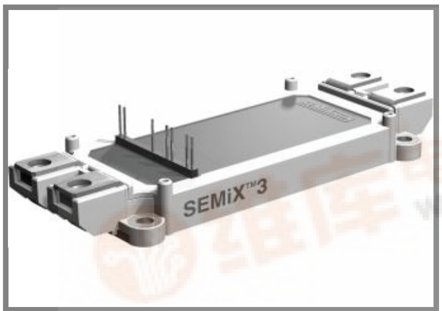
SEMiX 353GB176HD



SEMiX® 3

Trench IGBT Modules

SEMiX 353GB176HD

Preliminary Data

Features

- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- High short circuit capability

Typical Applications

- AC inverter drives
- UPS
- Electronic welders

Absolute Maximum Ratings	T_c = 25°C, unless otherwise specified		
Symbol	**Conditions**	**Values**	**Units**
IGBT			
V_{CES}		1700	V
I_C	T_c = 25 (80) °C	380 (270)	A
I_{CRM}	t_p = 1 ms	450	A
V_{GES}		± 20	V
T_{vj}, (T_{stg})	$T_{OPERATION} \leq T_{stg}$	- 40 ... + 150 (125)	°C
V_{isol}	AC, 1 min.	4000	V
Inverse diode			
I_F	T_c = 25 (80) °C	310 (210)	A
I_{FRM}	t_p = 1 ms	450	A
I_{FSM}	t_p = 10 ms; sin.; T_j = 25 °C	1800	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 = 9 mA	5,2	5,8	6,4	V
I_{CES}	V_{GE} = 0, $V_{CE} = V_{CES}$, T_j = 25 () °C			0,45	mA
$V_{CE(TO)}$	T_j = 25 (125) °C		1 (0,9)	1,2 (1,1)	V
r_{CE}	V_{GE} = 15 V, T_j = 25 (125) °C		4,4 (6,9)	5,5 (8)	mΩ
$V_{CE(sat)}$	I_{Cnom} = 225 A, V_{GE} = 15 V, T_j = 25 (125) °C, chip level		2 (2,45)	2,45 (2,9)	V
C_{ies}	under following conditions		17,1		nF
C_{oes}	V_{GE} = 0, V_{CE} = 25 V, f = 1 MHz		0,8		nF
C_{res}			0,7		nF
L_{CE}			20		nH
$R_{CC'+EE'}$	terminal-chip, T_c= 25 (125) °C		0,7 (1)		mΩ
$t_{d(on)}/t_r$	V_{CC} = 1200 V, I_{Cnom} = 225 A		250 / 75		ns
$t_{d(off)}/t_f$	V_{GE} = ± 15 V		930 / 180		ns
E_{on} (E_{off})	$R_{Gon} = R_{Goff}$ = 5,6 Ω, T_j = 125 °C		148 (81)		mJ
Inverse diode					
$V_F = V_{EC}$	I_{Fnom} = 225 A; V_{GE} = 0 V; T_j = 25 (125) °C, chip level		1,7 (1,7)	1,9 (1,9)	V
$V_{(TO)}$	T_j = 25 (125) °C		1,1 (0,9)	1,3 (1,1)	V
r_T	T_j = 25 (125) °C		2,7 (3,6)	2,7 (3,6)	mΩ
I_{RRM}	I_{Fnom} = 225 A; T_j = 25 (125) °C		(280)		A
Q_{rr}	di/dt = 4000 A/µs		(83)		µC
E_{rr}	V_{GE} = -15 V		(45)		mJ
Thermal characteristics					
$R_{th(j-c)}$	per IGBT			0,08	K/W
$R_{th(j-c)D}$	per Inverse Diode			0,143	K/W
$R_{th(j-c)FD}$	per FWD				K/W
$R_{th(c-s)}$	per module		0,04		K/W
Temperature sensor					
R_{25}	T_c = 25 °C		5 ±5%		kΩ
$B_{25/85}$	$R_2=R_1\exp[B(1/T_2-1/T_1)]$; T[K];B		3420		K
Mechanical data					
M_s/M_t	to heatsink (M5) / for terminals (M6)	3/2,5		5 /5	Nm
w			289		g

