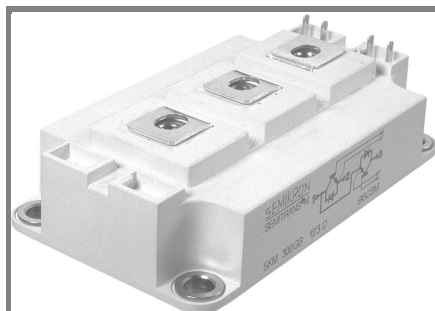




SEMITRANS™ 3

SPT IGBT Module

SKM 400GB128D

SKM 400GAL128D

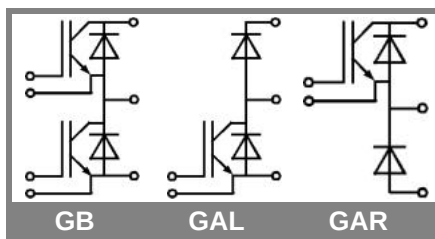
SKM 400GAR128D

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



Absolute Maximum Ratings		T _c = 25 °C, unless otherwise specified			
Symbol	Conditions	Values			Units
IGBT					
V _{CES}		1200			V
I _C	T _c = 25 (80) °C	565 (400)			A
I _{CRM}	t _p = 1 ms	600			A
V _{GES}		± 20			V
T _{vj} , (T _{stg})	T _{OPERATION} ≤ T _{stg}	- 40 ... + 150 (125)			°C
V _{isol}	AC, 1 min.	4000			V
Inverse diode					
I _F	T _c = 25 (80) °C	390 (260)			A
I _{FRM}	t _p = 1 ms	600			A
I _{FSM}	t _p = 10 ms; sin.; T _j = 150 °C	2900			A
Freewheeling diode					
I _F	T _c = 25 (80) °C	390 (260)			A
I _{FRM}	t _p = 1 ms	600			A
I _{FSM}	t _p = 10 ms; sin; T _j = 150 °C	2900			A
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 _{CE} = V _{CES} , T _j = 25 () °C		0,2	0,6	mA
V _{CE(TO)}	T _j = 25 () °C		1 (0,9)	1,15 (1,05)	V
r _{CE}	V _{GE} = 15 V, T _j = 25 (125) °C		3 (4)	4 (5)	mΩ
V _{CE(sat)}	I _{Cnom} = 300 A, V _{GE} = 15 V, chip level		1,9 (2,1)	2,35 (2,55)	V
C _{ies}	under following conditions		26		nF
C _{oes}	V _{GE} = 0, V _{CE} = 25 V, f = 1 MHz		3		nF
C _{res}			3		nF
L _{CE}				20	nH
R _{CC'+EE'}	res., terminal-chip T _c = 25 (125) °C		0,35 (0,5)		mΩ
t _{d(on)}	V _{CC} = 600 V, I _{Cnom} = 300 A		110		ns
t _r	R _{Gon} = R _{Goff} = 4,7 Ω, T _j = 125 °C		60		ns
t _{d(off)}	V _{GE} = ± 15 V		800		ns
t _f			60		ns
E _{on} (E _{off})			32 (31)		mJ
Inverse diode					
V _F = V _{EC}	I _{Fnom} = 300 A; V _{GE} = 0 V; T _j = 25 (125) °C		2 (1,8)	2,5	V
V _(TO)	T _j = 25 (125) °C		1,1	1,2	V
r _T	T _j = 25 (125) °C		3	4,3	mΩ
I _{RRM}	I _{Fnom} = 300 A; T _j = 125 () °C		176		A
Q _{rr}	di/dt = 2400 A/μs		40		μC
E _{rr}	V _{GE} = 0 V		16		mJ
FWD					
V _F = V _{EC}	I _F = 300 A; V _{GE} = 0 V, T _j = 25 (125) °C		2 (1,8)	2,5	V
V _(TO)	T _j = 25 (125) °C		1,1	1,2	V
r _T	T _j = 25 (125) °C		3	4,3	mΩ
I _{RRM}	I _F = 300 A; T _j = 125 () °C		176		A
Q _{rr}	di/dt = 0 A/μs		40		μC
E _{rr}	V _{GE} = 0 V		16		mJ
Thermal characteristics					
R _{th(j-c)}	per IGBT			0,055	K/W
R _{th(j-c)D}	per Inverse Diode			0,125	K/W
R _{th(c-s)}	per module			0,038	K/W
Mechanical data					
M _s	to heatsink M6	3		5	Nm
M _t	to terminals M6	2,5		5	Nm
w				325	g

