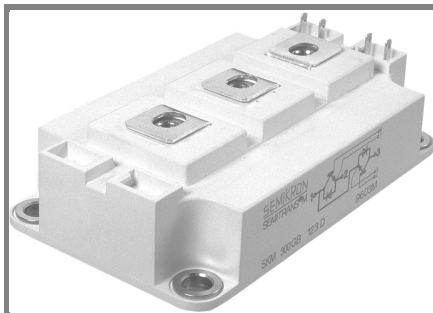


# SKM 400GB128D...



**SEMITRANS™ 3**

## SPT IGBT Module

SKM 400GB128D

SKM 400GAL128D

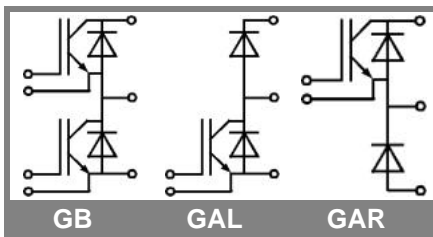
SKM 400GAR128D

### 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



Absolute Maximum Ratings		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified	
Symbol	Conditions	Values	Units
<b>IGBT</b>			
$V_{CES}$		1200	V
$I_c$	$T_c = 25\text{ (80) }^\circ\text{C}$	565 (400)	A
$I_{CRM}$	$t_p = 1\text{ ms}$	600	A
$V_{GES}$		$\pm 20$	V
$T_{vj}$ ( $T_{stg}$ )	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	$^\circ\text{C}$
$V_{isol}$	AC, 1 min.	4000	V

Inverse diode			
Symbol	Conditions	Values	Units
$I_F$	$T_c = 25\text{ (80) }^\circ\text{C}$	390 (260)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	600	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ }^\circ\text{C}$	2900	A

Freewheeling diode			
Symbol	Conditions	Values	Units
$I_F$	$T_c = 25\text{ (80) }^\circ\text{C}$	390 (260)	A
$I_{FRM}$	$t_p = 1\text{ ms}$	600	A
$I_{FSM}$	$t_p = 10\text{ ms}$ ; sin.; $T_j = 150\text{ }^\circ\text{C}$	2900	A