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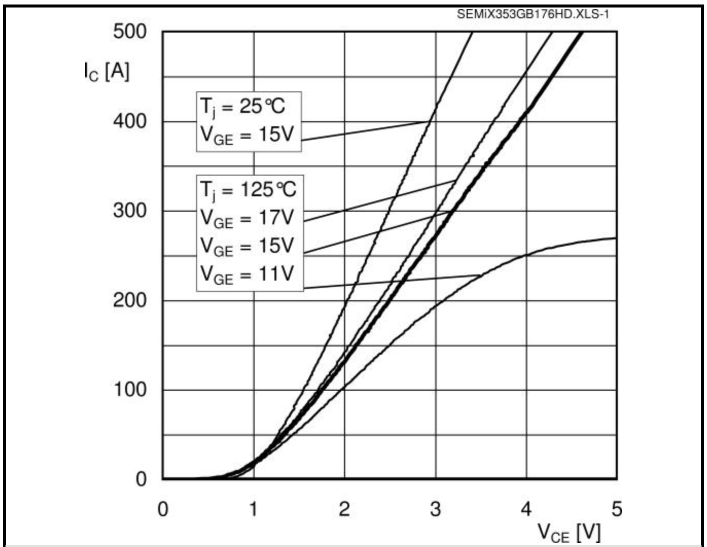

Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE'}$

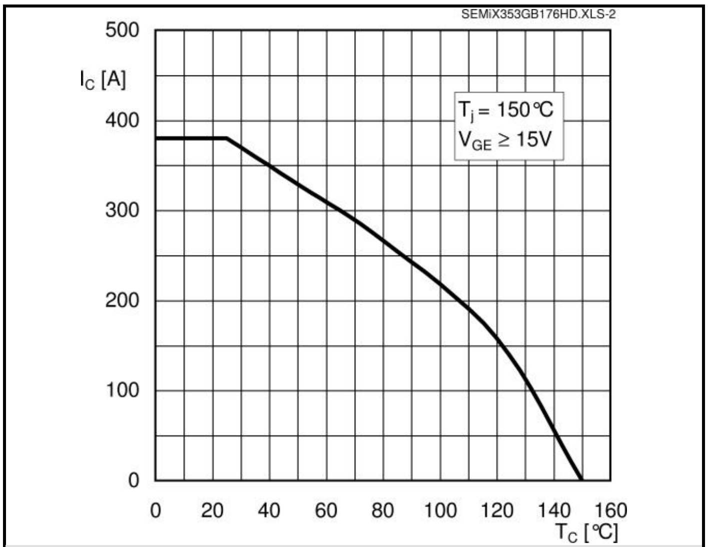

Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

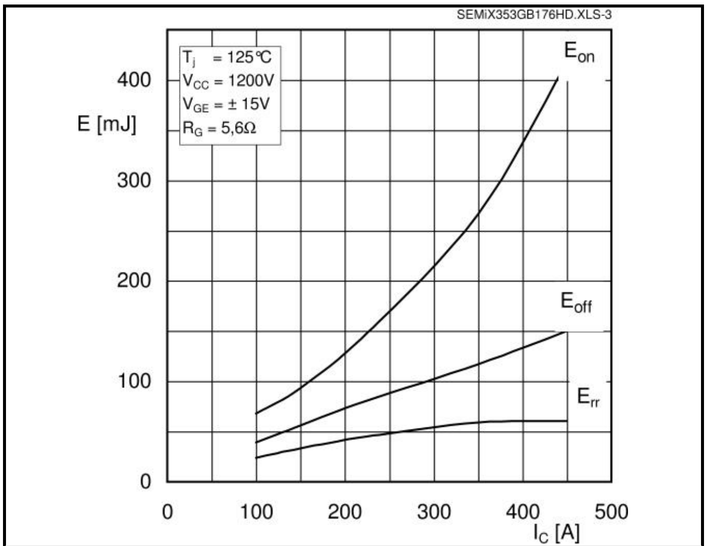

Fig. 3 Typ. turn-on /-off energy = f (I_C)

