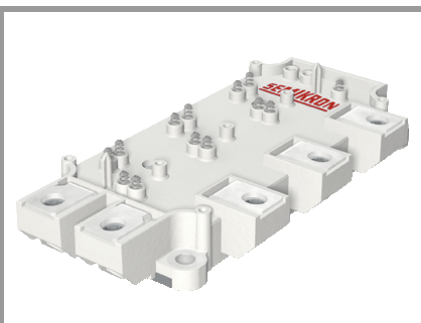


SEMiX101GD066HDs



SEMiX[®]13

Trench IGBT Modules

SEMiX101GD066HDs

Preliminary Data

Features

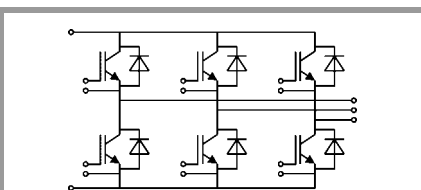
- Homogeneous Si
- Trench = Trenchgate technology
- $V_{CE(sat)}$ with positive temperature coefficient
- UL recognised file no. E63532

Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to $T_C=125^{\circ}\text{C}$ max.
- Product reliability results are valid for $T_j=150^{\circ}\text{C}$
- For short circuit: Soft R_{Goff} recommended
- Take care of over-voltage caused by stray inductance



GD

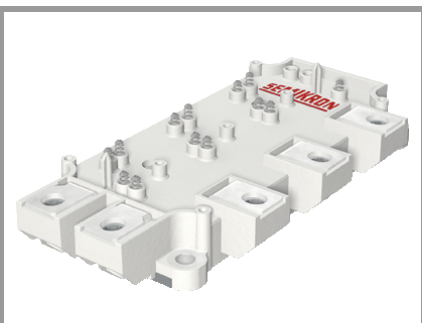
Absolute Maximum Ratings

Symbol	Conditions	Values	Unit	
IGBT				
V_{CES}		600	V	
I_C	$T_j = 175^{\circ}\text{C}$	$T_c = 25^{\circ}\text{C}$	139	A
		$T_c = 80^{\circ}\text{C}$	105	A
I_{Cnom}		100	A	
I_{CRM}	$I_{CRM} = 2 \times I_{Cnom}$	200	A	
V_{GES}		-20 ... 20	V	
t_{psc}	$V_{CC} = 360\text{ V}$ $V_{GE} \leq 15\text{ V}$ $T_j = 150^{\circ}\text{C}$ $V_{CES} \leq 600\text{ V}$	6	μs	
T_j		-40 ... 175	$^{\circ}\text{C}$	
Inverse diode				
I_F	$T_j = 175^{\circ}\text{C}$	$T_c = 25^{\circ}\text{C}$	151	A
		$T_c = 80^{\circ}\text{C}$	111	A
I_{Fnom}		100	A	
I_{FRM}	$I_{FRM} = 2 \times I_{Fnom}$	200	A	
I_{FSM}	$t_p = 10\text{ ms, sin } 180^{\circ}, T_j = 25^{\circ}\text{C}$	500	A	
T_j		-40 ... 175	$^{\circ}\text{C}$	
Module				
$I_{t(RMS)}$		600	A	
T_{stg}		-40 ... 125	$^{\circ}\text{C}$	
V_{isol}	AC sinus 50Hz, $t = 1\text{ min}$	4000	V	

