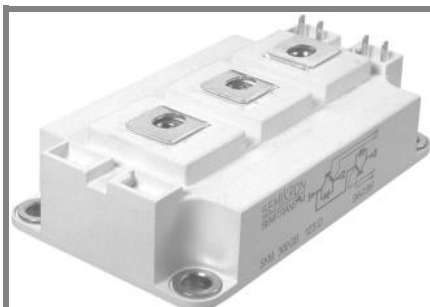


SKM 400GB128D...



SEMITRANS® 3

SPT IGBT Module

SKM 400GB128D

SKM 400GAL128D

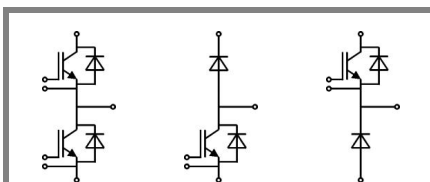
SKM 400GAR128D

Features

- Homogeneous Si
- SPT = Soft-Puch-Through 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 at f_{sw} up to 20kHz



GB

GAL

GAR

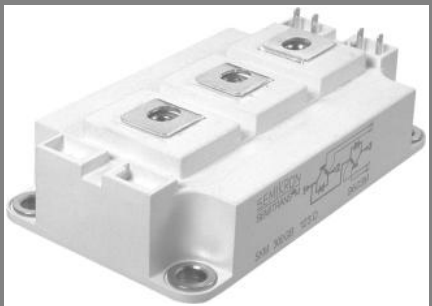
Absolute Maximum Ratings $T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	Values	Units
IGBT			
V_{CES}	$T_j = 25^\circ\text{C}$	1200	V
I_c	$T_j = 150^\circ\text{C}$	$T_c = 25^\circ\text{C}$	565 A
		$T_c = 80^\circ\text{C}$	400 A
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	600	A
V_{GES}		± 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

Freewheeling 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.	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	6,45	V
I _{CES}	V _{GE} = 0 V, V _{CE} = V _{CES}	T _j = 25 °C		0,2	0,6	mA
V _{CE0}		T _j = 25 °C		1	1,15	V
		T _j = 125 °C		0,9	1,05	V
r _{CE}	V _{GE} = 15 V	T _j = 25°C		3	4	mΩ
		T _j = 125°C		4	5	mΩ
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V	T _j = 25°C _{chiplev.}		1,9	2,35	V
		T _j = 125°C _{chiplev.}		2,1	2,55	V
C _{ies}	V _{CE} = 25, V _{GE} = 0 V	f = 1 MHz		26		nF
C _{oes}				3		nF
C _{res}				3		nF
Q _G	V _{GE} = -8V - +20V			3700		nC
R _{Gint}	T _j = 25 °C			1,25		Ω
t _{d(on)}	R _{Gon} = 4,7 Ω	V _{CC} = 600V I _{Cnom} = 300A		110		ns
t _r				60		ns
E _{on}				32		mJ
t _{d(off)}	R _{Goff} = 4,7 Ω	T _j = 125 °C V _{GE} = ± 15V		800		ns
t _f				60		ns
E _{off}				31		mJ
R _{th(j-c)}	per IGBT				0,055	K/W



SEMITRANS® 3

SPT IGBT Module

SKM 400GB128D
SKM 400GAL128D
SKM 400GAR128D

Features

- Homogeneous Si
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- V_{CEsat} with positive temperature coefficient
- High short circuit capability, self limiting to $6 \times I_c$