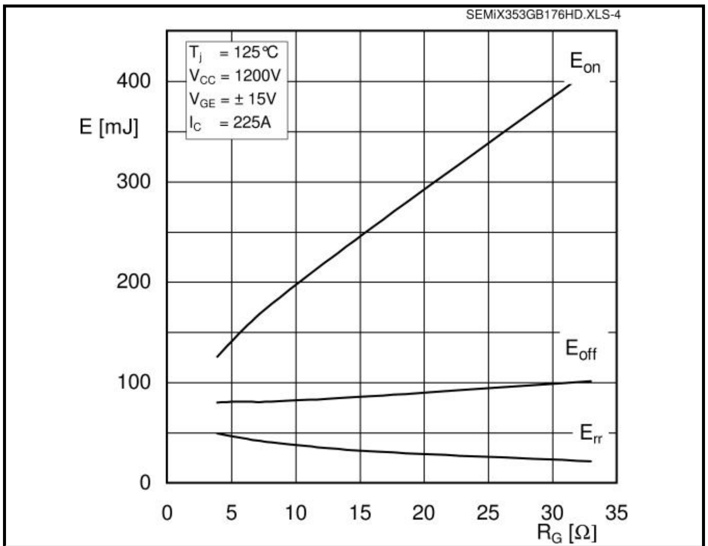

Fig. 4 Typ. turn-on /-off energy = f (R_G)

