



SEMITRANS™ 4

Low Loss IGBT Modules

SKM 500GA124D

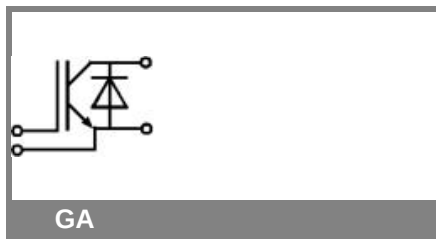
Preliminary Data

Features

- MOS input (voltage controlled)
- N channel, homogeneous Si-structure (NPT-IGBT)
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Fast & soft invese CAL diodes
- Isolated copper baseplate using DCB Direct Copper Bonding Technology without hard mould
- Large clearance (9 mm) and creepage distances (13 mm)

Typical Applications

- Switched mode power supplies
- Three phase inverters for AC motor speed control
- Pulse frequencies also above 10 kHz



Absolute Maximum Ratings		$T_c = 25\text{ °C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1200	V
I_C	$T_c = 25\text{ (80) °C}$	700 (500)	A
I_{CRM}	$t_p = 1\text{ ms}$	800	A
V_{GES}		± 20	V
T_{vj} (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	°C
V_{isol}	AC, 1 min.	2500	V
Inverse diode			
I_F	$T_c = 25\text{ (80) °C}$	500 (350)	A
I_{FRM}	$t_p = 1\text{ ms}$	800	A
I_{FSM}	$t_p = 10\text{ ms}$; sin.; $T_j = 150\text{ °C}$	3600	A

Characteristics		$T_c = 25\text{ °C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 16\text{ mA}$	4,5	5,5	6,5	V
I_{CES}	$V_{GE} = 0$, $V_{CE} = V_{CES}$, $T_j = 25\text{ (125) °C}$		0,1	0,3	mA
$V_{CE(TO)}$	$T_j = 25\text{ (125) °C}$		1,1 (1,1)	1,25 (1,25)	V
r_{CE}	$V_{GE} = 15\text{ V}$, $T_j = 25\text{ (125) °C}$		2,5 (3,25)	3 (4)	mΩ
$V_{CE(sat)}$	$I_{Cnom} = 400\text{ A}$, $V_{GE} = 15\text{ V}$, chip level		2,1 (2,4)	2,45 (2,85)	V
C_{ies}	under following conditions		26	40	nF
C_{oes}	$V_{GE} = 0$, $V_{CE} = 25\text{ V}$, $f = 1\text{ MHz}$		4	5,2	nF
C_{res}			2	2,6	nF
L_{CE}				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25\text{ (125) °C}$		0,18 (0,22)		mΩ
$t_{d(on)}$	$V_{CC} = 600\text{ V}$, $I_{Cnom} = 400\text{ A}$		100	600	ns
t_r	$R_{Gon} = R_{Goff} = 3\text{ Ω}$, $T_j = 125\text{ °C}$		75	340	ns
$t_{d(off)}$	$V_{GE} = \pm 15\text{ V}$		660	1100	ns
t_f			82	125	ns
$E_{on} (E_{off})$			39 (57)		mJ
Inverse diode					
$V_F = V_{EC}$	$I_{Fnom} = 400\text{ A}$; $V_{GE} = 0\text{ V}$; $T_j = 25\text{ (125) °C}$		2 (1,8)	2,5	V
$V_{(TO)}$	$T_j = 125\text{ () °C}$			1,2	V
r_T	$T_j = 125\text{ () °C}$			3	mΩ
I_{RRM}	$I_{Fnom} = 400\text{ A}$; $T_j = 25\text{ (125) °C}$		180		A
Q_{rr}	$di/dt = A/\mu s$		52		μC
E_{rr}	$V_{GE} = V$				mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,041	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,09	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, M4				Nm
w				330	g