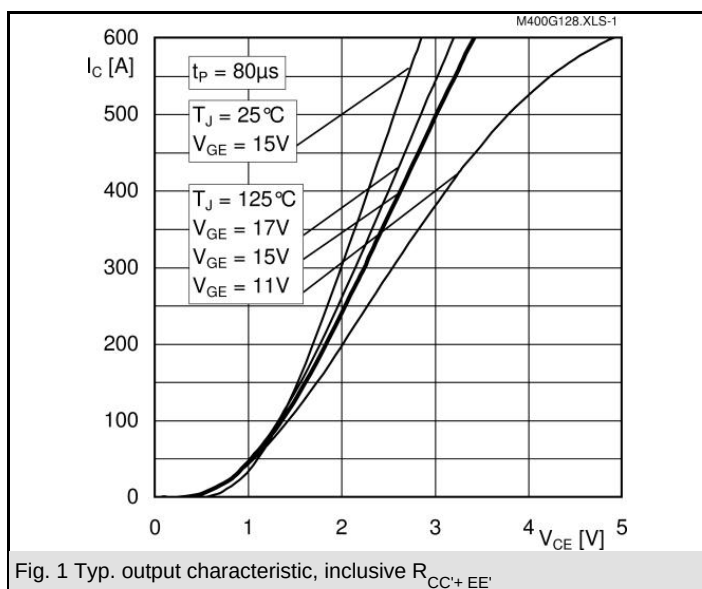


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

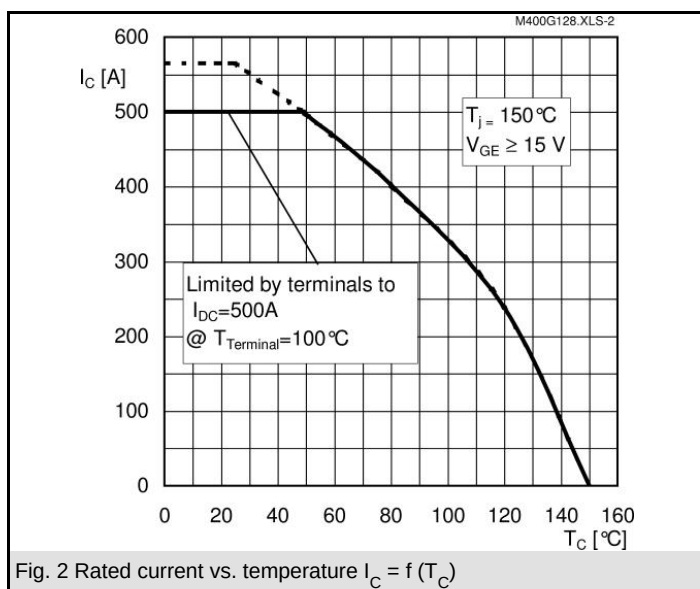


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