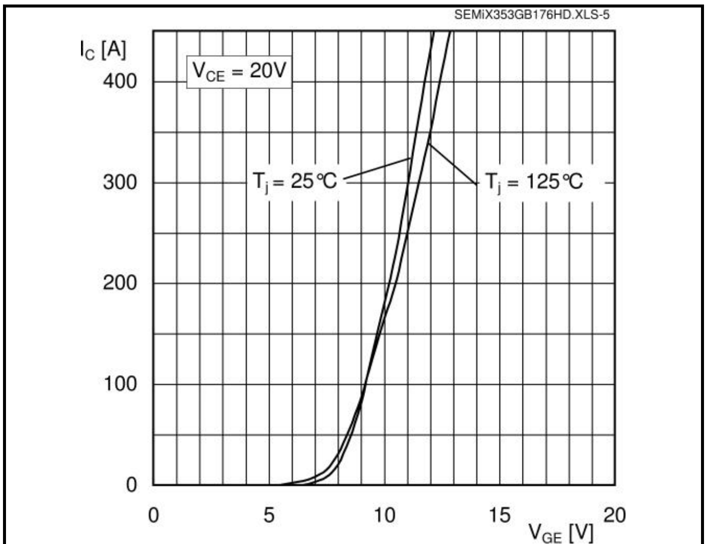

Fig. 5 Typ. transfer characteristic

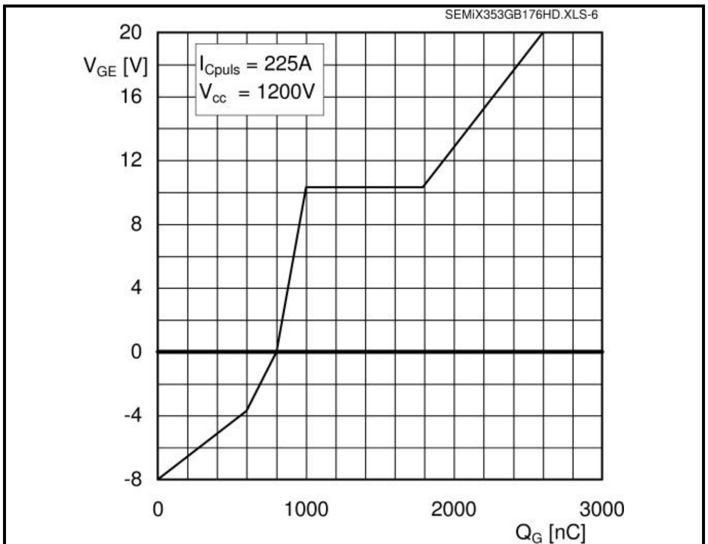

Fig. 6 Typ. gate charge characteristic

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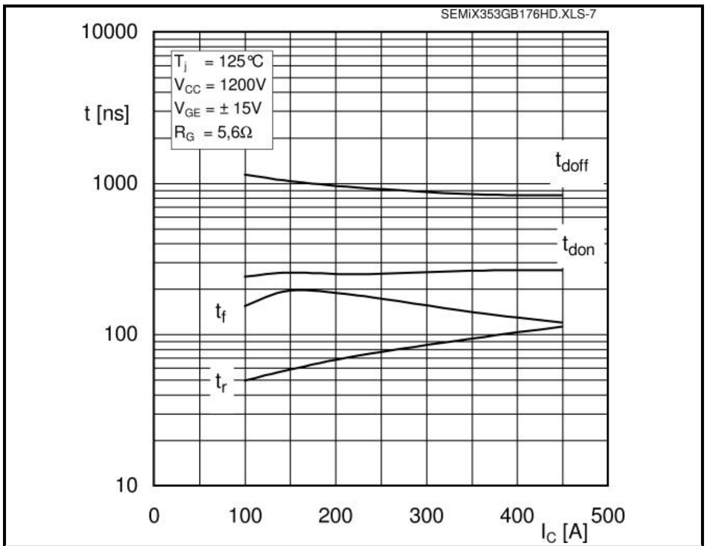

