

SKM150GB17E4



SEMITRANS® 2

IGBT4 Modules

SKM150GB17E4

Features*

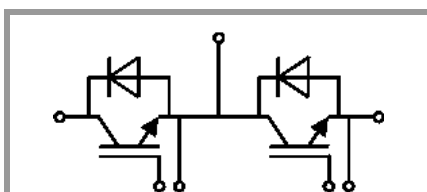
- IGBT4 = 4th generation medium fast trench IGBT (Infineon)
- CAL4 = Soft switching 4th generation CAL-Diode
- Insulated copper baseplate using DBC Technology (Direct Copper Bonding)
- With integrated Gate resistor
- For switching frequencies up to 8kHz
- UL recognized, file no. E63532

Typical Applications

- AC inverter drives
- UPS
- Electronic welders
- Wind power
- Public transport

Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Recommended $T_{j,op} = -40 \dots +150^\circ\text{C}$
- Product reliability results valid for $T_j = 150^\circ\text{C}$



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Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}	T _j = 25 °C		1700	V
I _C	T _j = 175 °C	T _c = 25 °C	248	A
		T _c = 80 °C	189	A
I _{Cnom}			150	A
I _{CRM}			450	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 1000 V V _{GE} ≤ 15 V V _{CES} ≤ 1700 V	T _j = 150 °C	10	μs
T _j			-40 ... 175	°C
Inverse diode				
V _{RRM}	T _j = 25 °C		1700	V
I _F	T _j = 175 °C	T _c = 25 °C	169	A
		T _c = 80 °C	125	A
I _{FRM}			300	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		950	A
T _j			-40 ... 175	°C
Module				
I _{t(RMS)}			200	A
T _{stg}	module without TIM		-40 ... 125	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		4000	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 150 A	T _j = 25 °C		1.90	2.20	V
	V _{GE} = 15 V chiplevel	T _j = 150 °C		2.31	2.60	V
V _{CE0}	chiplevel	T _j = 25 °C		1.10	1.20	V
		T _j = 150 °C		1.00	1.10	V
r _{CE}	V _{GE} = 15 V chiplevel	T _j = 25 °C		5.3	6.7	mΩ
		T _j = 150 °C		8.7	10.0	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 6 mA		5.2	5.8	6.4	V
I _{CES}	V _{GE} = 0 V, V _{CE} = 1700 V, T _j = 25 °C				2.0	mA
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		11.8		nF
C _{oes}		f = 1 MHz		0.43		nF
C _{res}		f = 1 MHz		0.38		nF
Q _G	V _{GE} = - 8 V...+ 15 V			1200		nC
R _{Gint}	T _j = 25 °C			5.0		Ω
t _{d(on)}	V _{CC} = 1200 V	T _j = 150 °C		234		ns
t _r	I _C = 150 A	T _j = 150 °C		41		ns
E _{on}	V _{GE} = +15/-15 V R _{G on} = 2 Ω	T _j = 150 °C		67		mJ
t _{d(off)}	R _{G off} = 2 Ω	T _j = 150 °C		671		ns
t _f	di/dt _{on} = 3500 A/μs di/dt _{off} = 890 A/μs	T _j = 150 °C		144		ns
E _{off}	dv/dt = 5440 V/μs	T _j = 150 °C		59		mJ
R _{th(j-c)}	per IGBT				0.162	K/W
R _{th(c-s)}	per IGBT (λ _{grease} =0.81 W/(m²K))			0.072		K/W
R _{th(c-s)}	per IGBT, pre-applied phase change material			0.05		K/W



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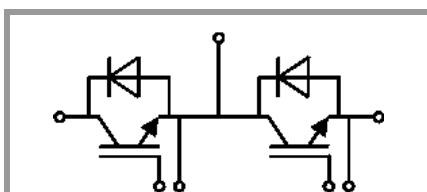
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- AC inverter drives
- UPS
- Electronic welders
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Remarks