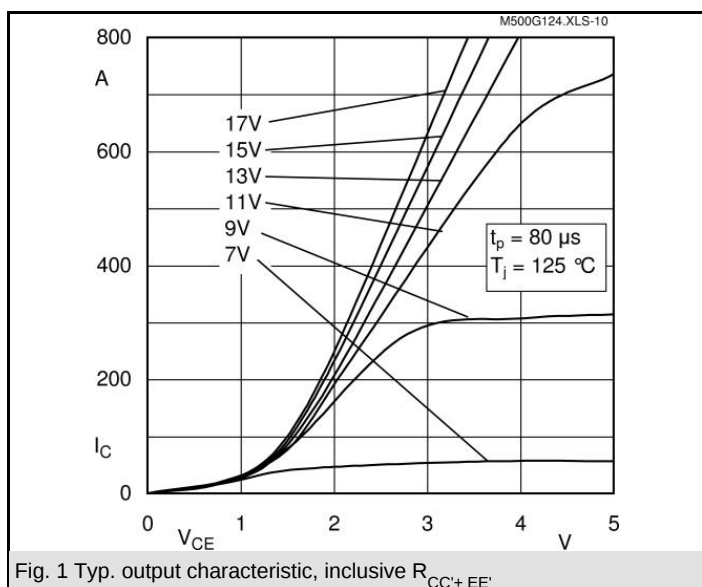


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

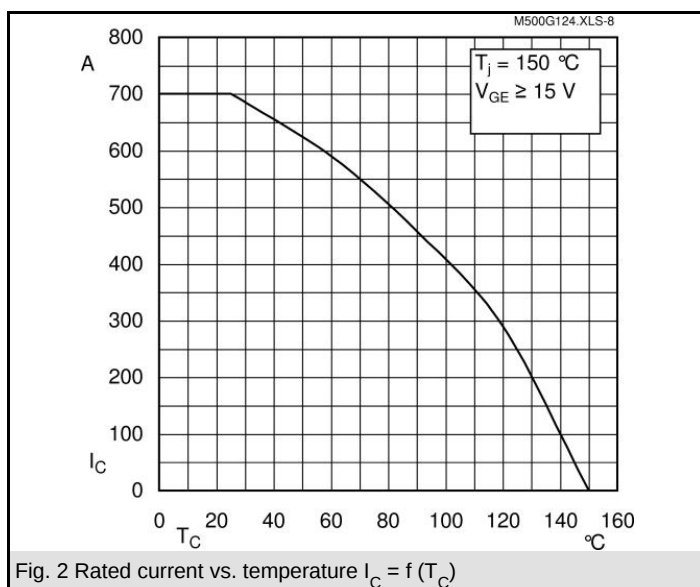


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