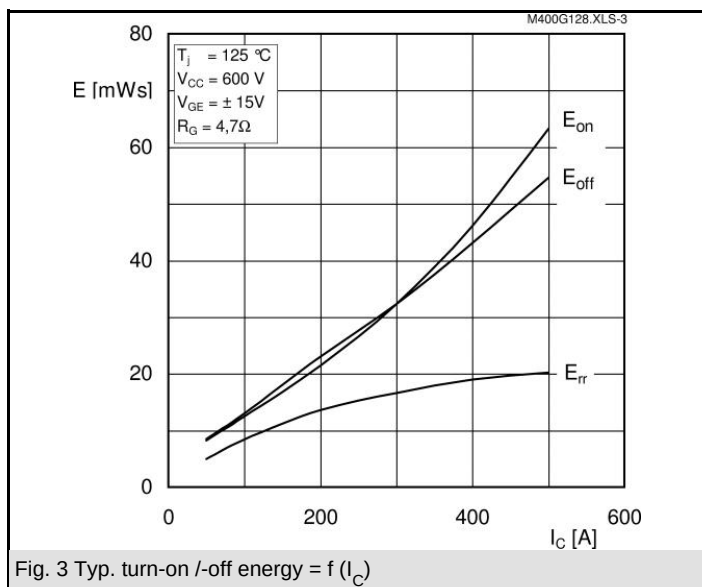


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

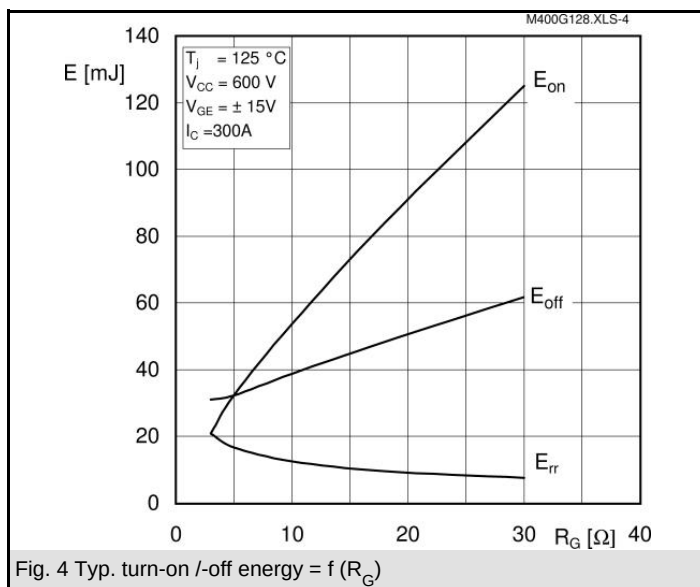


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

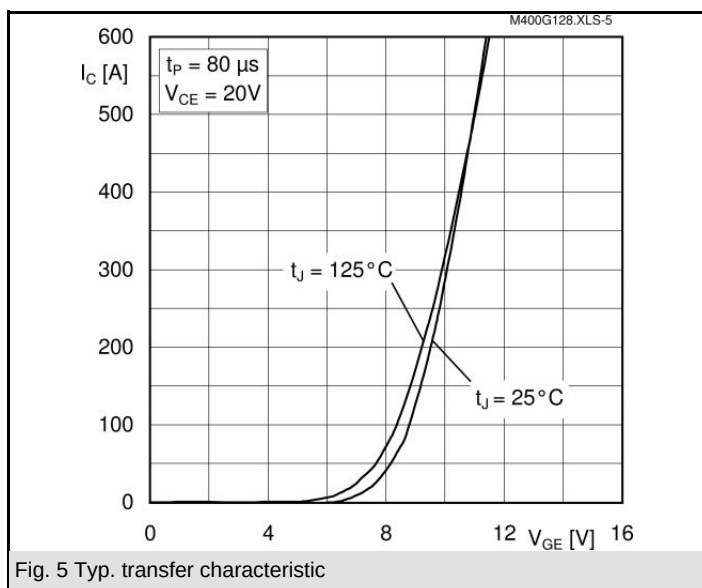


