



SEMITRANS™ 4

IGBT Modules

SKM 400GA173D

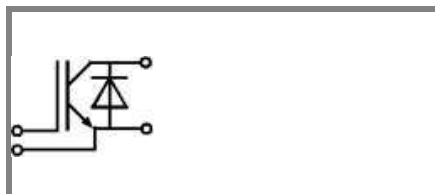
SKM 400GA173D1S

Features

- MOS input (voltage controlled)
- N channel, Homogeneous Si
- Low inductance case
- Very low tail current with low temperature dependence
- High short circuit capability, self limiting to $6 \times I_{Cnom}$
- Latch-up free
- 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

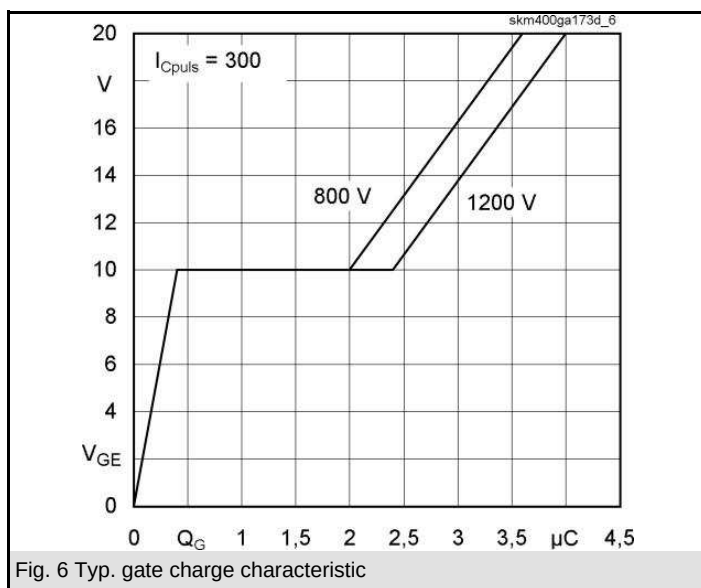
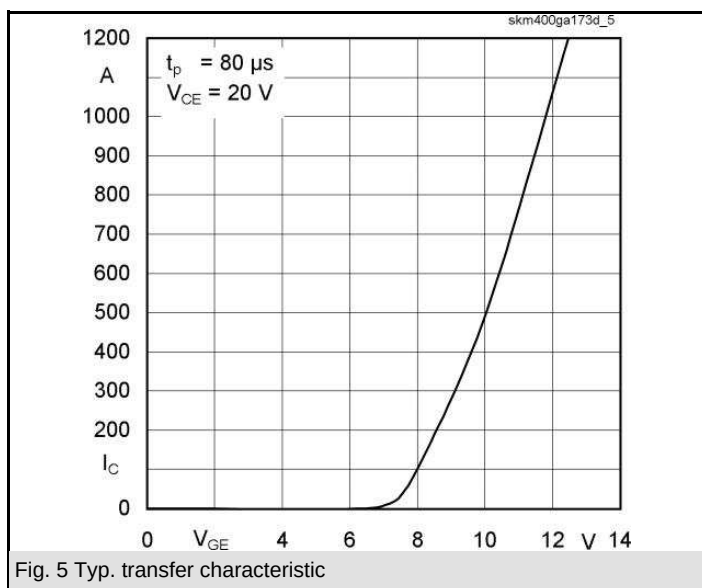
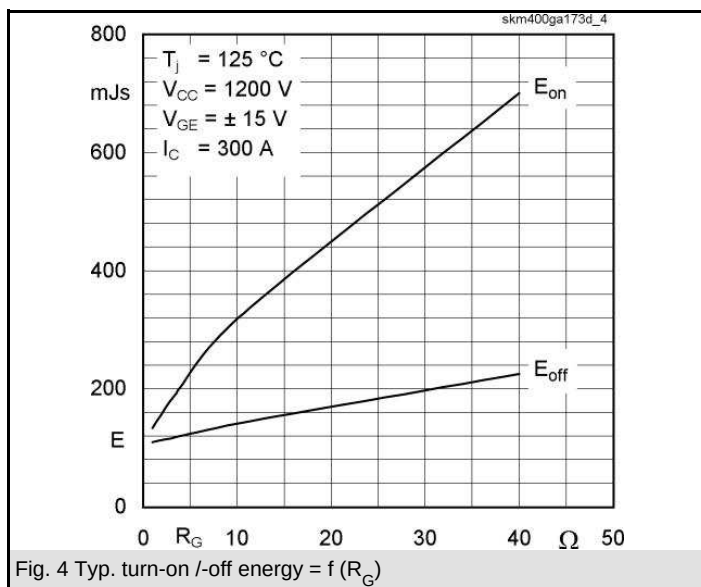
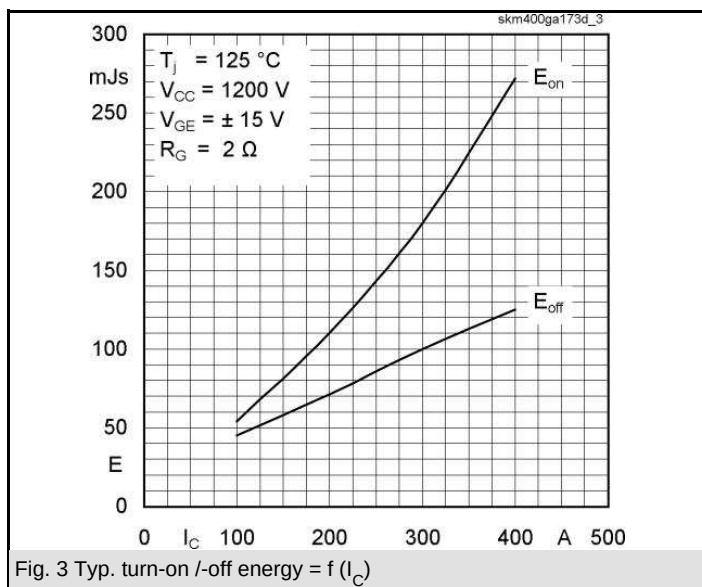
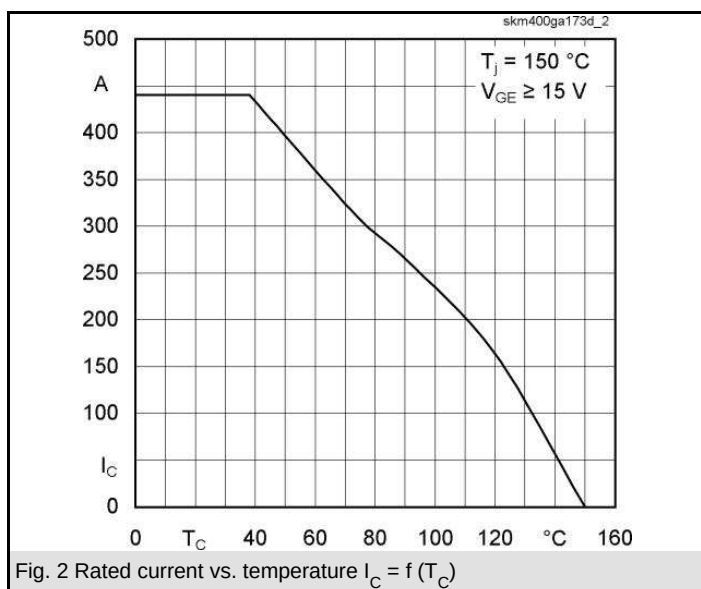
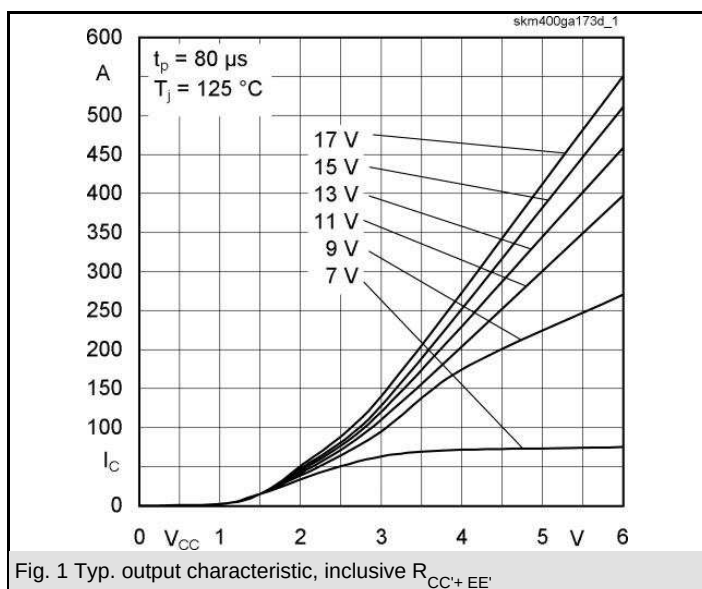
- AC inverter drives on mains 575-750 V_{AC}
- DC bus voltage 750-1200 V_{DC}
- Public transport
- Switching (not for linear use)