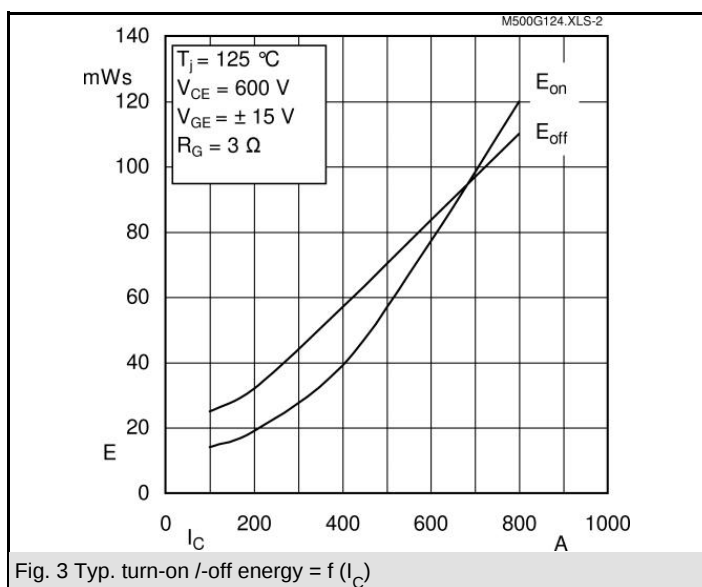


Fig. 3 Typ. turn-on /off energy = $f(I_C)$

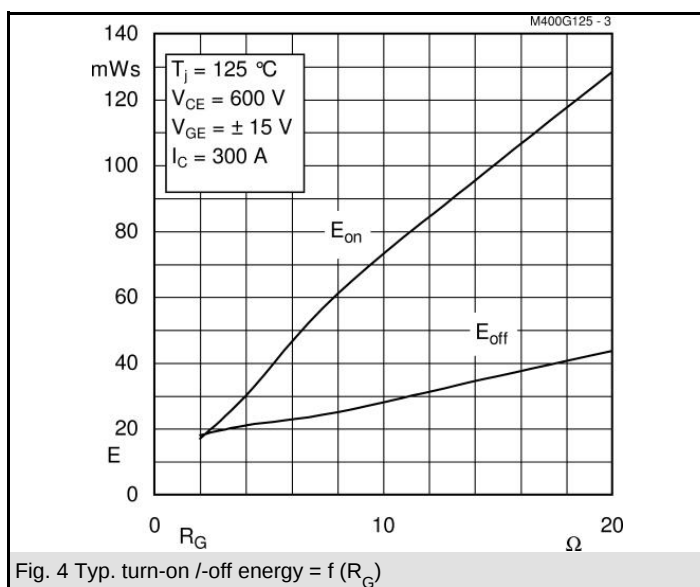


Fig. 4 Typ. turn-on /off energy = $f(R_G)$

