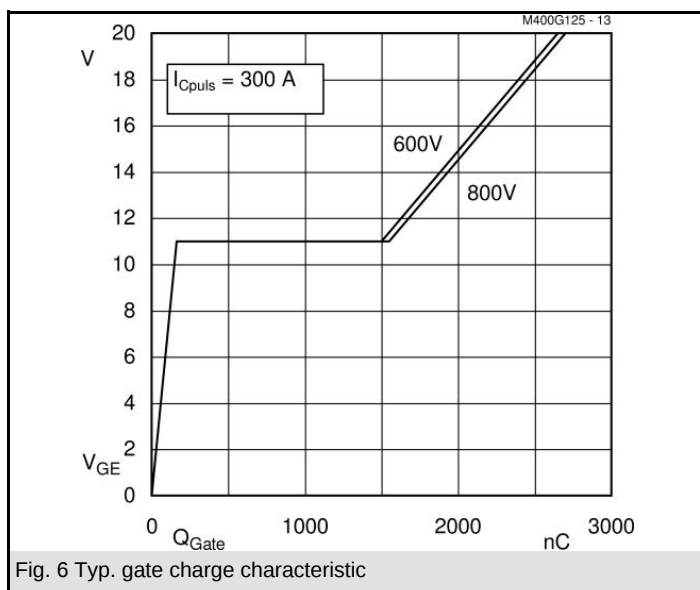
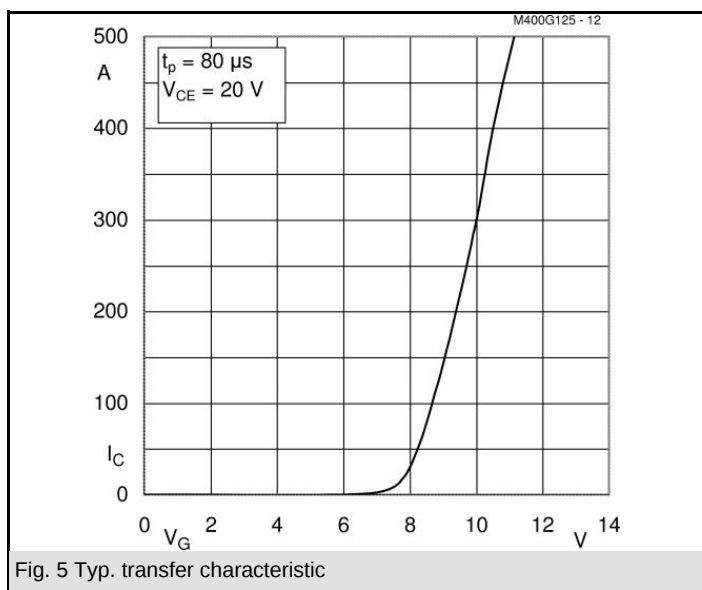
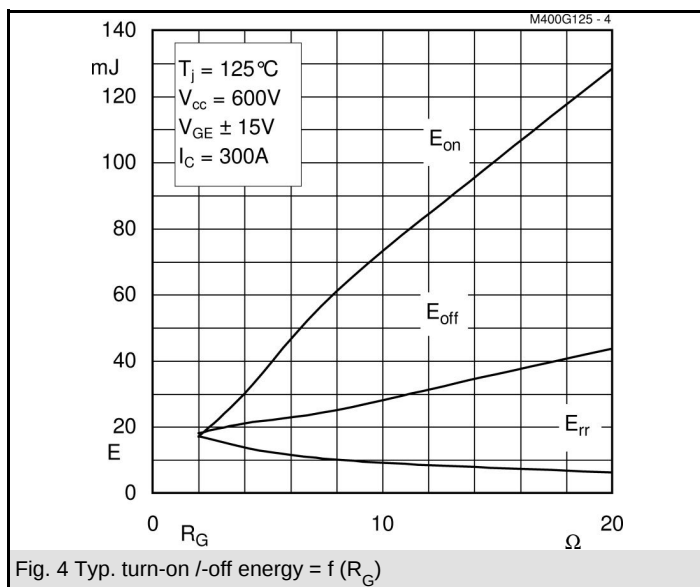
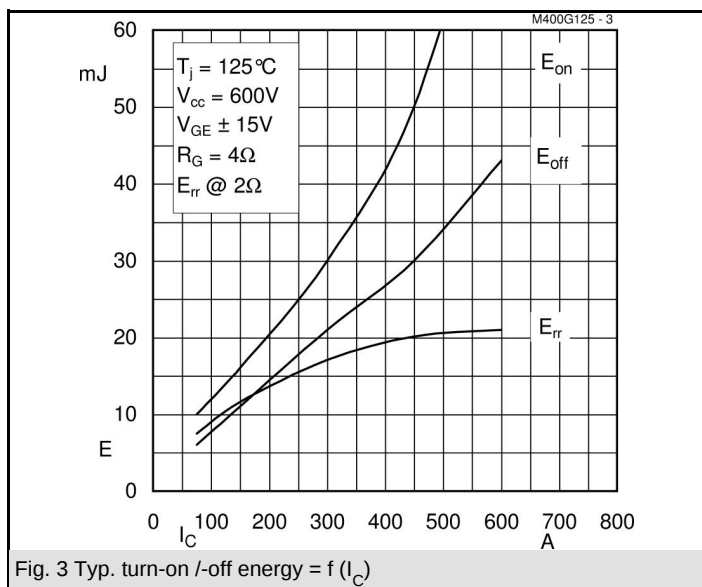
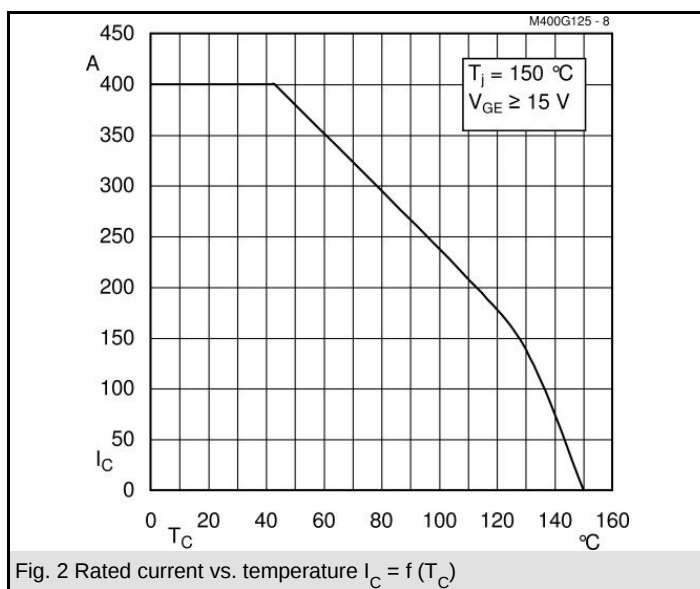