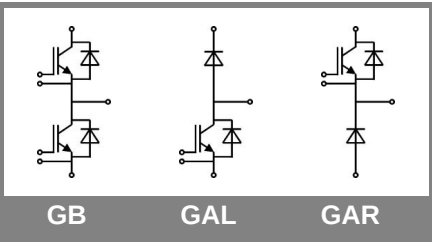
Typical Applications

- AC inverter drives
- UPS
- Electronic welders at f_{sw} up to 20kHz

Characteristics						
Symbol	Conditions		min.	typ.	max.	Units
Inverse Diode						
V _F = V _{EC}	I _{Fnom} = 300 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.} T _j = 125 °C _{chiplev.}		2 1,8	2,5	V V
V _{F0}		T _j = 25 °C		1,1	1,2	V
r _F		T _j = 25 °C		3	4,3	mΩ
I _{RRM} Q _{rr} E _{rr}	I _{Fnom} = 300 A di/dt = 2400 A/μs V _{GE} = -15 V; V _{CC} = 600 V	T _j = 125 °C		176 40 16		A μC mJ
R _{th(j-c)D}	per diode				0,125	K/W
FWD						
V _F = V _{EC}	I _{Fnom} = 300 A; V _{GE} = 0 V	T _j = 25 °C _{chiplev.} T _j = 125 °C _{chiplev.}		2 1,8	2,5	V V
V _{F0}		T _j = 25 °C		1,1	1,2	V
r _F		T _j = 25 °C		3	4,3	V
I _{RRM} Q _{rr} E _{rr}	I _{Fnom} = 300 A di/dt = 2400 A/μs V _{GE} = -15 V; V _{CC} = 600 V	T _j = 125 °C		176 40 16		A μC mJ
R _{th(j-c)D}	per diode				0,125	K/W
Module						
L _{CE}				15	20	nH
R _{CC'+EE'}	res., terminal-chip	T _{case} = 25 °C T _{case} = 125 °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.



SKM 400GB128D...



SEMITRANS® 3

SPT IGBT Module

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SKM 400GAR128D

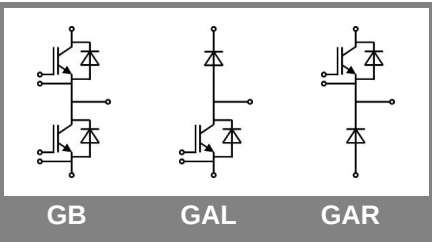
Features

- Homogeneous Si
- SPT = Soft-Puch-Through 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 at f_{sw} up to 20kHz

Z_{th} Symbol	Conditions	Values	Units
$Z_{th(j-c)I}$			
R_i	$i = 1$	37	mk/W
R_i	$i = 2$	14	mk/W
R_i	$i = 3$	3,45	mk/W
R_i	$i = 4$	0,55	mk/W
τ_{a_i}	$i = 1$	0,0744	s
τ_{a_i}	$i = 2$	0,0078	s
τ_{a_i}	$i = 3$	0,0024	s
τ_{a_i}	$i = 4$	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_{a_i}	$i = 1$	0,0386	s
τ_{a_i}	$i = 2$	0,0201	s
τ_{a_i}	$i = 3$	0,001	s
τ_{a_i}	$i = 4$	0,003	s