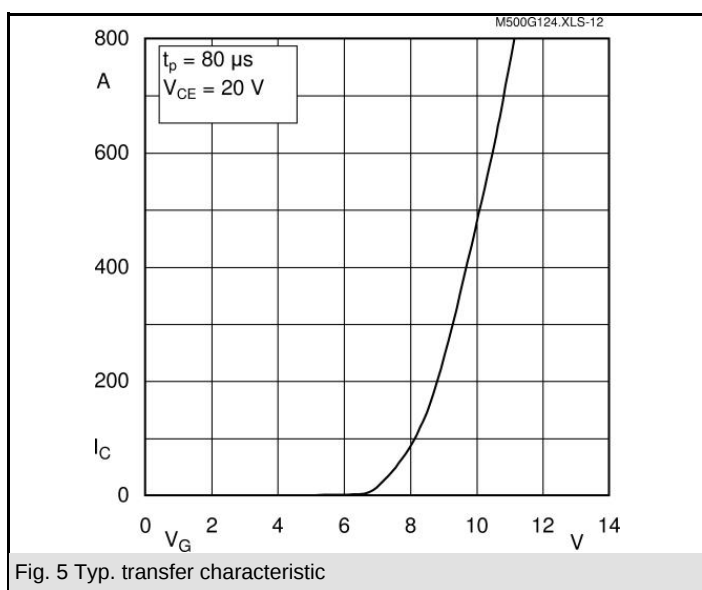


Fig. 5 Typ. transfer characteristic

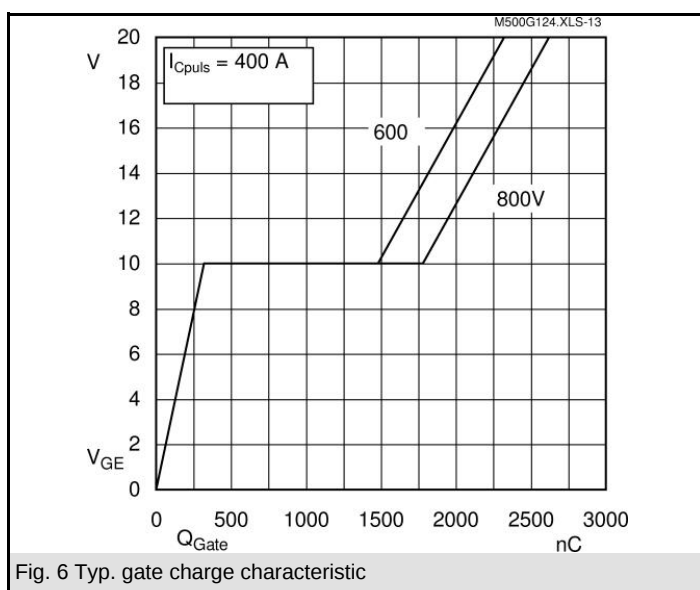
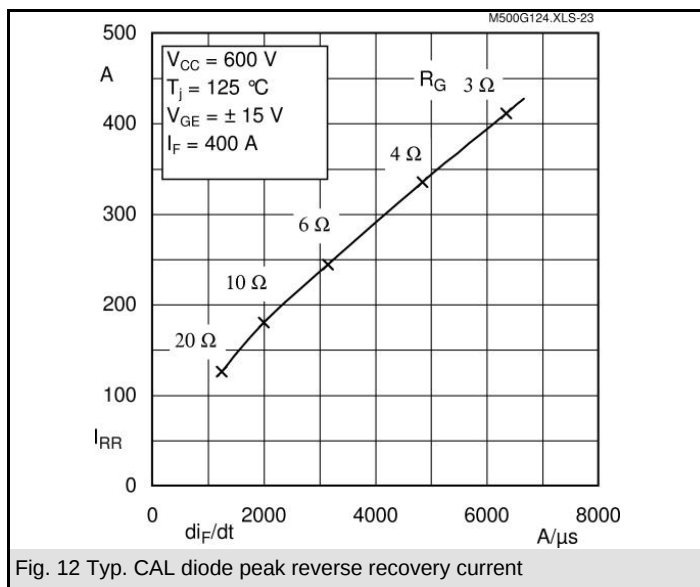
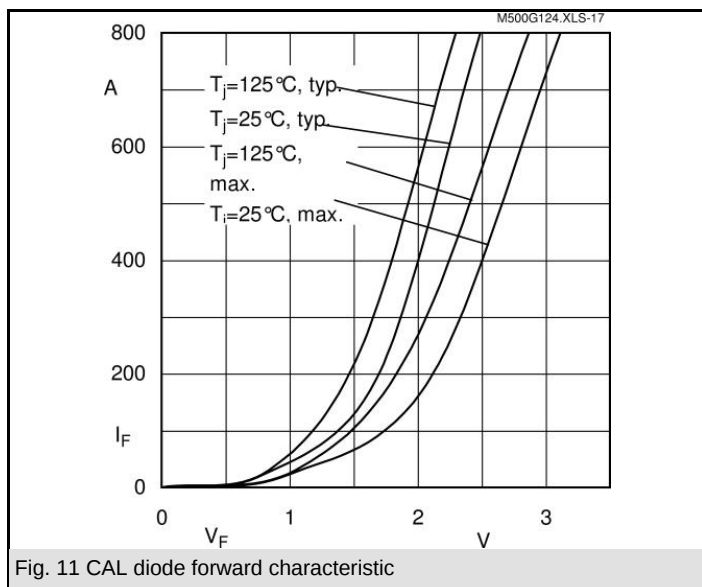