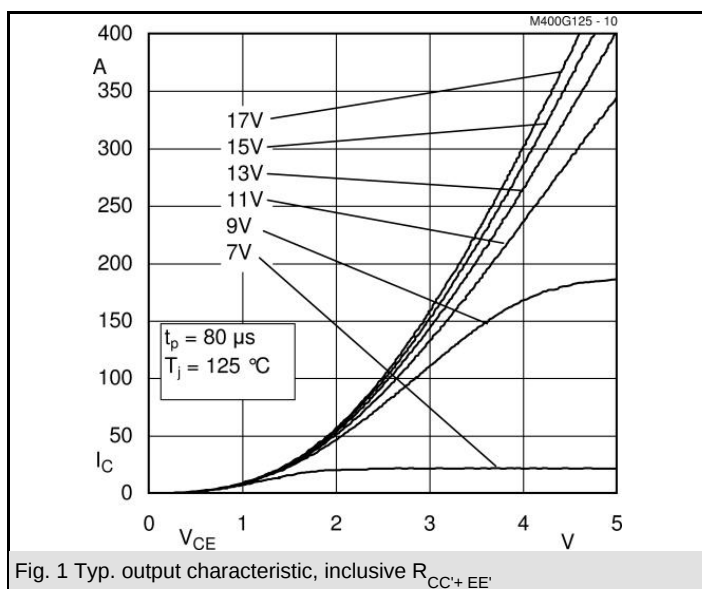
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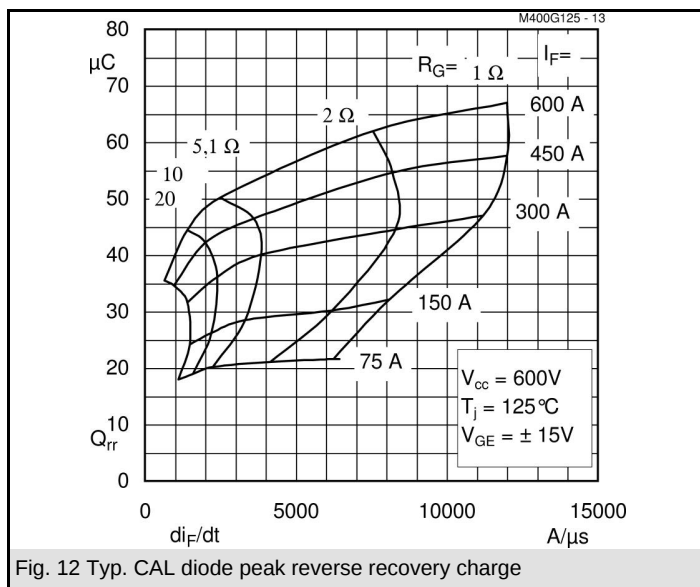
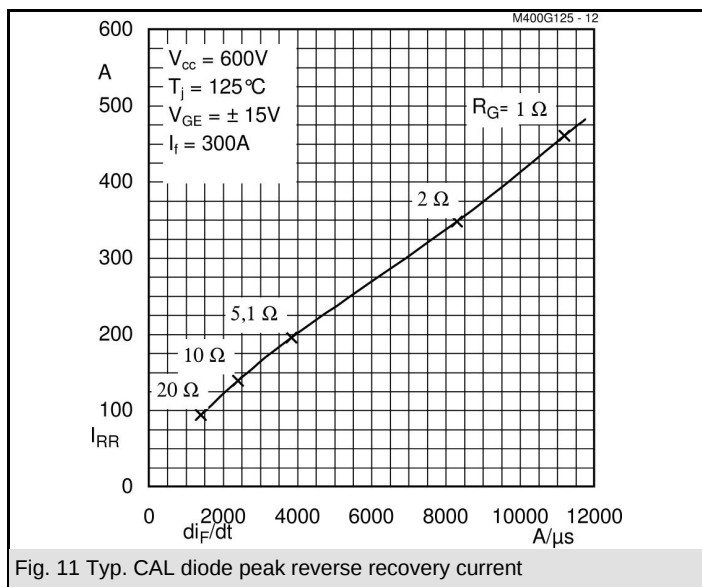