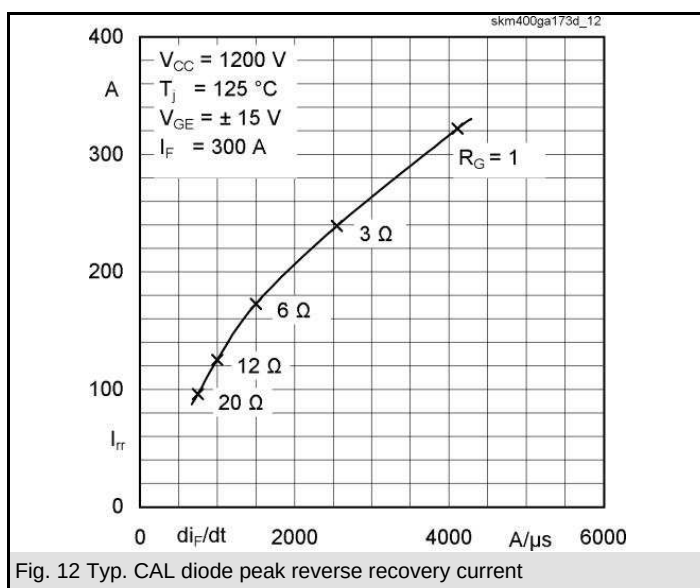
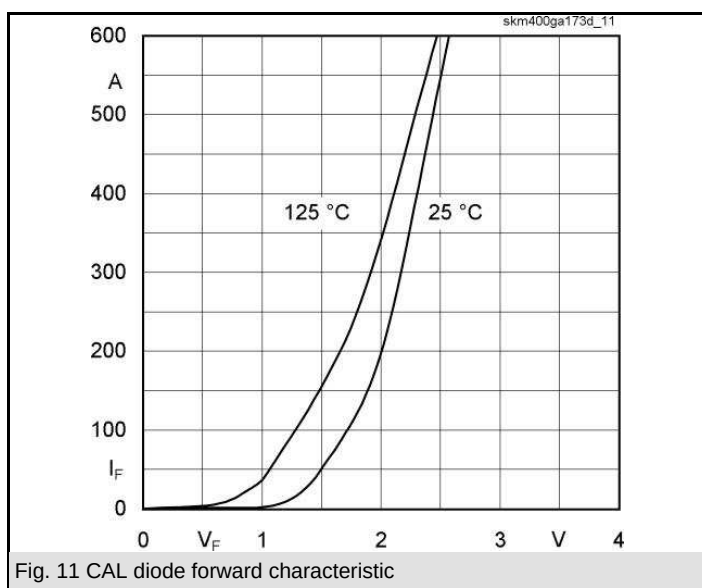
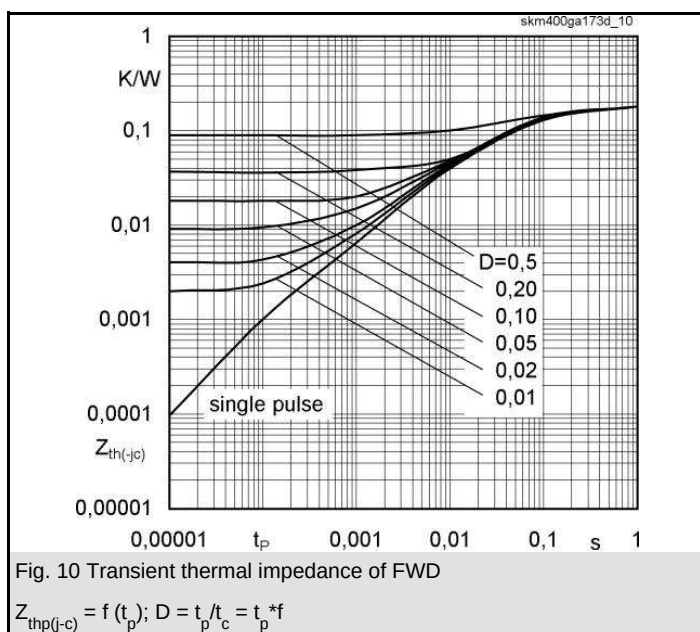
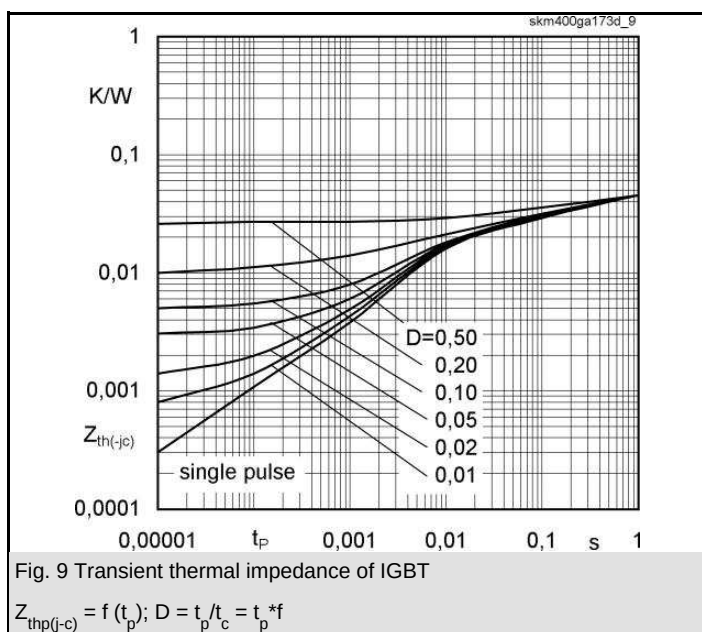
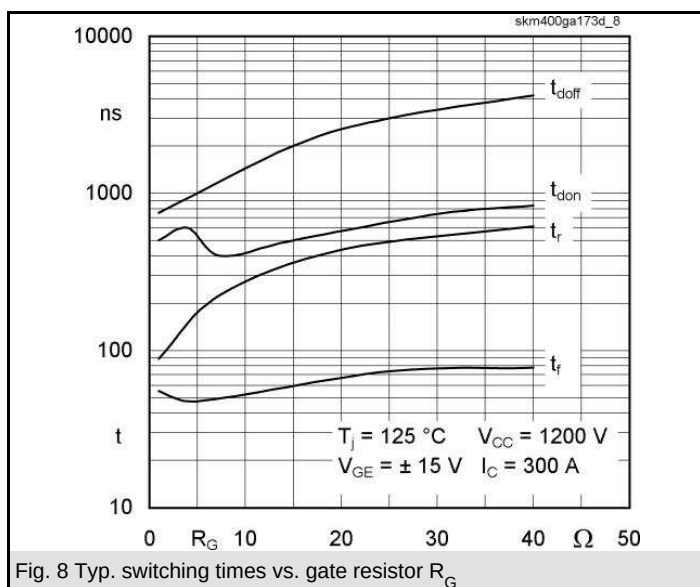
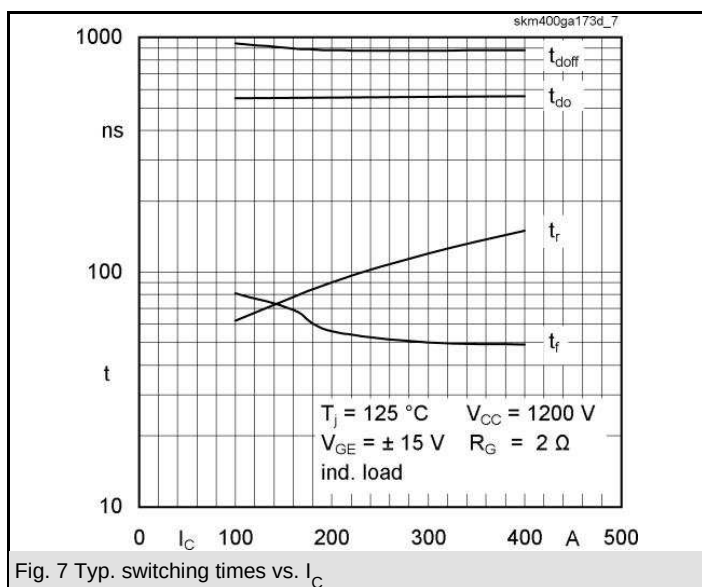