Characteristics

Symbol	Conditions	min.	typ.	max.	Unit
IGBT					
$V_{CE(sat)}$	$I_C = 100\text{ A}$ $V_{GE} = 15\text{ V}$ chipelevel	$T_j = 25^{\circ}\text{C}$	1.45	1.9	V
		$T_j = 150^{\circ}\text{C}$	1.70	2.1	V
V_{CE0}		$T_j = 25^{\circ}\text{C}$	0.9	1	V
		$T_j = 150^{\circ}\text{C}$	0.85	0.9	V
r_{CE}	$V_{GE} = 15\text{ V}$	$T_j = 25^{\circ}\text{C}$	5.5	9.0	$\text{m}\Omega$
		$T_j = 150^{\circ}\text{C}$	8.5	12.0	$\text{m}\Omega$
$V_{GE(th)}$	$V_{GE}=V_{CE}, I_C = 1.6\text{ mA}$	5	5.8	6.5	V
I_{CES}	$V_{GE} = 0\text{ V}$ $V_{CE} = 600\text{ V}$	$T_j = 25^{\circ}\text{C}$	0.15	0.45	mA
		$T_j = 150^{\circ}\text{C}$			mA
C_{ies}	$V_{CE} = 25\text{ V}$ $V_{GE} = 0\text{ V}$	$f = 1\text{ MHz}$	6.2		nF
C_{oes}		$f = 1\text{ MHz}$	0.38		nF
C_{res}		$f = 1\text{ MHz}$	0.18		nF
Q_G	$V_{GE} = -8\text{ V...} + 15\text{ V}$		800		nC
R_{Gint}	$T_j = 25^{\circ}\text{C}$		2.00		Ω
$t_{d(on)}$	$V_{CC} = 300\text{ V}$		140		ns
t_r	$I_C = 100\text{ A}$		35		ns
E_{on}	$T_j = 150^{\circ}\text{C}$		3		mJ
$t_{d(off)}$	$R_{Gon} = 6.2\ \Omega$		440		ns
t_f	$R_{Goff} = 6.2\ \Omega$		55		ns
E_{off}			4		mJ
$R_{th(j-c)}$	per IGBT			0.41	K/W
$R_{th(j-s)}$	per IGBT				K/W

SEMiX101GD066HDs



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Trench IGBT Modules

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Preliminary Data

Features

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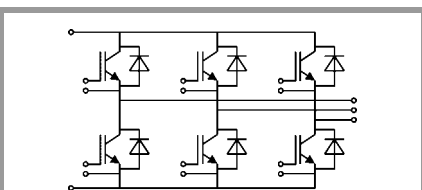
Typical Applications

- Matrix Converter
- Resonant Inverter
- Current Source Inverter

Remarks

- Case temperature limited to $T_C=125^\circ\text{C}$ max.
- Product reliability results are valid for $T_j=150^\circ\text{C}$
- For short circuit: Soft R_{Goff} recommended
- Take care of over-voltage caused by stray inductance

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
$V_F = V_{EC}$	$I_F = 100\text{ A}$ $V_{GE} = 0\text{ V}$ chipelevel	$T_j = 25^\circ\text{C}$		1.4	1.6	V
		$T_j = 150^\circ\text{C}$		1.4	1.6	V
V_{F0}		$T_j = 25^\circ\text{C}$	0.9	1	1.1	V
		$T_j = 150^\circ\text{C}$	0.75	0.85	0.95	V
r_F		$T_j = 25^\circ\text{C}$	3.0	4.0	5.0	m Ω
		$T_j = 150^\circ\text{C}$	4.5	5.5	6.5	m Ω
I_{RRM}	$I_F = 100\text{ A}$	$T_j = 150^\circ\text{C}$		130		A
Q_{rr}	$di/dt_{off} = 3200\text{ A}/\mu\text{s}$ $V_{GE} = -8\text{ V}$	$T_j = 150^\circ\text{C}$		18		μC
E_{rr}	$V_{CC} = 300\text{ V}$	$T_j = 150^\circ\text{C}$		4.5		mJ
$R_{th(j-c)}$	per diode				0.51	K/W
$R_{th(j-s)}$	per diode					K/W
Module						
L_{CE}				20		nH
$R_{CC+EE'}$	res., terminal-chip	$T_C = 25^\circ\text{C}$		0.7		m Ω
		$T_C = 125^\circ\text{C}$		1		m Ω
$R_{th(c-s)}$	per module			0.04		K/W
M_s	to heat sink (M5)		3		5	Nm
M_t	to terminals (M6)		2.5		5	Nm
						Nm
w					350	g
Temperature sensor						
R_{100}	$T_C=100^\circ\text{C}$ ($R_{25}=5\text{ k}\Omega$)			0,493 $\pm 5\%$		k Ω
$B_{100/125}$	$R_{(T)}=R_{100}\exp[B_{100/125}(1/T-1/T_{100})]$; $T[\text{K}]$;			3550 $\pm 2\%$		K