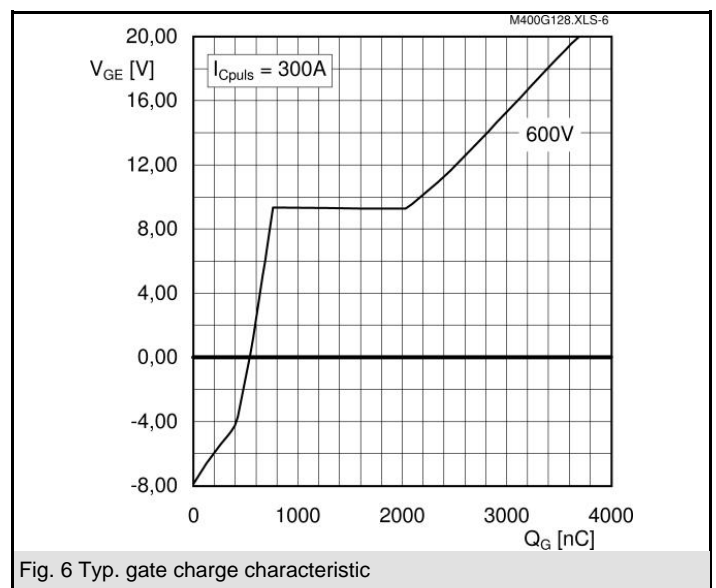
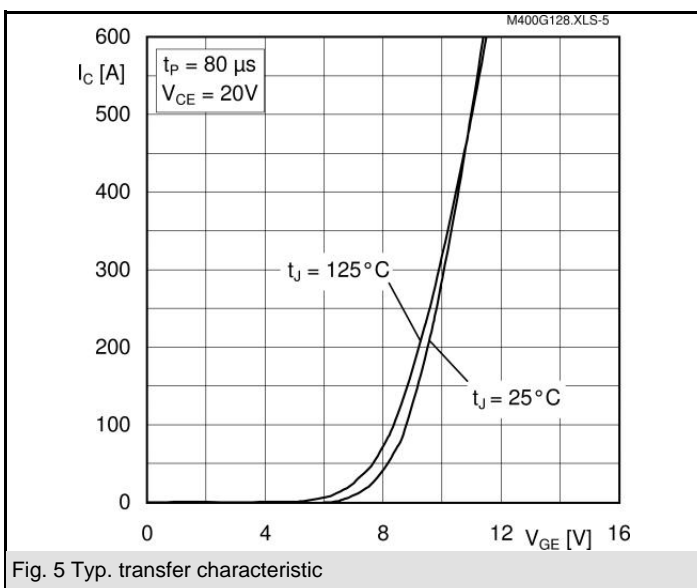
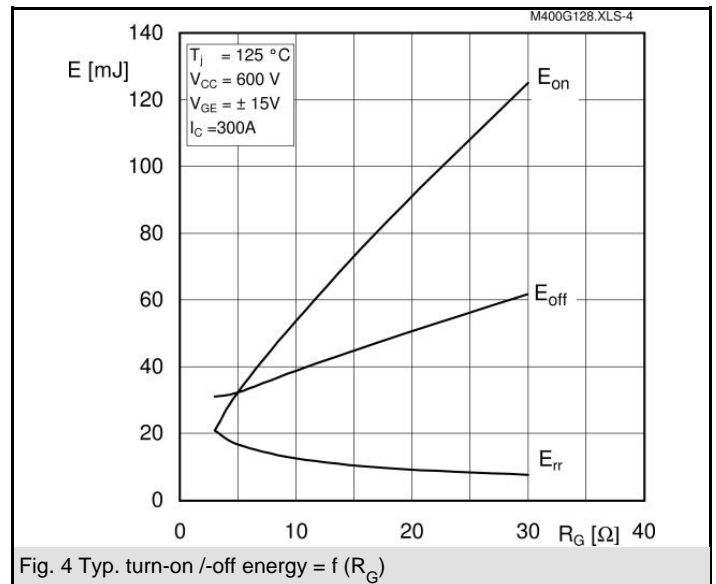
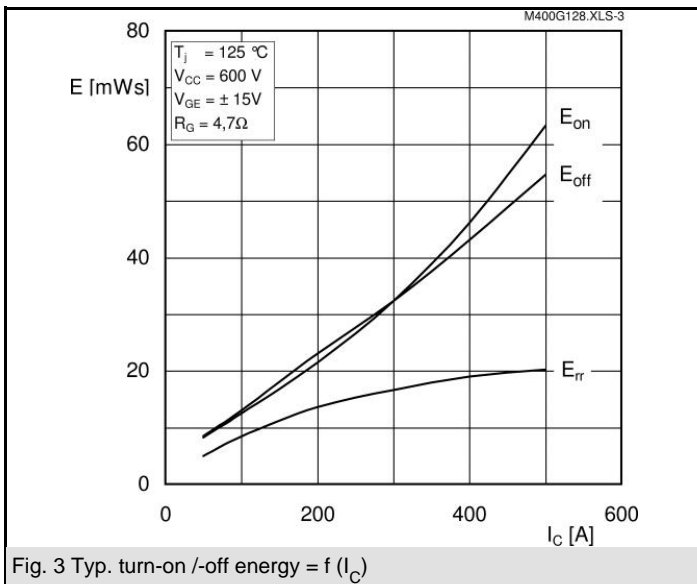
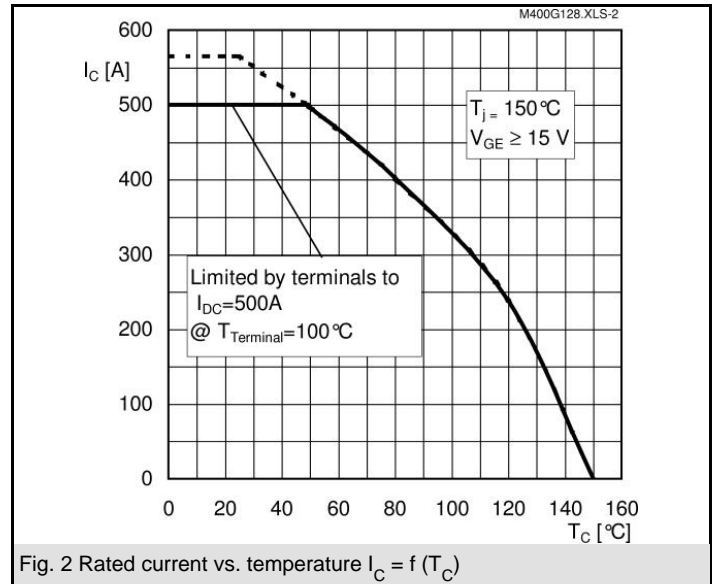
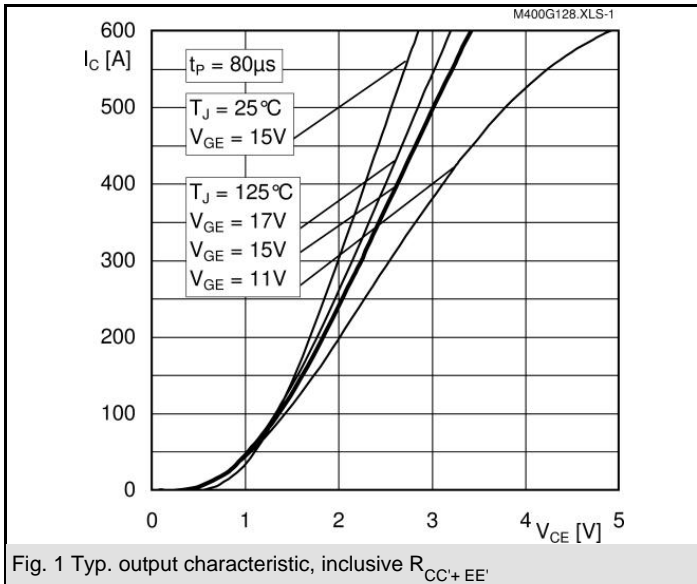
Characteristics		$T_c = 25\text{ }^\circ\text{C}$ , unless otherwise specified			Units
Symbol	Conditions	min.	typ.	max.	Units
<b>IGBT</b>					
$V_{GE(th)}$	$V_{GE} = V_{CE}$ , $I_c = 12\text{ mA}$	4,5	5,5	6,45	V
$I_{CES}$	$V_{GE} = 0$ , $V_{CE} = V_{CES}$ , $T_j = 25\text{ ( ) }^\circ\text{C}$		0,2	0,6	mA
$V_{CE(TO)}$	$T_j = 25\text{ ( ) }^\circ\text{C}$		1 (0,9)	1,15 (1,05)	V
$r_{CE}$	$V_{GE} = 15\text{ V}$ , $T_j = 25\text{ (125) }^\circ\text{C}$		3 (4)	4 (5)	m $\Omega$
$V_{CE(sat)}$	$I_{Cnom} = 300\text{ A}$ , $V_{GE} = 15\text{ V}$ , chip level		1,9 (2,1)	2,35 (2,55)	V
$C_{ies}$	under following conditions		26		nF
$C_{oes}$	$V_{GE} = 0$ , $V_{CE} = 25\text{ V}$ , $f = 1\text{ MHz}$		3		nF
$C_{res}$			3		nF
$L_{CE}$				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25\text{ (125) }^\circ\text{C}$		0,35 (0,5)		m $\Omega$
$t_{d(on)}$	$V_{CC} = 600\text{ V}$ , $I_{Cnom} = 300\text{ A}$		110		ns
$t_r$	$R_{Gon} = R_{Goff} = 4,7\text{ }^\circ\Omega$ , $T_j = 125\text{ }^\circ\text{C}$		60		ns
$t_{d(off)}$	$V_{GE} = \pm 15\text{ V}$		800		ns
$t_f$			60		ns
$E_{on}$ ( $E_{off}$ )			32 (31)		mJ