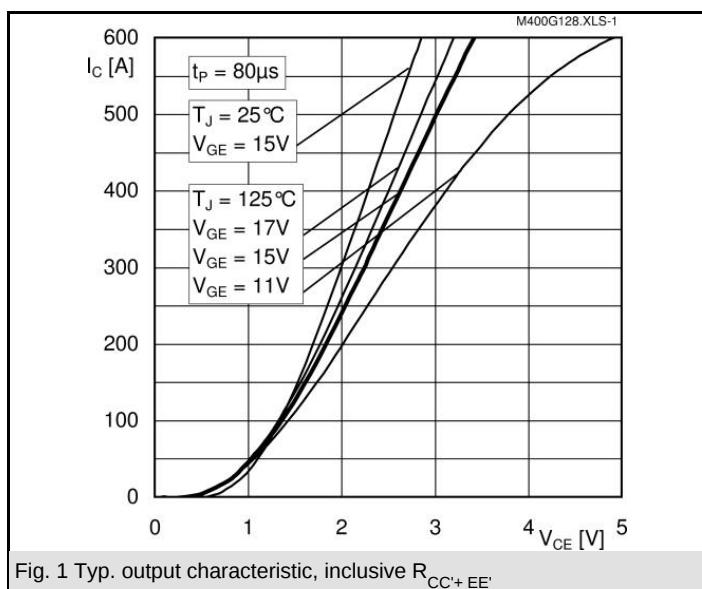


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

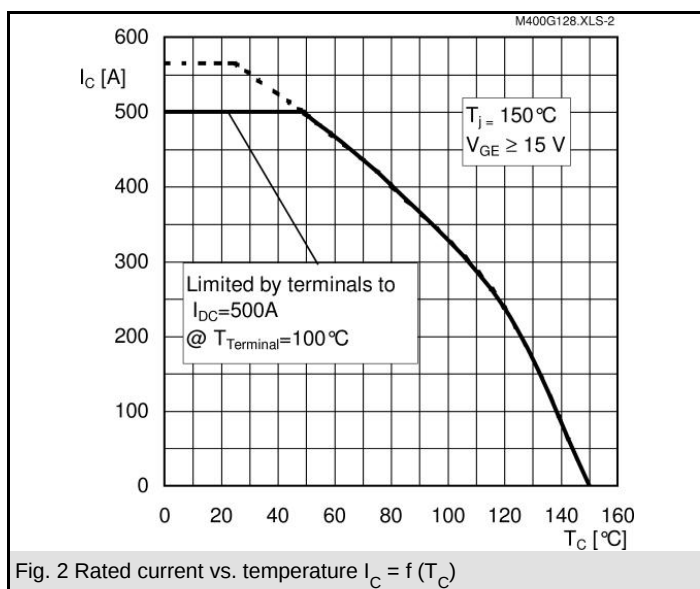


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

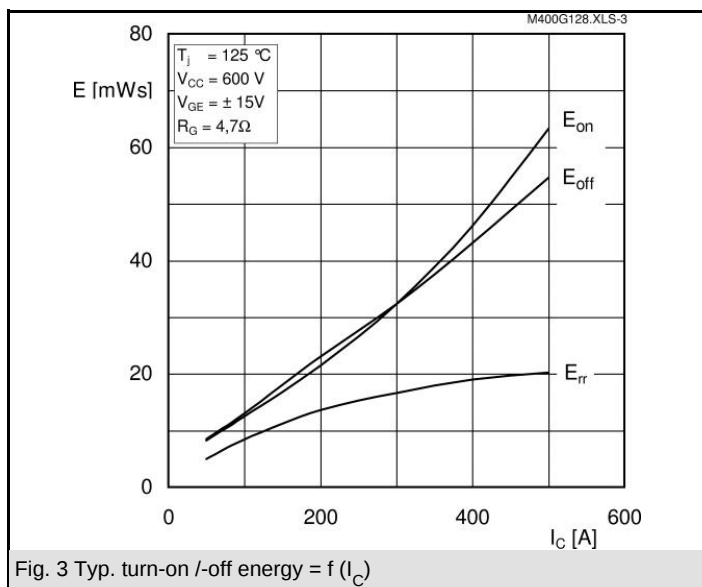