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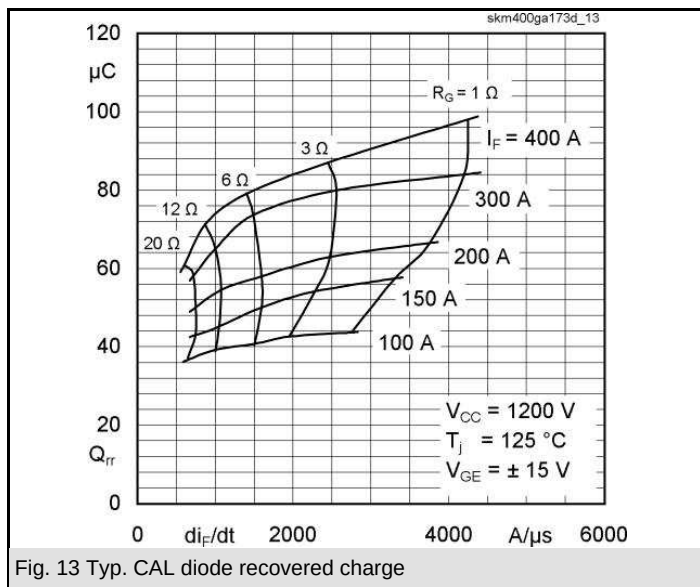
Absolute Maximum Ratings		$T_c = 25^\circ\text{C}$, unless otherwise specified	
Symbol	Conditions	Values	Units
IGBT			
V_{CES}		1700	V
I_C	$T_c = 25 (80)^\circ\text{C}$	440 (300)	A
I_{CRM}	$t_p = 1 \text{ ms}$	600	A
V_{GES}		± 20	V
T_{vj} (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	$^\circ\text{C}$
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F	$T_c = 25 (80)^\circ\text{C}$	300 (200)	A
I_{FRM}	$t_p = 1 \text{ ms}$	600	A
I_{FSM}	$t_p = 10 \text{ ms}$; sin.; $T_j = 150^\circ\text{C}$	2900	A