Fig. 7 Typ. switching times vs. I_C

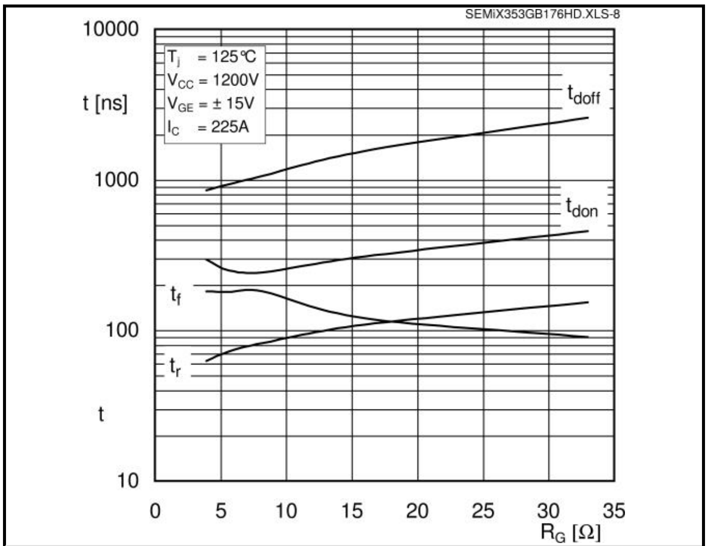

Fig. 8 Typ. switching times vs. gate resistor R_G

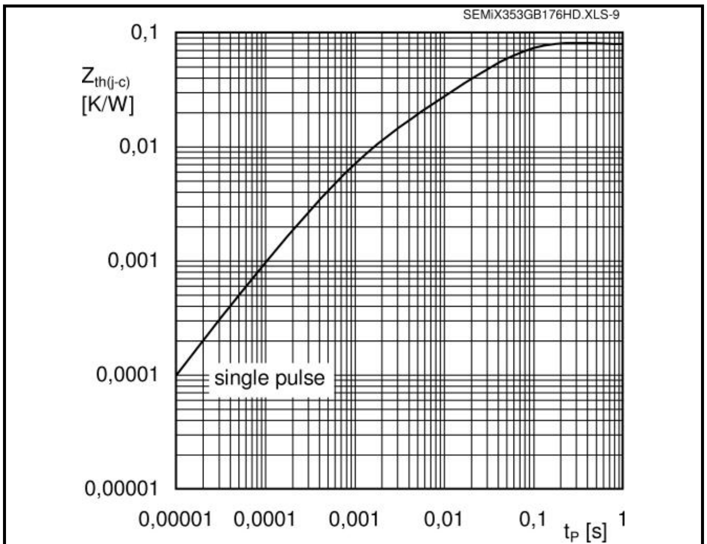

Fig. 9 Transient thermal impedance of IGBT

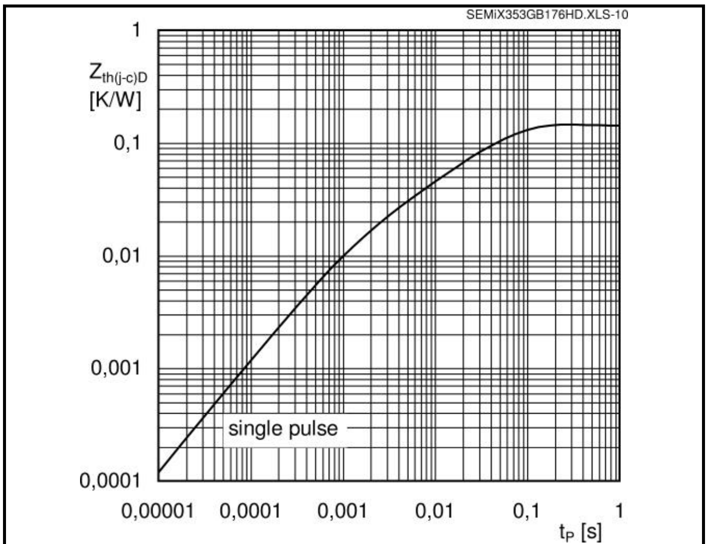

Fig. 10 Transient thermal impedance of FWD

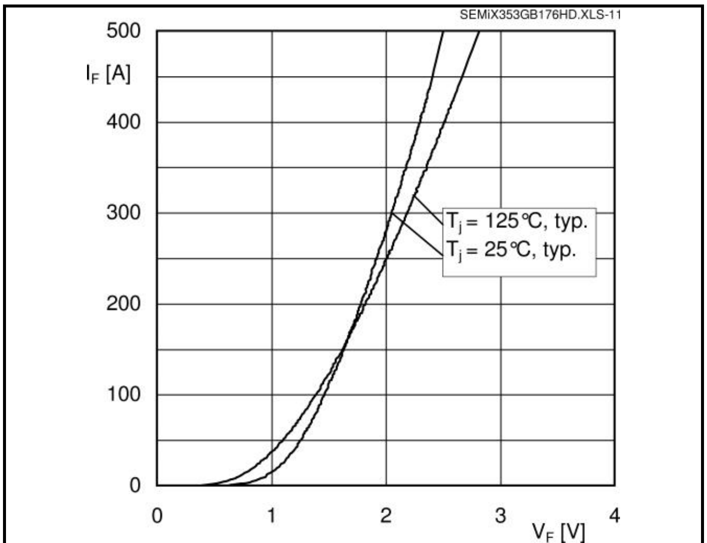

Fig. 11 CAL diode forward characteristic

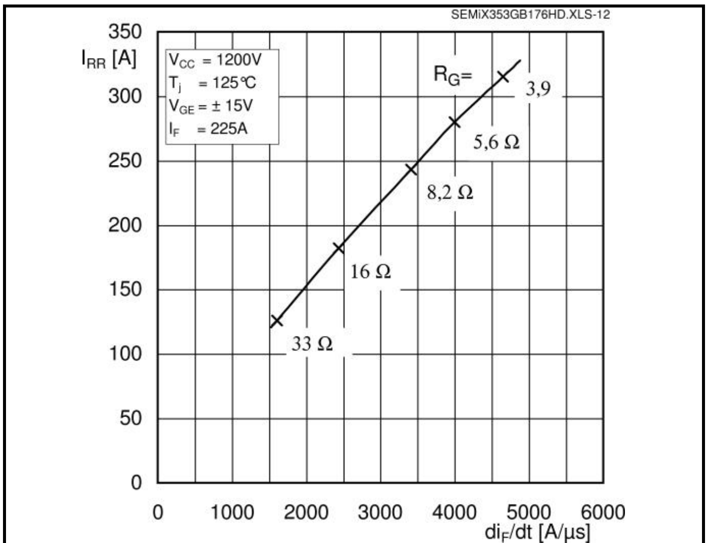