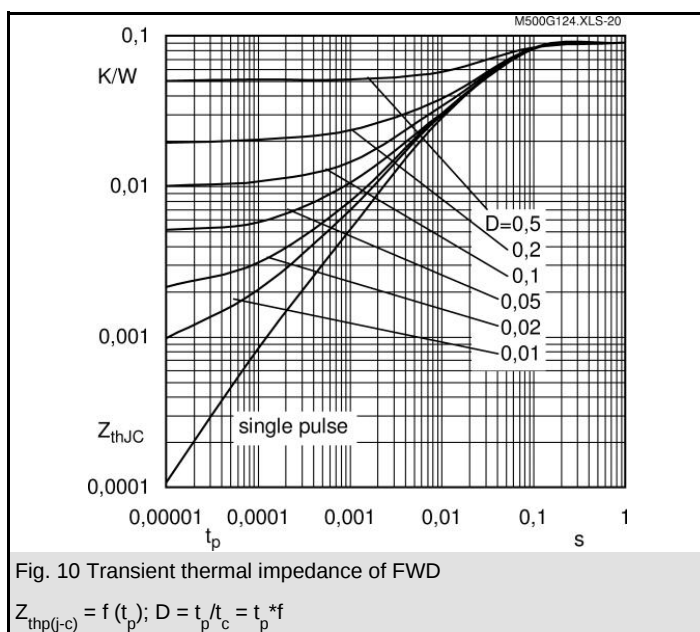
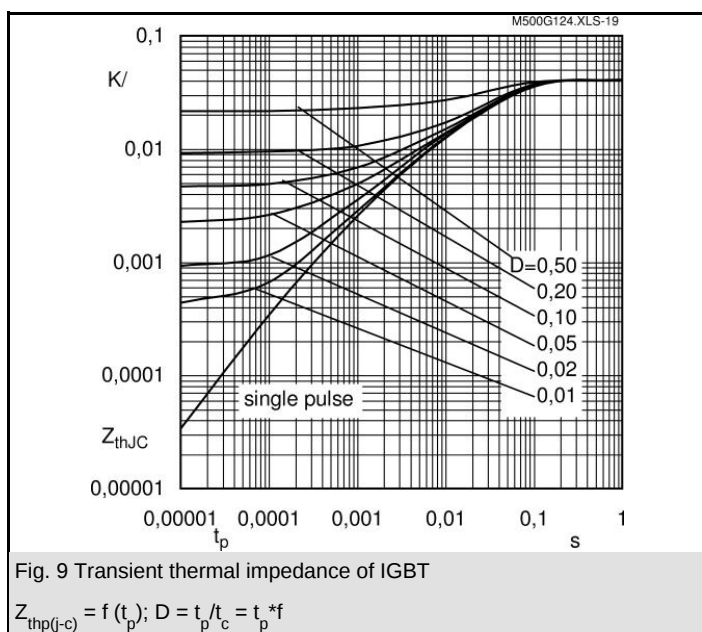
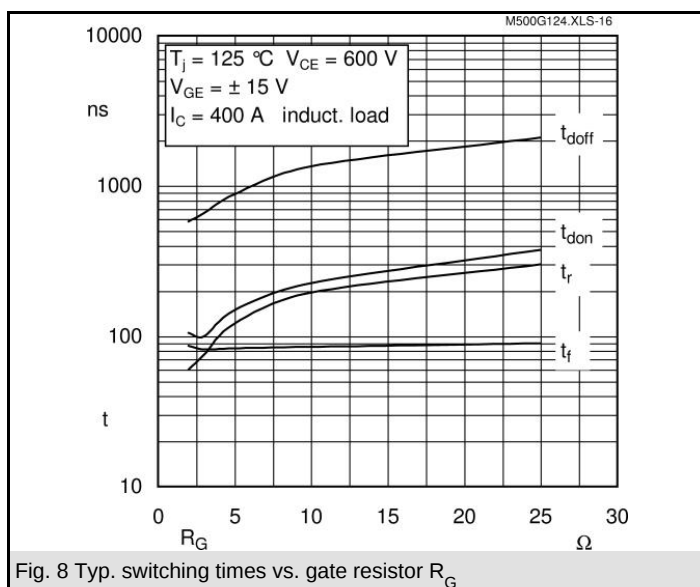
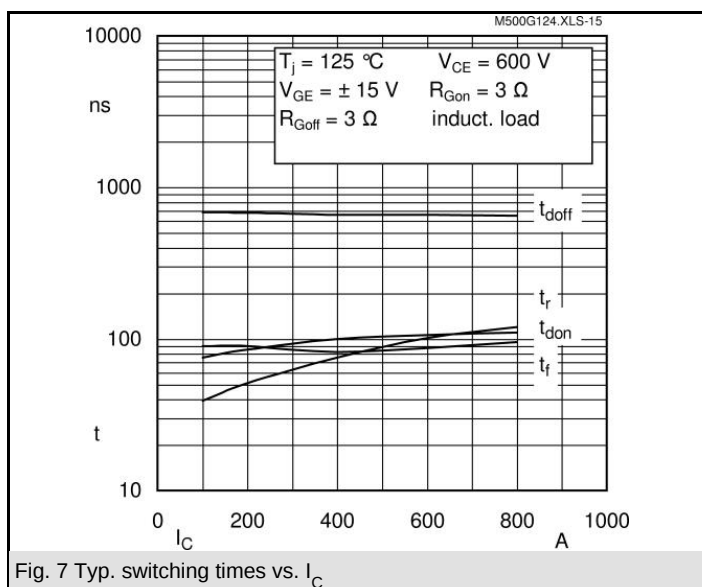
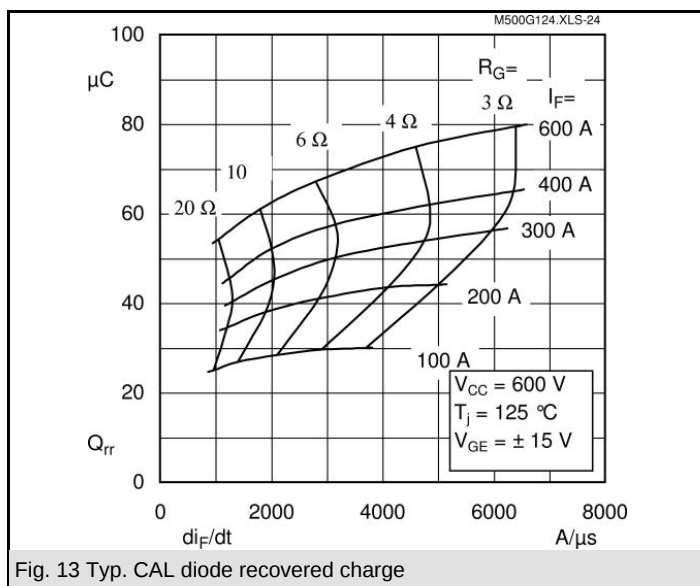