Fig. 5 Typ. transfer characteristic

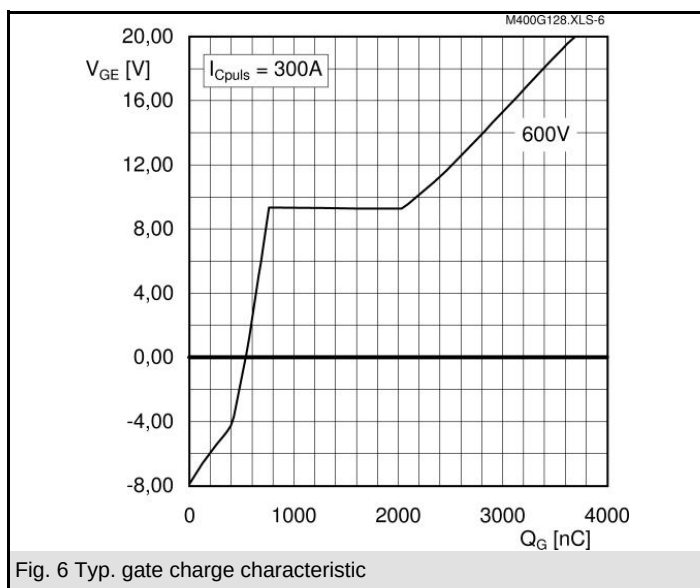
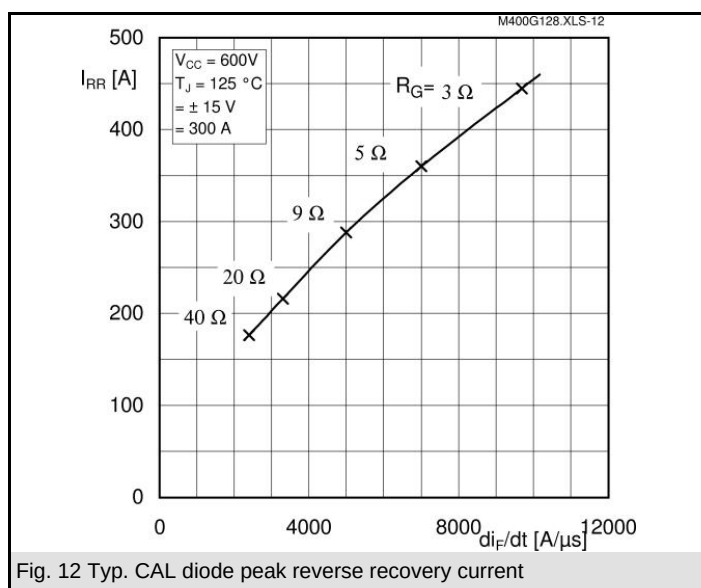
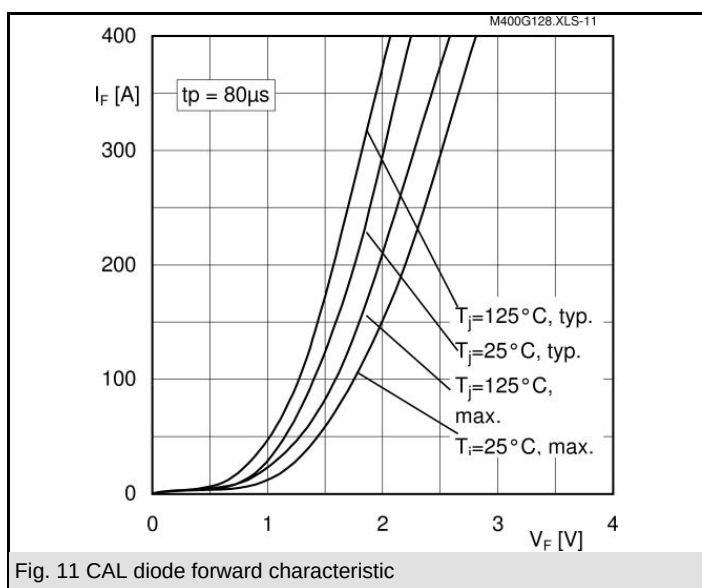
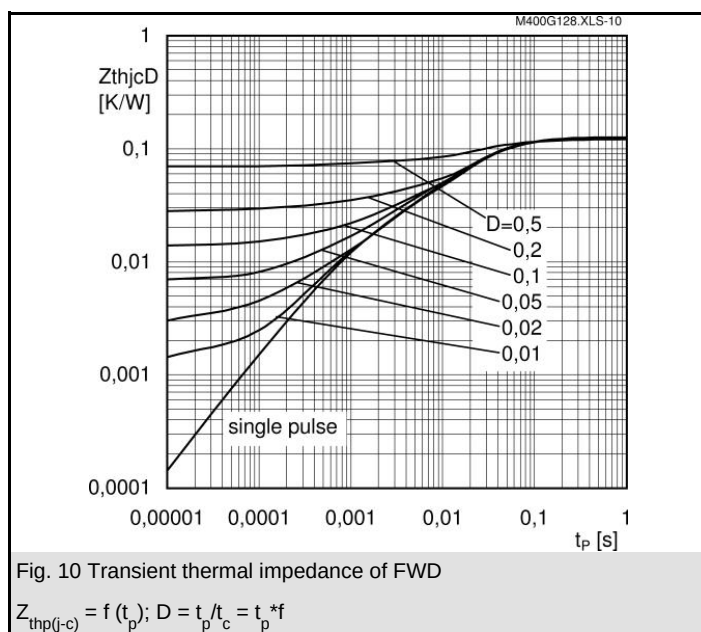