GD

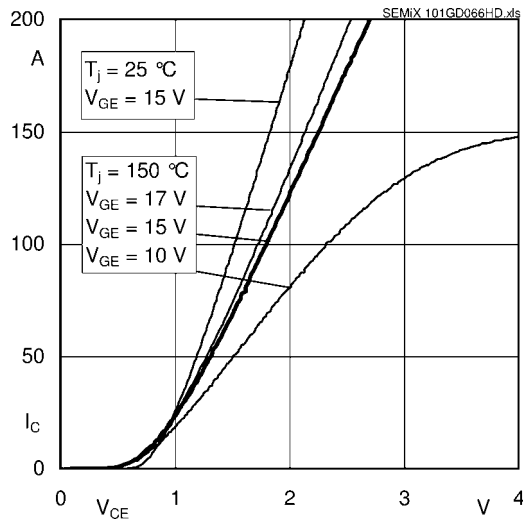


Fig. 1 Typ. output characteristic, inclusive $R_{CC'+EE}$

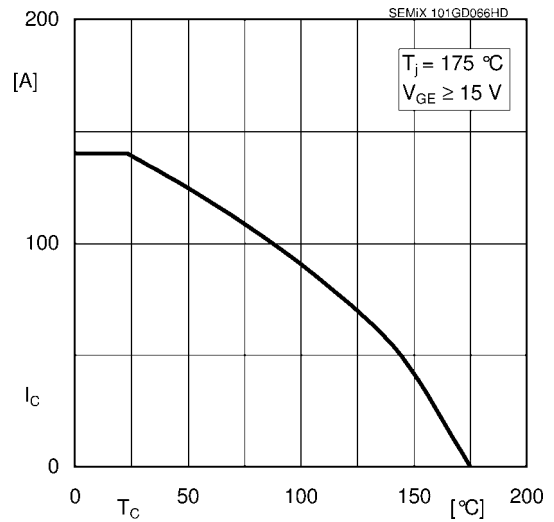


Fig. 2 Rated current vs. temperature $I_C = f(T_C)$

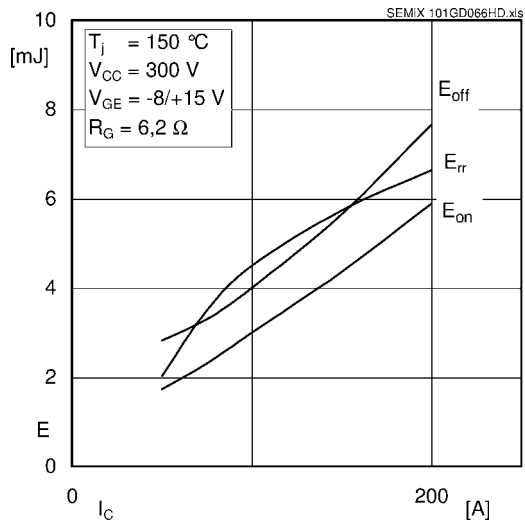


Fig. 3 Typ. turn-on /-off energy = $f(I_C)$

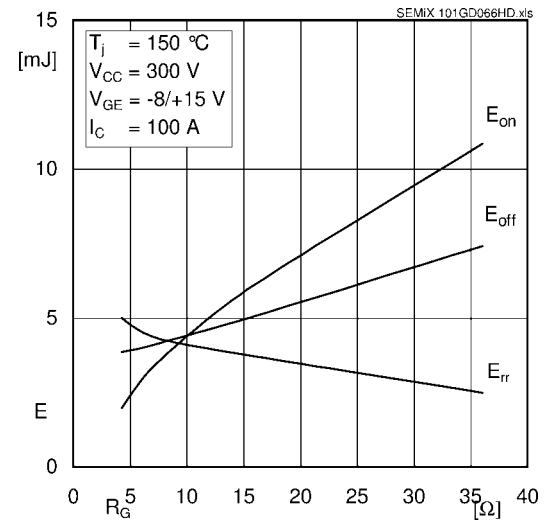


Fig. 4 Typ. turn-on /-off energy = $f(R_G)$