Fig. 12 Typ. CAL diode peak reverse recovery current

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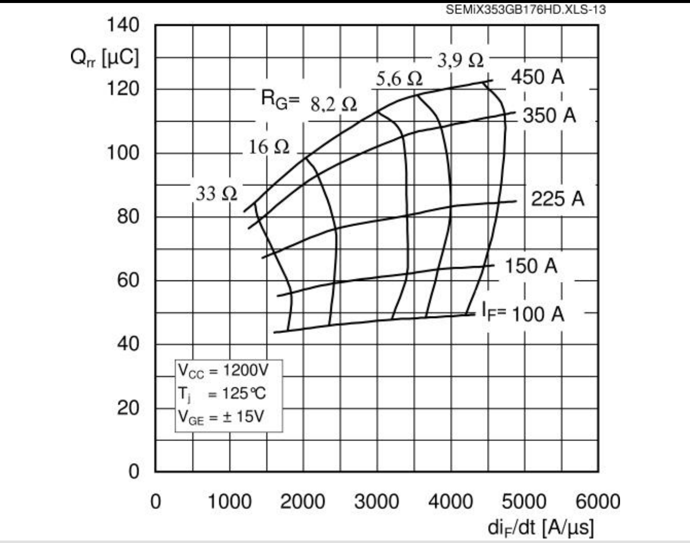
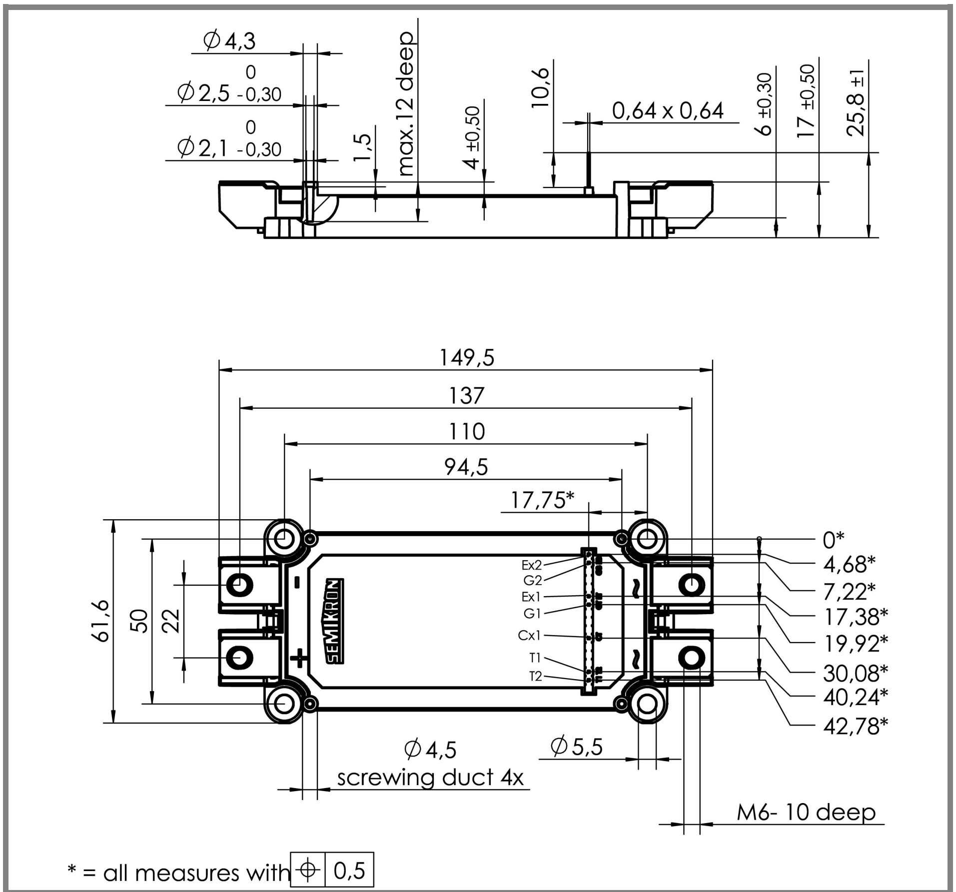
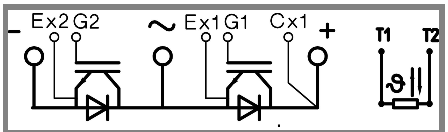


Fig. 13 Typ. CAL diode recovered charge



Case SEMiX 3



GB Case SEMiX 3

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

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