Characteristics		$T_c = 25^\circ\text{C}$, unless otherwise specified			
Symbol	Conditions	min.	typ.	max.	Units
IGBT					
$V_{GE(th)}$	$V_{GE} = V_{CE}$, $I_C = 20 \text{ mA}$	4,8	5,5	6,2	V
I_{CES}	$V_{GE} = 0$, $V_{CE} = V_{CES}$, $T_j = 25 (125)^\circ\text{C}$		0,1	0,3	mA
$V_{CE(TO)}$	$T_j = 25 (125)^\circ\text{C}$		1,65 (1,9)	1,9 (2,15)	V
r_{CE}	$V_{GE} = 15 \text{ V}$, $T_j = 25 (125)^\circ\text{C}$		9 (16)	6,6666 (9,5)	m Ω
$V_{CE(sat)}$	$I_{Cnom} = 300 \text{ A}$, $V_{GE} = 15 \text{ V}$, chip level		3 (4,3)	3,9 (5)	V
C_{ies}	under following conditions		44		nF
C_{oes}	$V_{GE} = 0$, $V_{CE} = 25 \text{ V}$, $f = 1 \text{ MHz}$		3,5		nF
C_{res}			1		nF
L_{CE}				20	nH
$R_{CC'+EE'}$	res., terminal-chip $T_c = 25 (125)^\circ\text{C}$		0,18 (0,22)		m Ω
$t_{d(on)}$	$V_{CC} = 1200 \text{ V}$, $I_{Cnom} = 300 \text{ A}$		550		ns
t_r	$R_{Gon} = R_{Goff} = 2 \Omega$, $T_j = 125^\circ\text{C}$		120		ns
$t_{d(off)}$	$V_{GE} = \pm 15 \text{ V}$		850		ns
t_f			50		ns
$E_{on} (E_{off})$			180 (10)		mJ
Inverse diode					
$V_F = V_{EC}$	$I_{Fnom} = 300 \text{ A}$; $V_{GE} = 0 \text{ V}$; $T_j = 25 (125)^\circ\text{C}$		2,2 (1,9)	2,7 (2,4)	V
$V_{(TO)}$	$T_j = 125 ()^\circ\text{C}$		1,3	1,5	V
r_T	$T_j = 125 ()^\circ\text{C}$		2,9	3,2	m Ω
I_{RRM}	$I_{Fnom} = 300 \text{ A}$; $T_j = 25 (125)^\circ\text{C}$		120 (170)		A
Q_{rr}	$di/dt = 1500 \text{ A}/\mu\text{s}$		30 (72)		μC
E_{rr}	$V_{GE} = V$				mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,05	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,17	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)	2,5 (1,1)		5 (2)	Nm
w				330	g