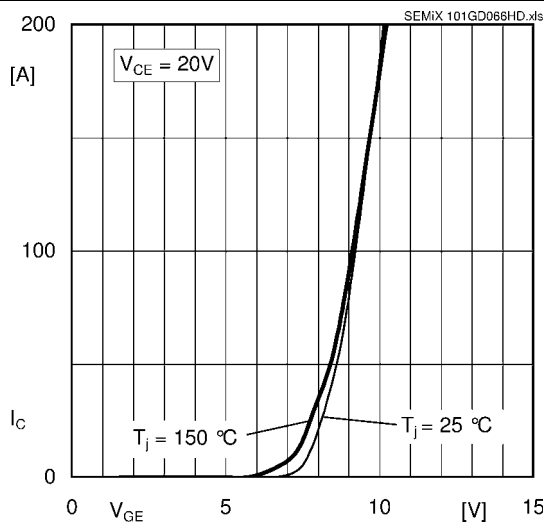


Fig. 5 Typ. transfer characteristic

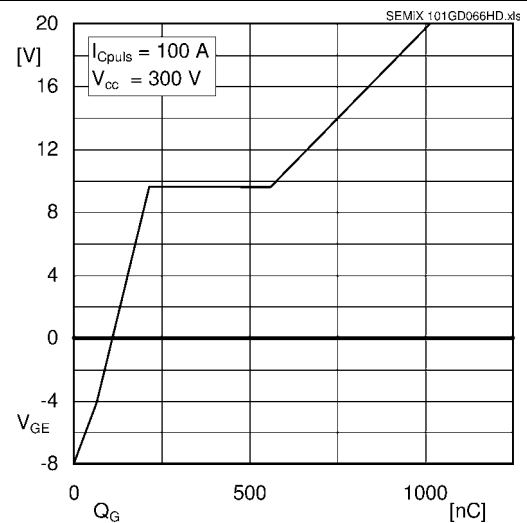


Fig. 6 Typ. gate charge characteristic

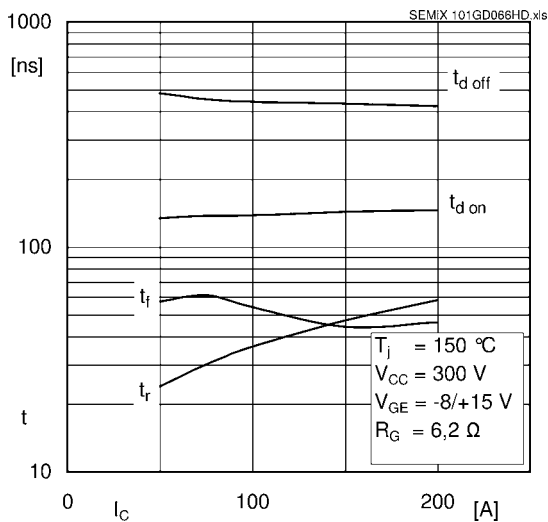


Fig. 7 Typ. switching times vs. I_C

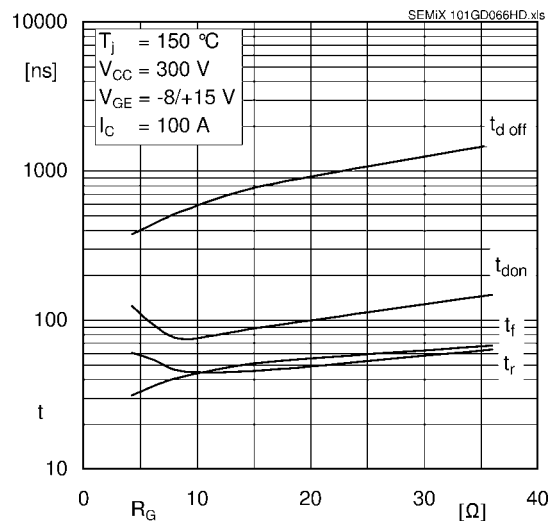


Fig. 8 Typ. switching times vs. gate resistor R_G

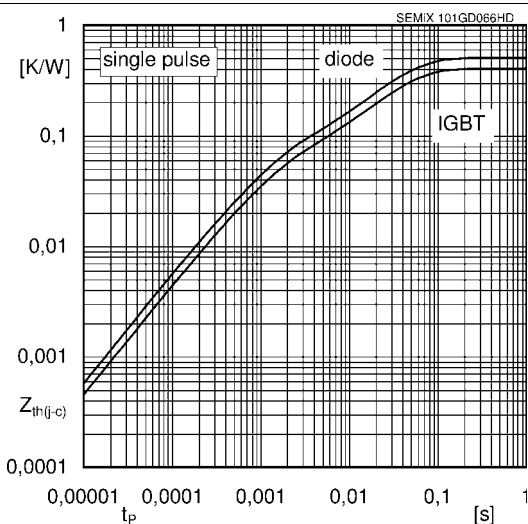