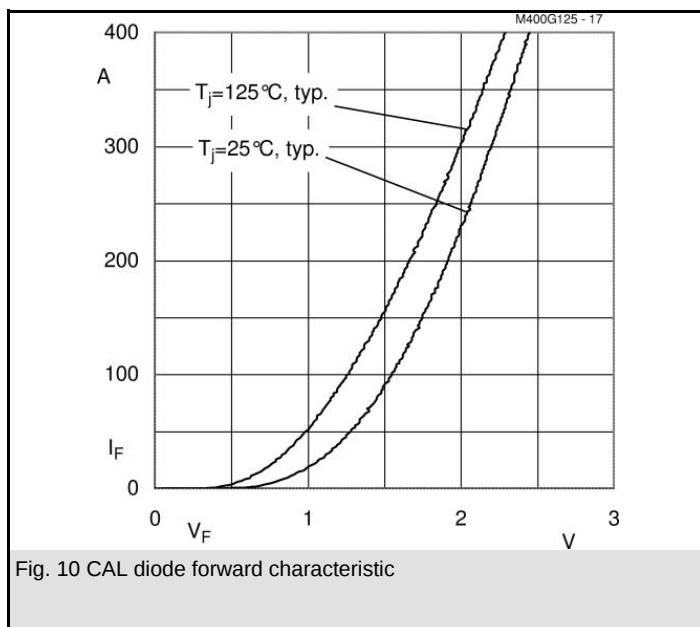
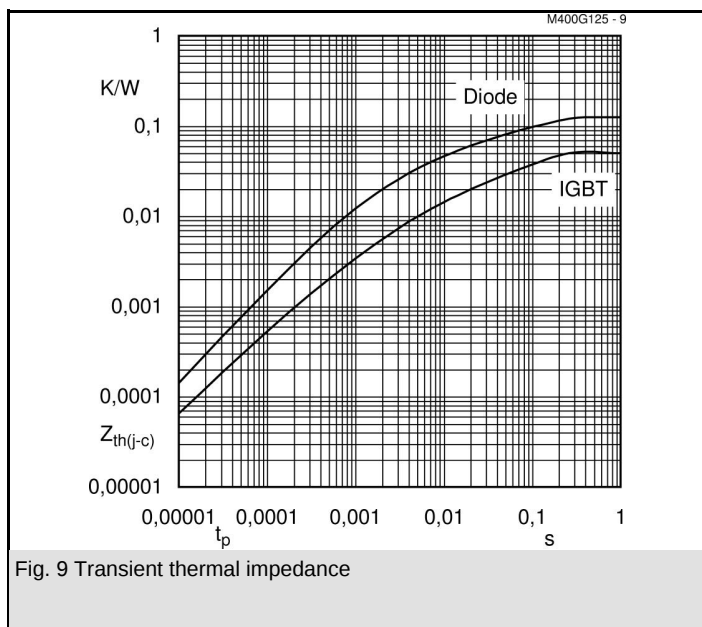
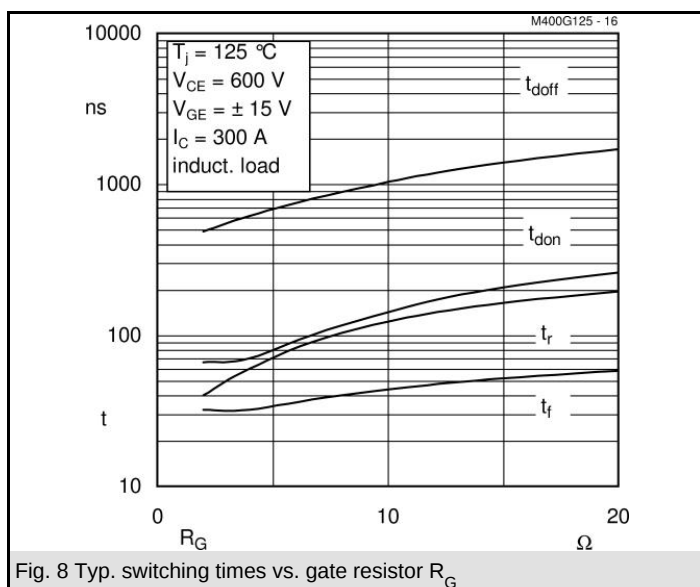
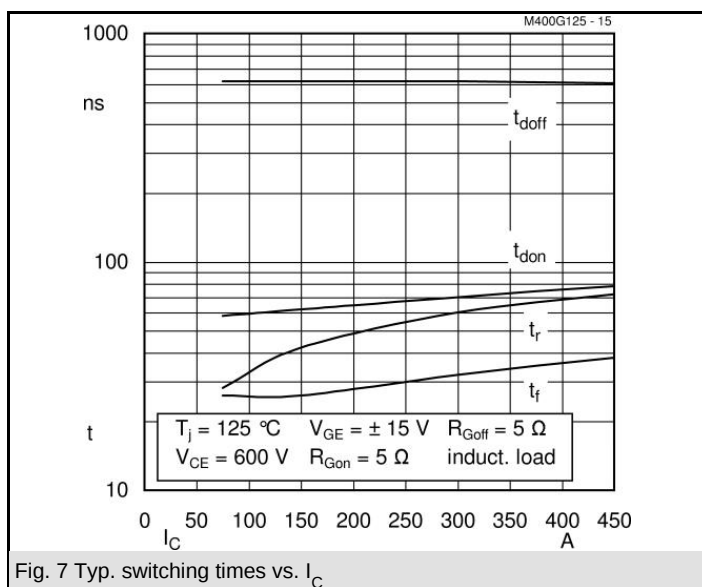
Typical Applications