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

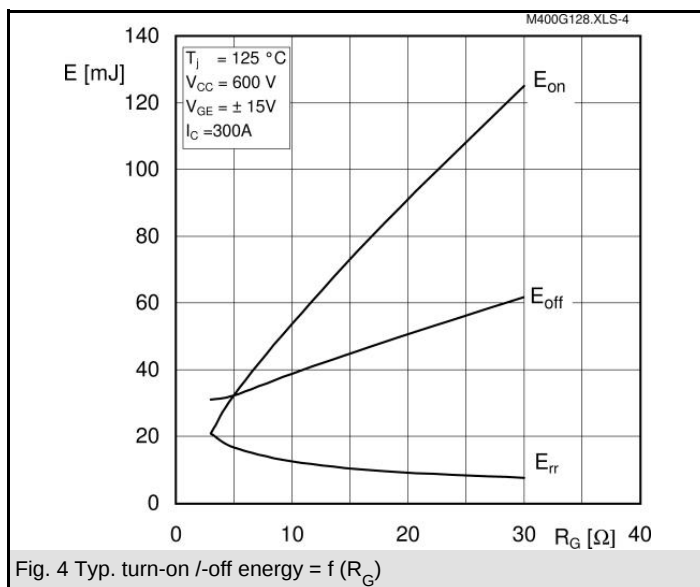


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

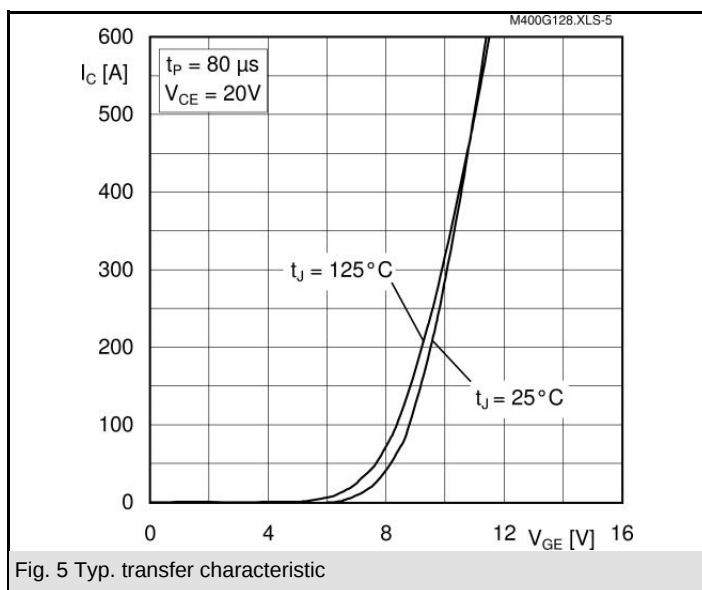


Fig. 5 Typ. transfer characteristic

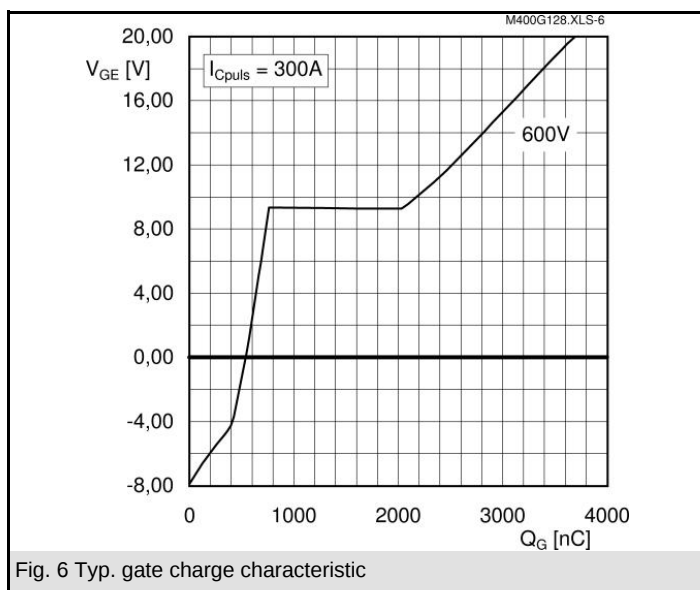