Fig. 9 Typ. transient thermal impedance

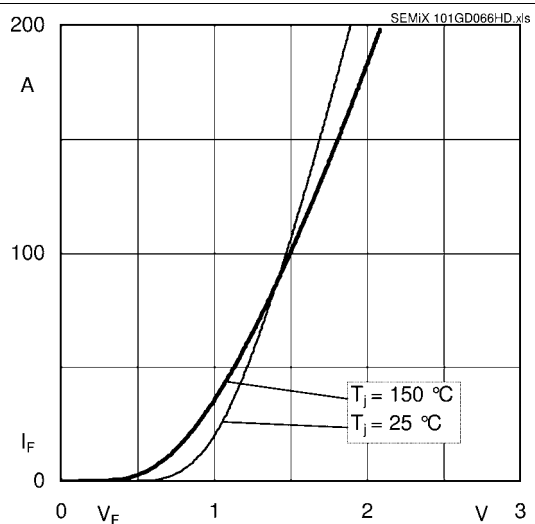


Fig. 10 Typ. CAL diode forward charact., incl. R_{CC+EE}

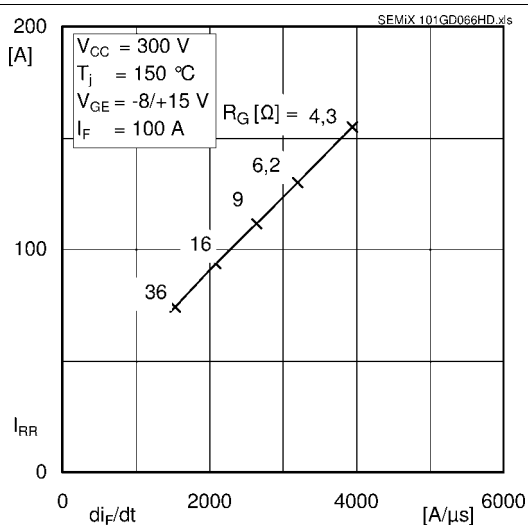


Fig. 11 Typ. CAL diode peak reverse recovery current

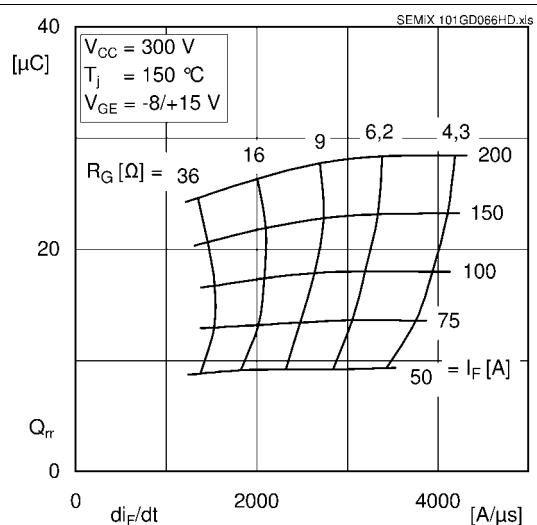
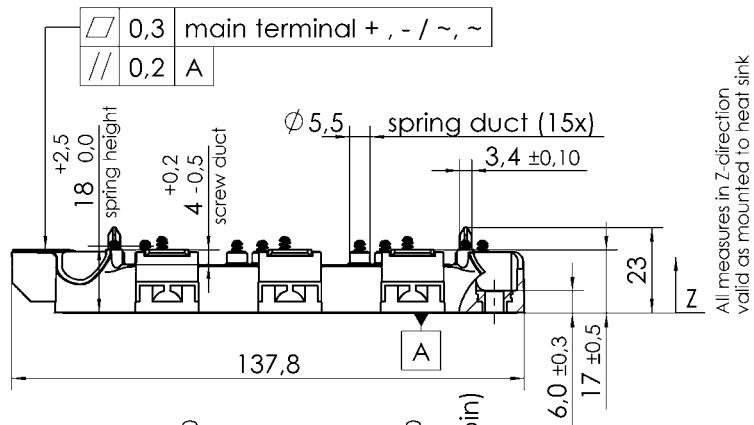
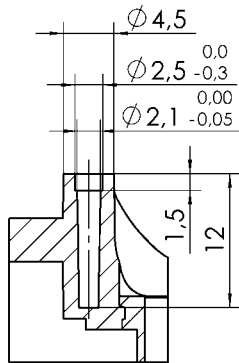