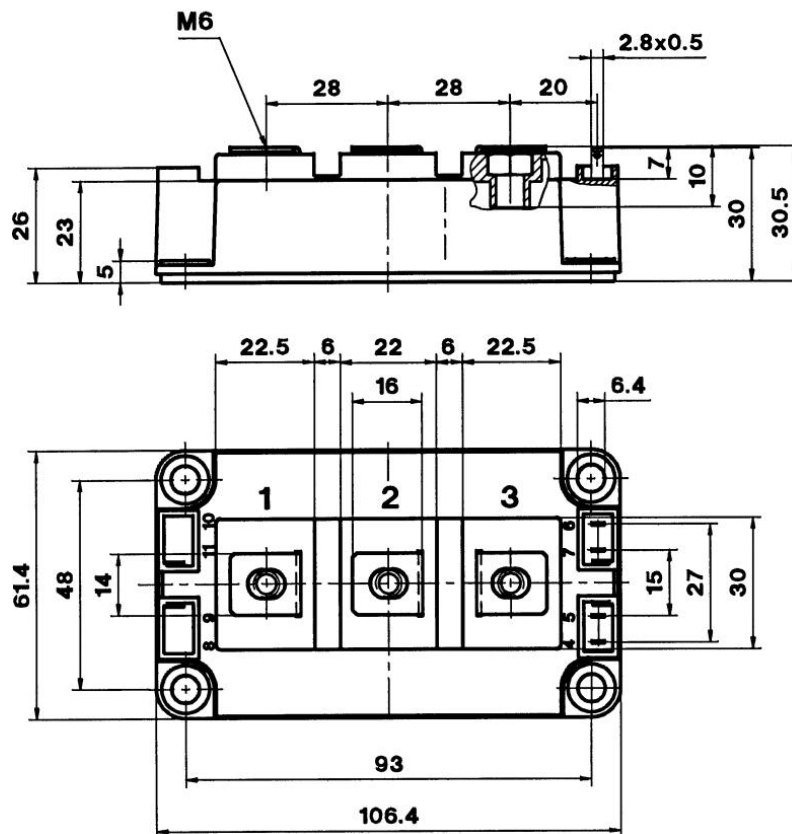
- Switched mode power supplies at $f_{sw} > 20\text{kHz}$
- Resonant inverters up to 100 kHz
- Inductive heating
- Electronic welders at $f_{sw} > 20\text{ kHz}$