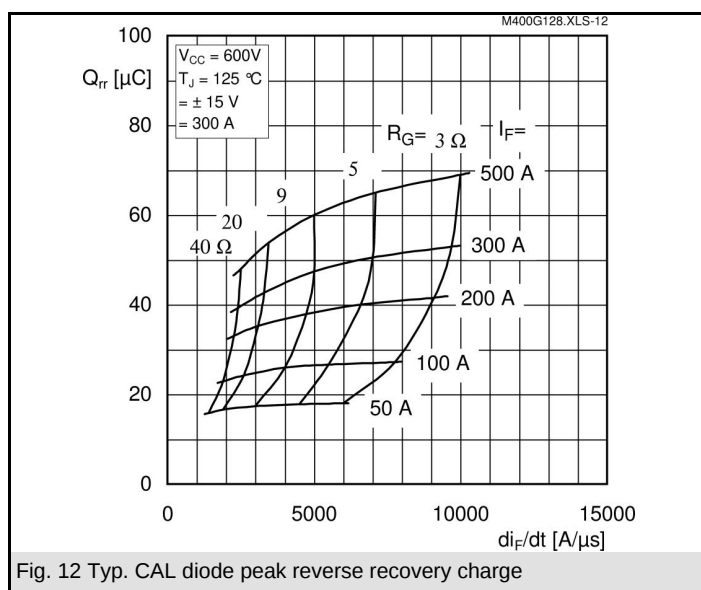
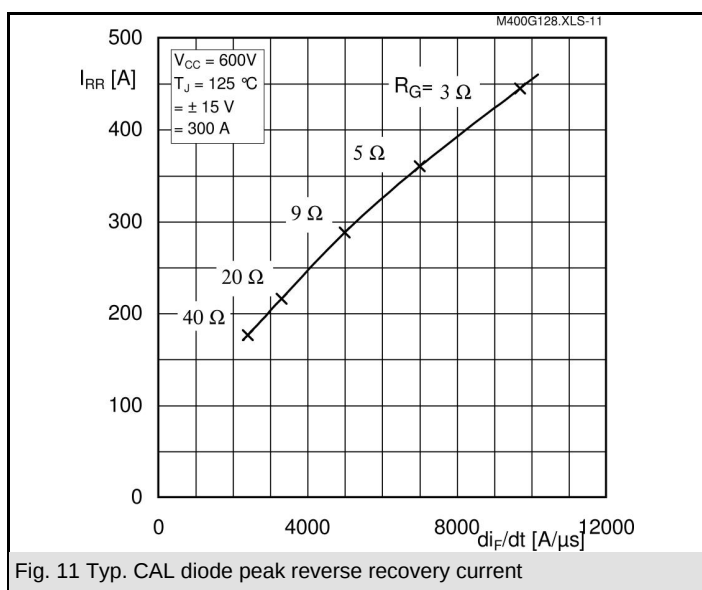
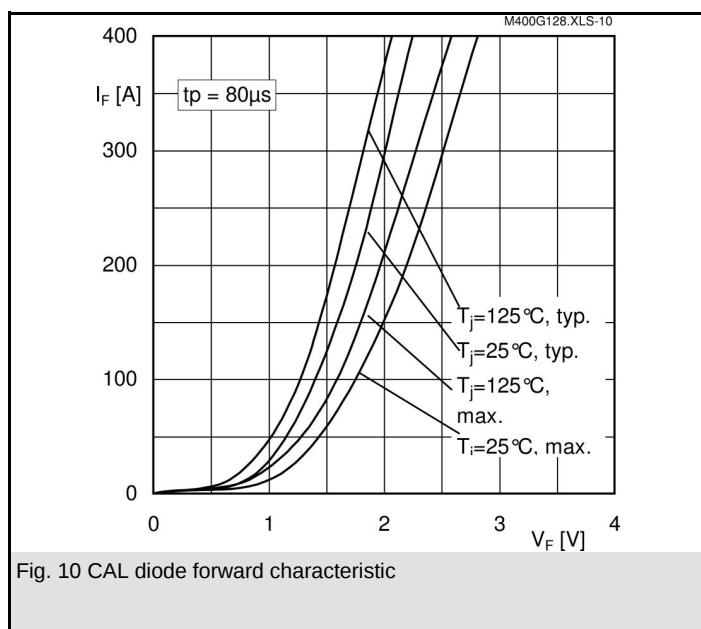
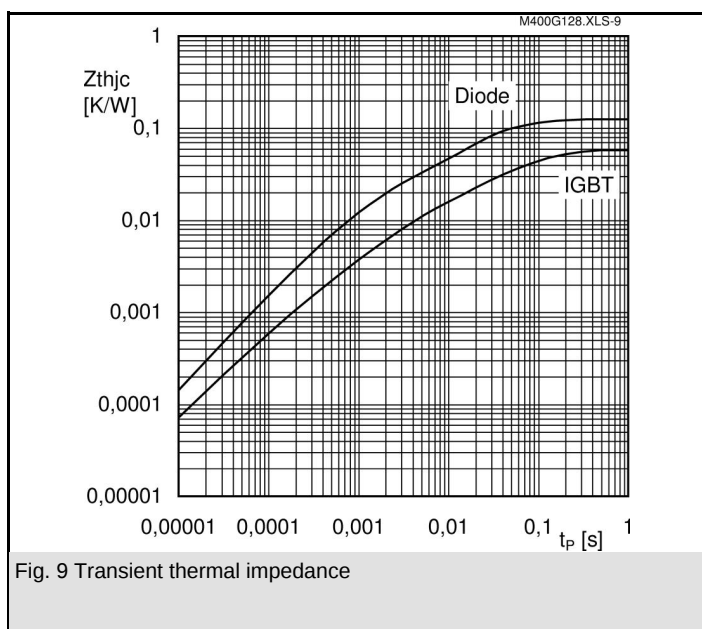
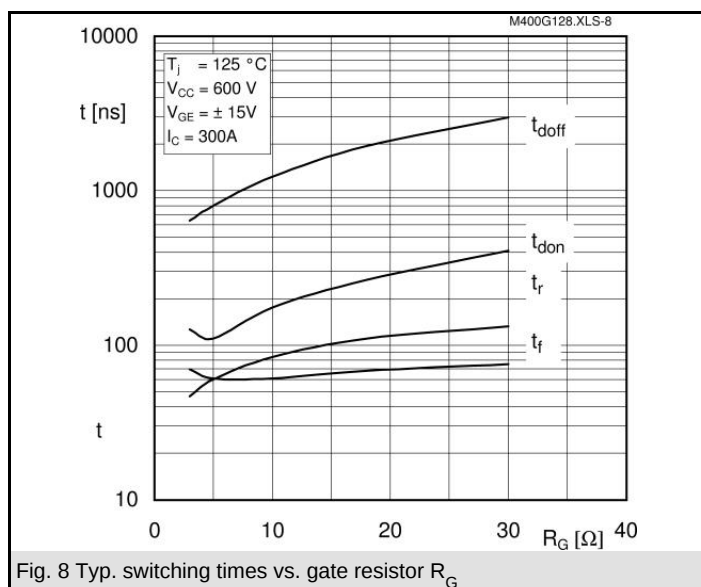
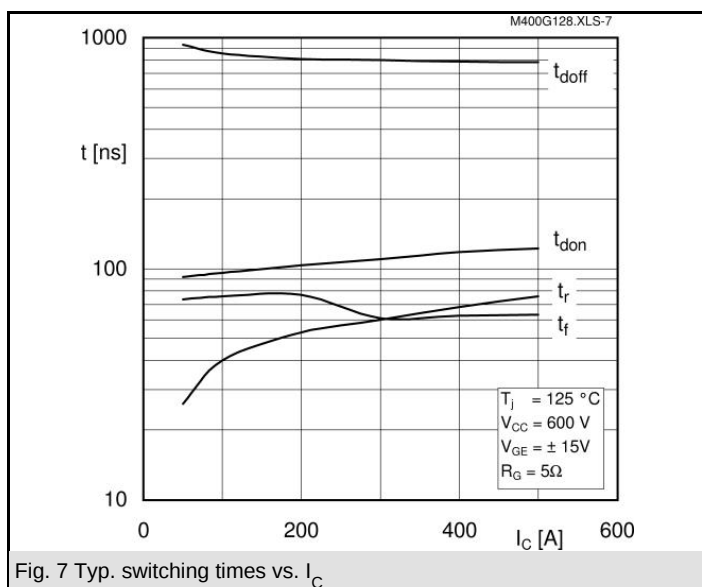