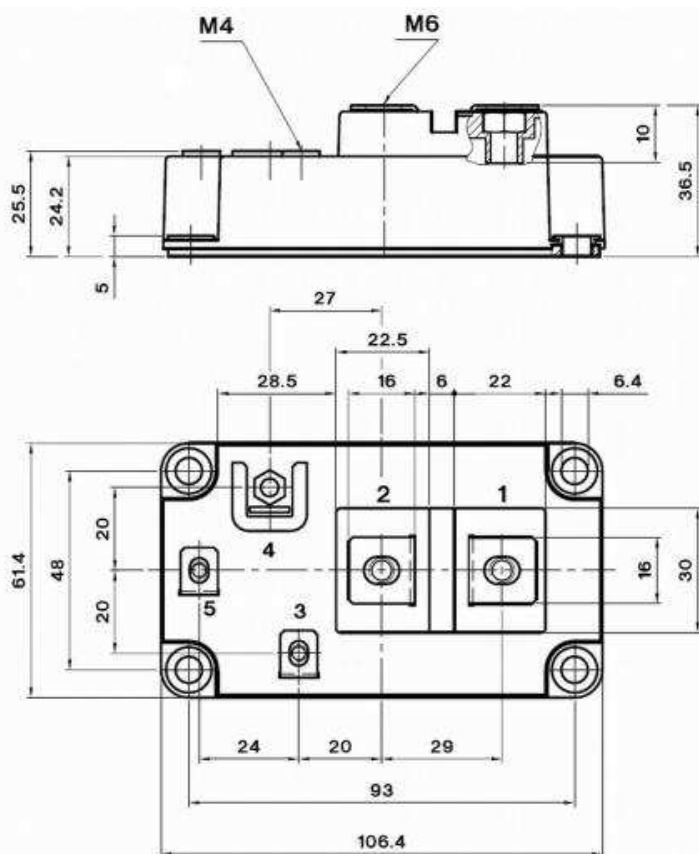


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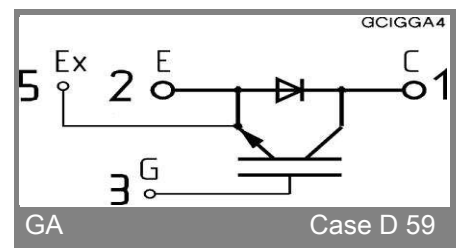


UL Recognized
File no. E 63 532

Dimensions in mm



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.