Fig. 12 Typ. CAL diode recovery charge

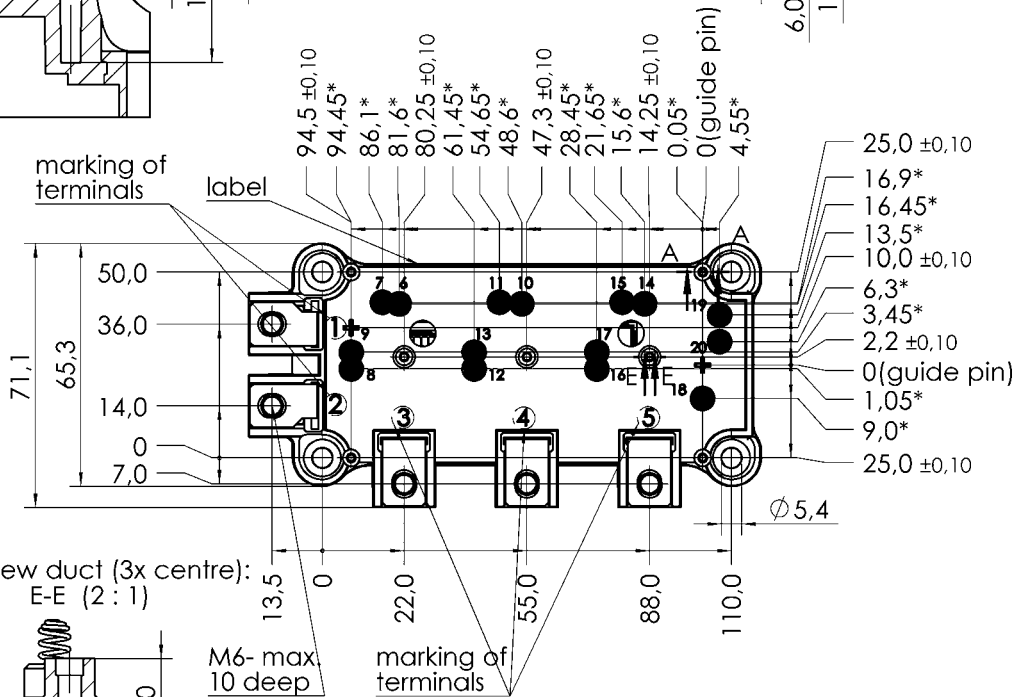
SEMiX101GD066HDs

case: SEMiX 13

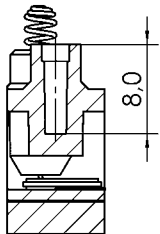
screw duct (4x):
A-A (2:1)



All measures in Z-direction
valid as mounted to heat sink



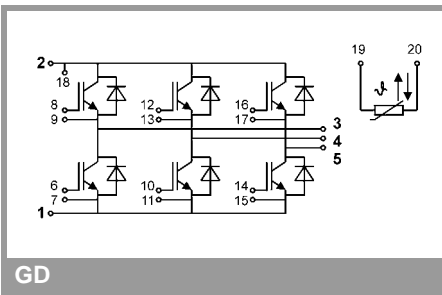
screw duct (3x centre):
E-E (2:1)



* all measures with $\pm 0,2$

Rules for the contact PCB:
- spring landing pad = $\varnothing 3,5 \pm 0,2$
- holes guidepins = $\varnothing 4 \pm 0,1$

SEMIX 13



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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.