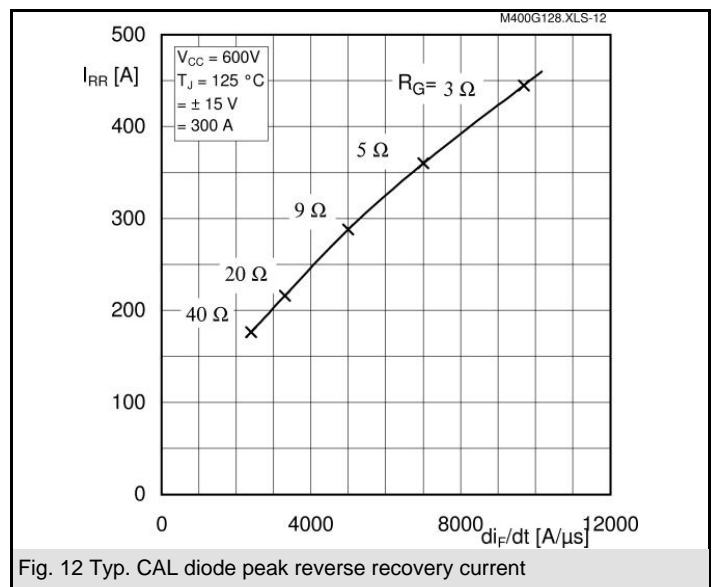
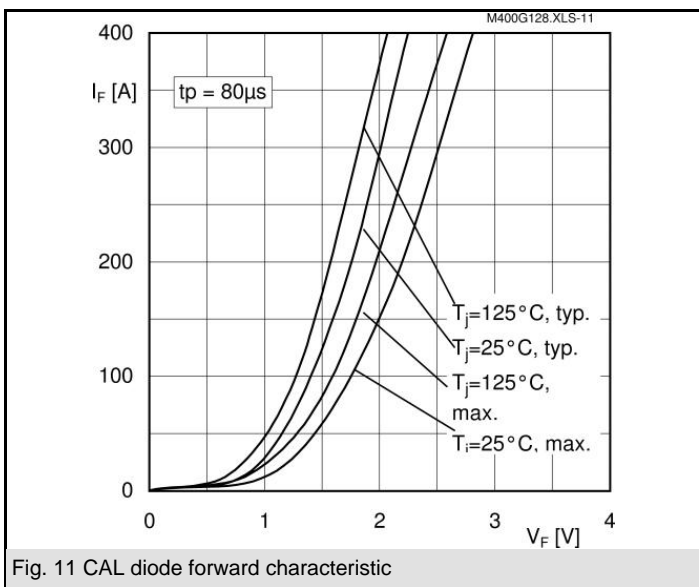
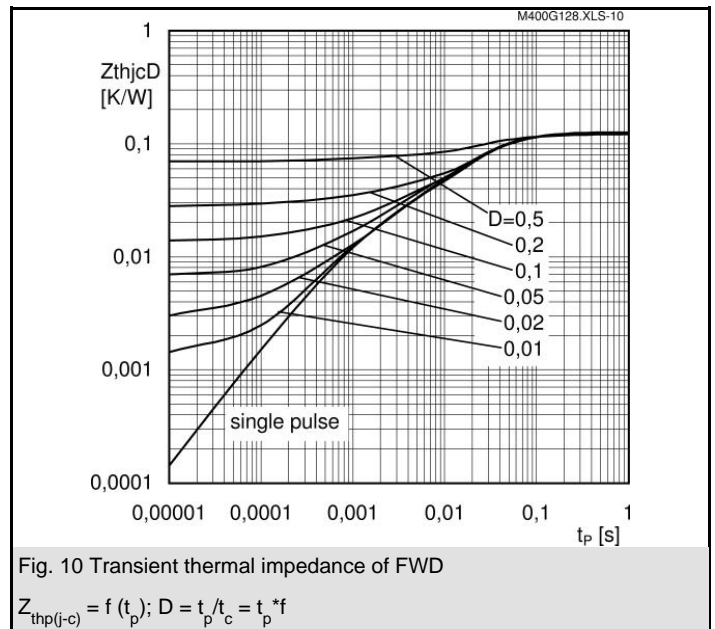
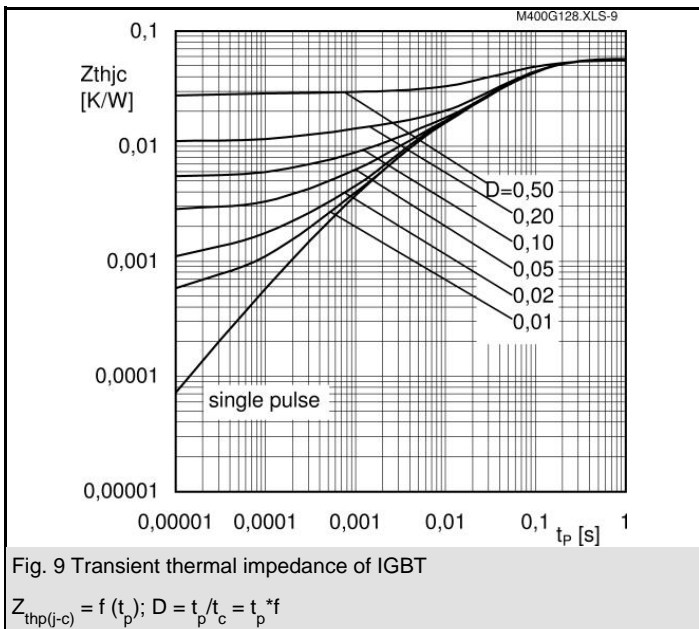
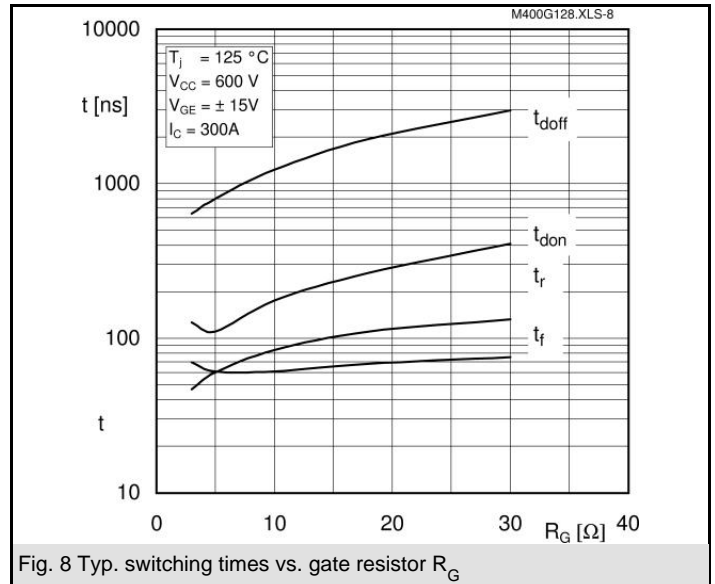
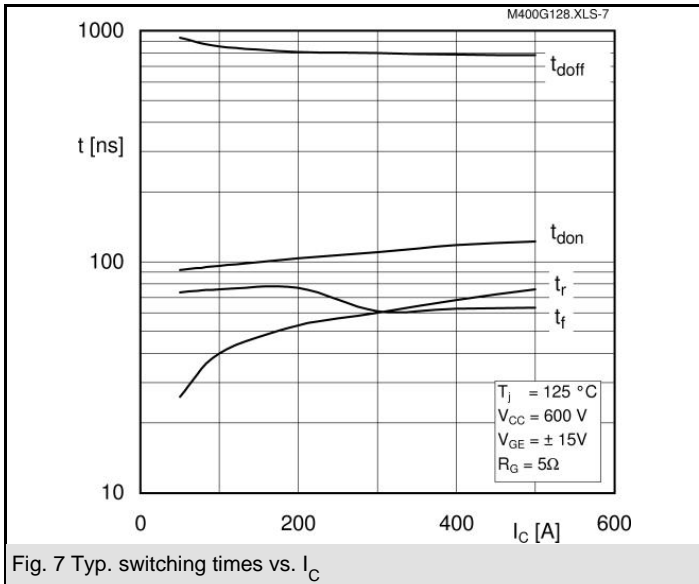
Inverse diode				
Symbol	Conditions	min.	max.	Units
$V_F = V_{EC}$	$I_{Fnom} = 300\text{ A}$ ; $V_{GE} = 0\text{ V}$ ; $T_j = 25\text{ (125) }^\circ\text{C}$	2 (1,8)	2,5	V
$V_{(TO)}$	$T_j = 25\text{ (125) }^\circ\text{C}$	1,1	1,2	V
$r_T$	$T_j = 25\text{ (125) }^\circ\text{C}$	3	4,3	m $\Omega$
$I_{RRM}$	$I_{Fnom} = 300\text{ A}$ ; $T_j = 125\text{ ( ) }^\circ\text{C}$	176		A
$Q_{rr}$	$di/dt = 2400\text{ A}/\mu\text{s}$	40		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0\text{ V}$	16		mJ