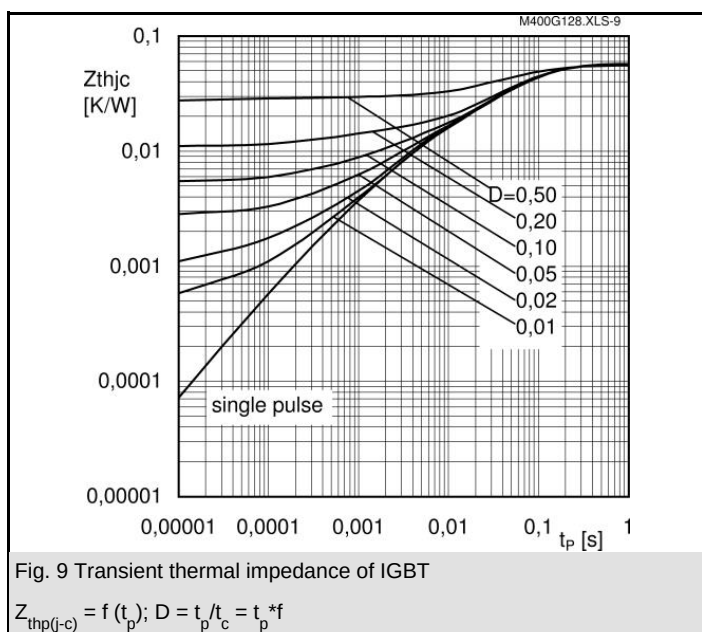
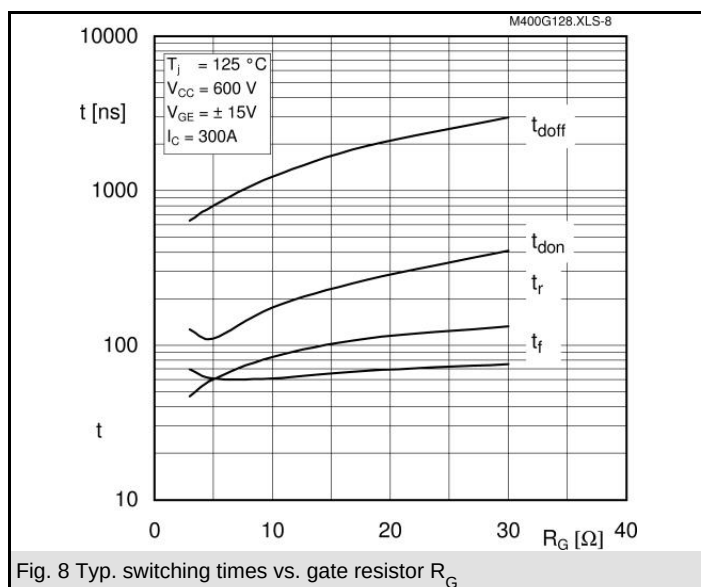
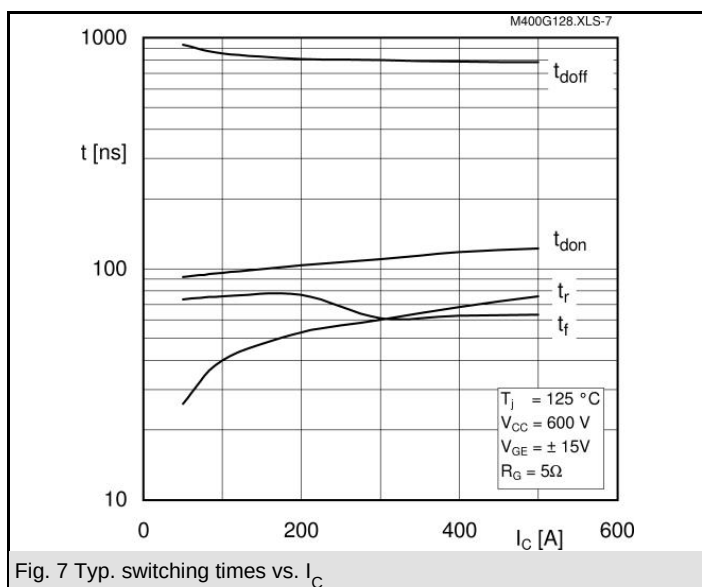
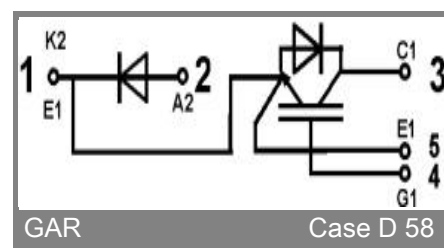
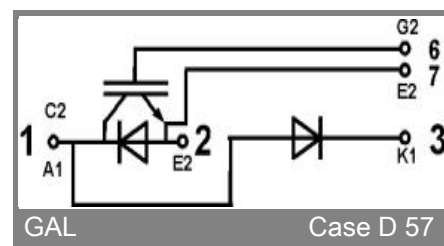