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	36	mk/W
R_i	$i = 2$	10,5	mk/W
R_i	$i = 3$	3	mk/W
R_i	$i = 4$	0,5	mk/W
τ_{ui}	$i = 1$	0,0744	s
τ_{ui}	$i = 2$	0,0078	s
τ_{ui}	$i = 3$	0,0016	s
τ_{ui}	$i = 4$	0,0002	s
$Z_{th(j-c)D}$			
R_i	$i = 1$	75	mk/W
R_i	$i = 2$	38	mk/W
R_i	$i = 3$	10,6	mk/W
R_i	$i = 4$	1,4	mk/W
τ_{ui}	$i = 1$	0,0386	s
τ_{ui}	$i = 2$	0,0201	s
τ_{ui}	$i = 3$	0,001	s
τ_{ui}	$i = 4$	0,003	s

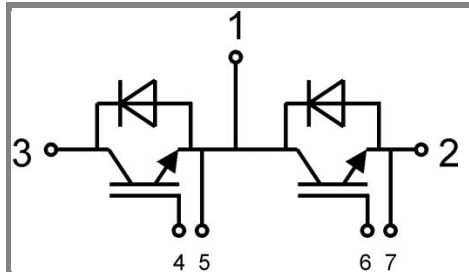






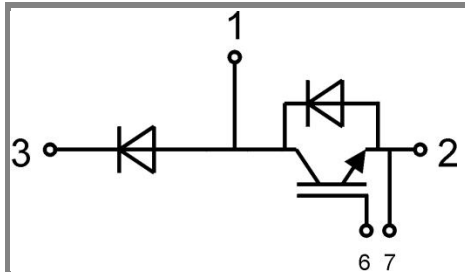


Case D 56



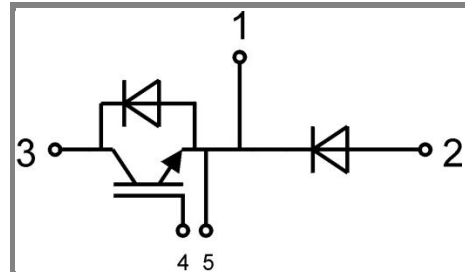
GB

Case D 56



GAL

Case D 57 (→ D 56)



GAR

Case D 58 (→ D 56)