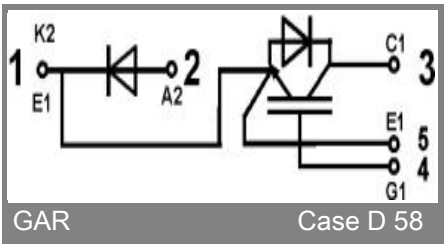
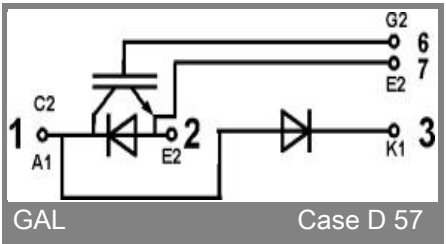
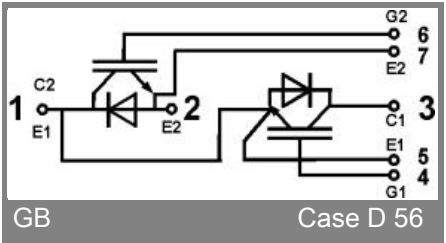
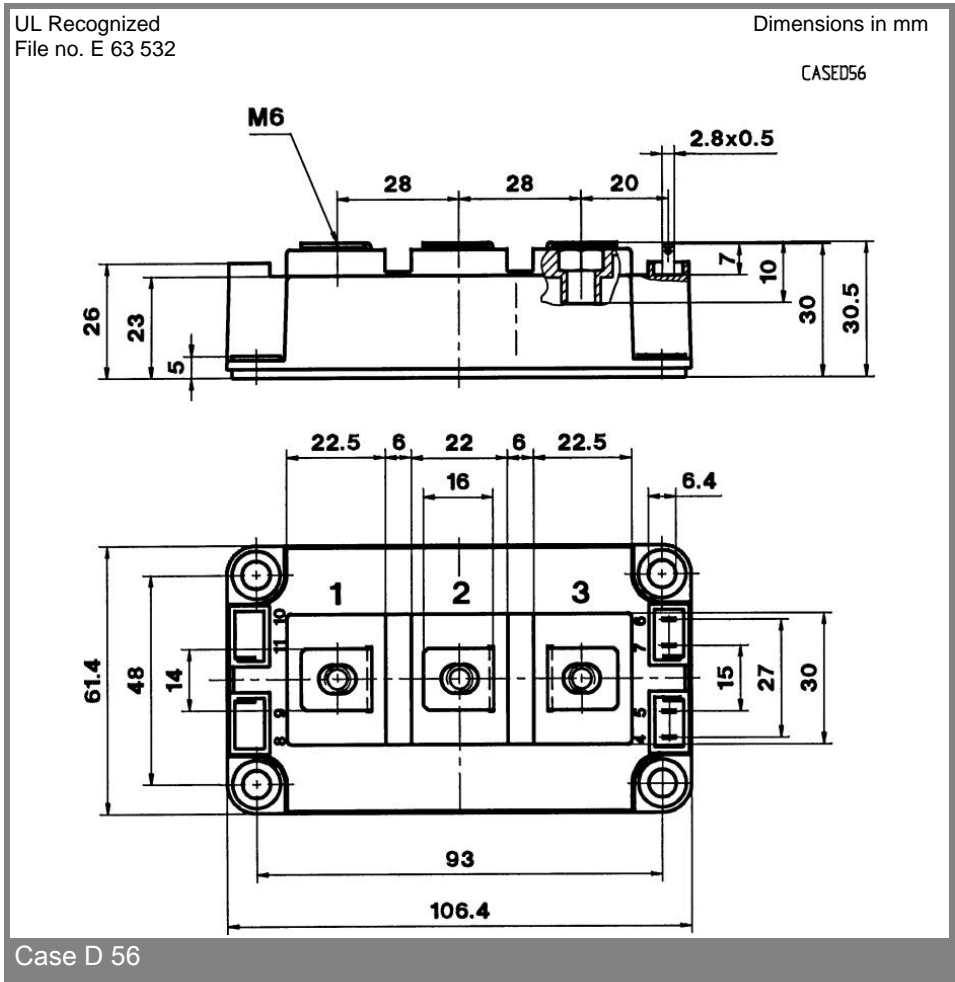
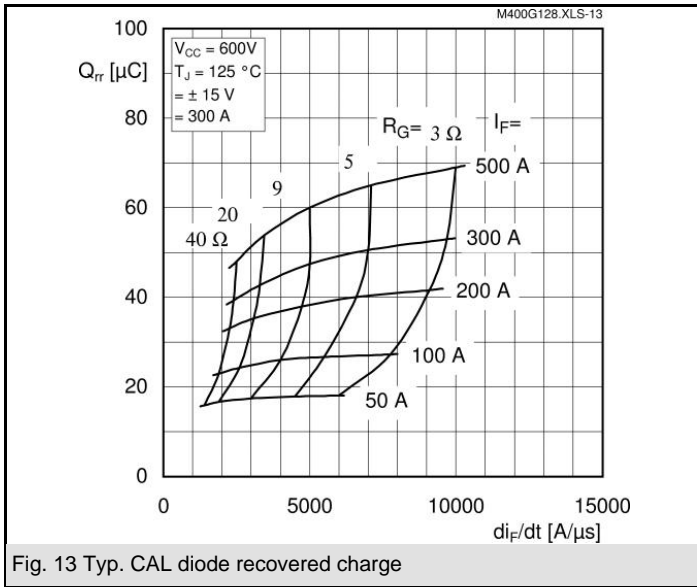
FWD				
Symbol	Conditions	min.	max.	Units
$V_F = V_{EC}$	$I_F = 300\text{ A}$ ; $V_{GE} = 0\text{ V}$ , $T_j = 25\text{ (125) }^\circ\text{C}$	2 (1,8)	2,5	V
$V_{(TO)}$	$T_j = 25\text{ (125) }^\circ\text{C}$	1,1	1,2	V
$r_T$	$T_j = 25\text{ (125) }^\circ\text{C}$	3	4,3	m $\Omega$
$I_{RRM}$	$I_F = 300\text{ A}$ ; $T_j = 125\text{ ( ) }^\circ\text{C}$	176		A
$Q_{rr}$	$di/dt = 0\text{ A}/\mu\text{s}$	40		$\mu\text{C}$
$E_{rr}$	$V_{GE} = 0\text{ V}$	16		mJ

Thermal characteristics			
Symbol	Conditions	Values	Units
$R_{th(j-c)}$	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			
Symbol	Conditions	Values	Units
$M_s$	to heatsink M6	3	Nm
$M_t$	to terminals M6	2,5	Nm
w			325 g







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

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