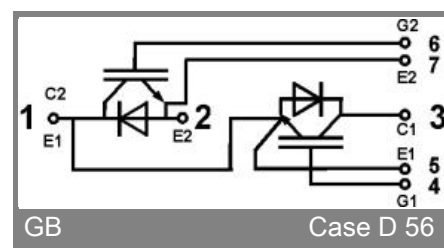
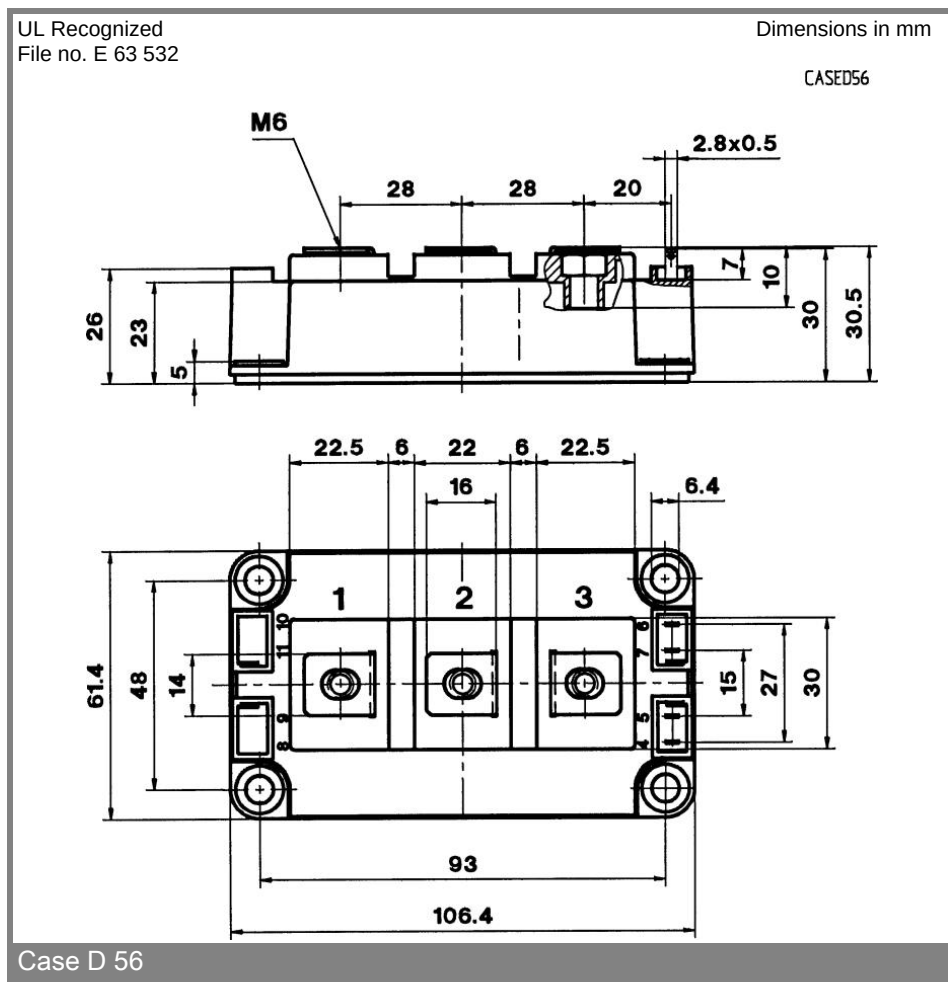
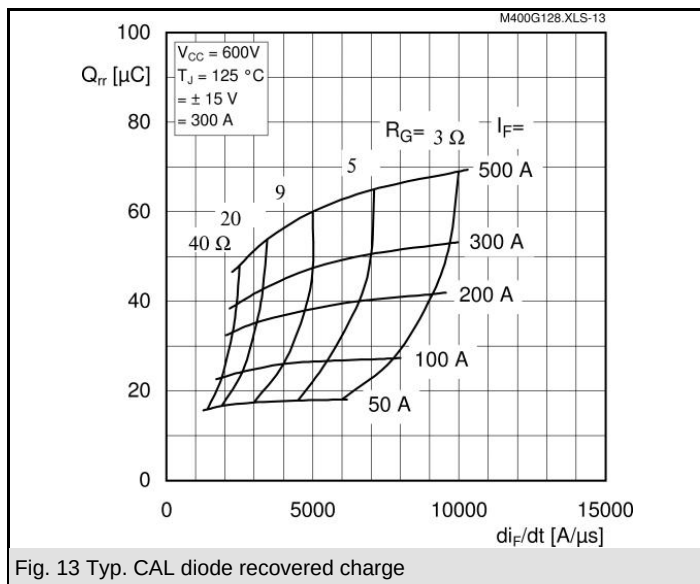


Fig. 6 Typ. gate charge characteristic





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.