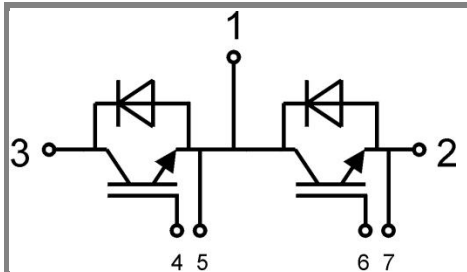


Fig. 6 Typ. gate charge characteristic



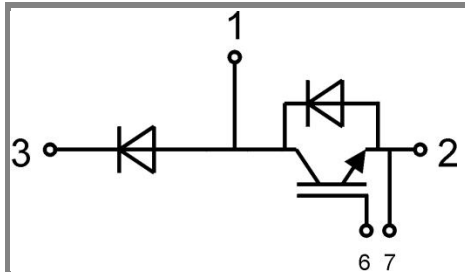


Case D 56



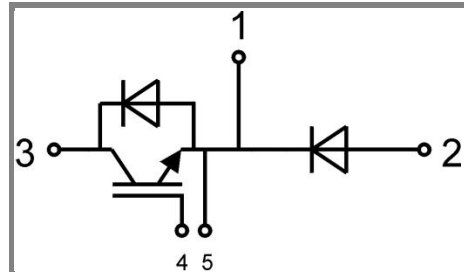
GB

Case D 56



GAL

Case D 57



GAR

Case D 58