Fig. 6 Typ. gate charge characteristic

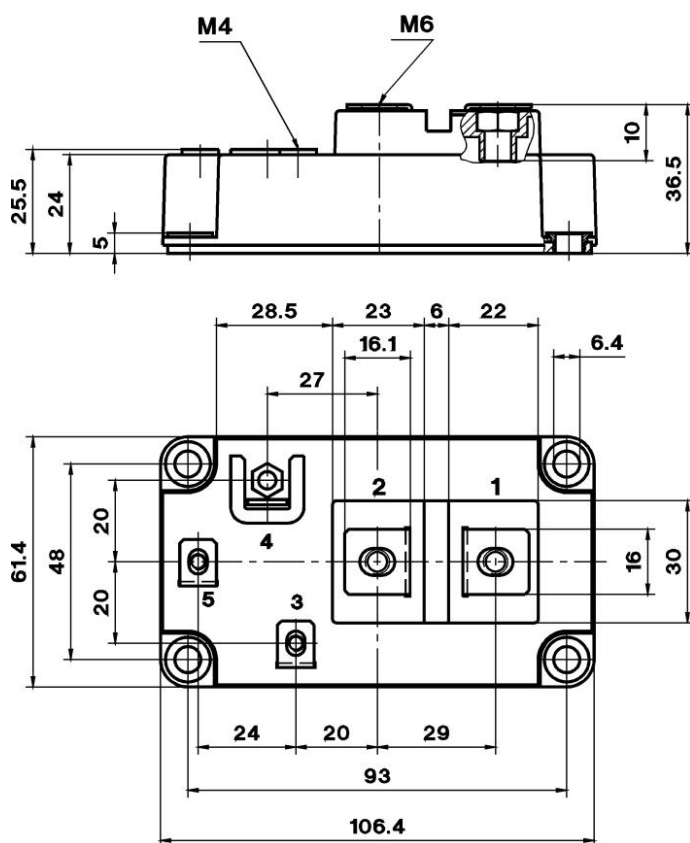




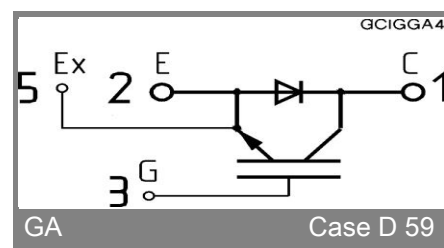
UL Recognized
File no. E 63 532

Dimensions in mm

CASED59



Case D 59



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.