- Case temperature limited to $T_C = 125^\circ\text{C}$ max.
- Recommended $T_{j,op} = -40 \dots +150^\circ\text{C}$
- Product reliability results valid for $T_j = 150^\circ\text{C}$

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 150 A	T _j = 25 °C		1.98	2.37	V
	V _{GE} = 0 V chiplevel	T _j = 150 °C		2.12	2.52	V
V _{F0}	chiplevel	T _j = 25 °C		1.32	1.56	V
		T _j = 150 °C		1.08	1.22	V
r _F	chiplevel	T _j = 25 °C		4.4	5.4	mΩ
		T _j = 150 °C		6.9	8.7	mΩ
I _{RRM}	I _F = 150 A	T _j = 150 °C		77		A
Q _{rr}	di/dt _{off} = 2410 A/μs	T _j = 150 °C		46		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 1200 V	T _j = 150 °C		32		mJ
R _{th(j-c)}	per diode				0.345	K/W
R _{th(c-s)}	per diode (λ _{grease} =0.81 W/(m*K))			0.095		K/W
R _{th(c-s)}	per diode, pre-applied phase change material			0.067		K/W
Module						
L _{CE}				30		nH
R _{CC'+EE'}	measured per switch	T _C = 25 °C		0.65		mΩ
		T _C = 125 °C		1.09		mΩ
R _{th(c-s)1}	calculated without thermal coupling			0.0205		K/W
R _{th(c-s)2}	including thermal coupling, T _s underneath module (λ _{grease} =0.81 W/(m*K))			0.031		K/W
R _{th(c-s)2}	including thermal coupling, T _s underneath module, pre-applied phase change material			0.022		K/W
M _s	to heat sink M6		3		5	Nm
M _t		to terminals M5	2.5		5	Nm
						Nm
w					160	g



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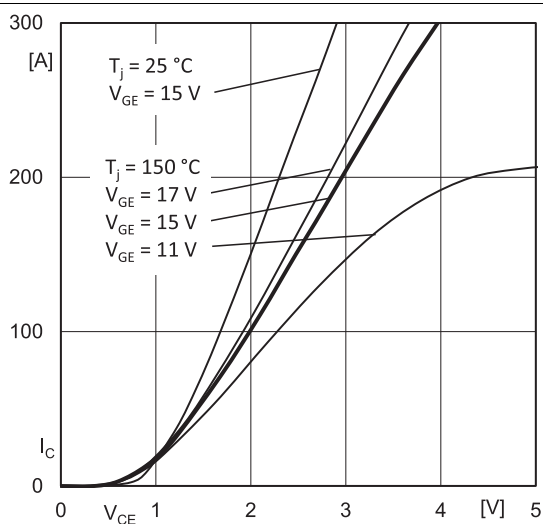


Fig. 1: Typ. output characteristic, inclusive $R_{CC} + EE'$

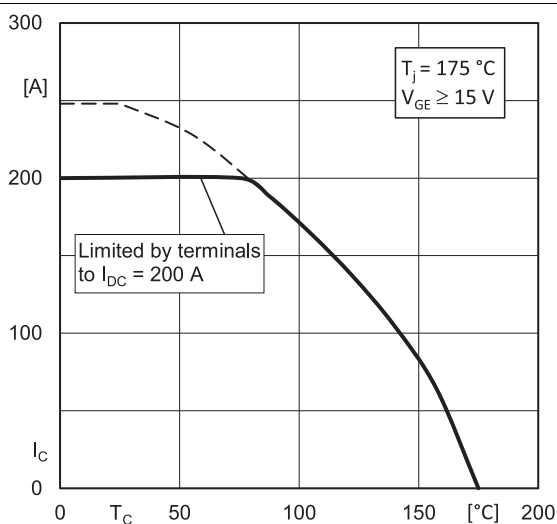


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

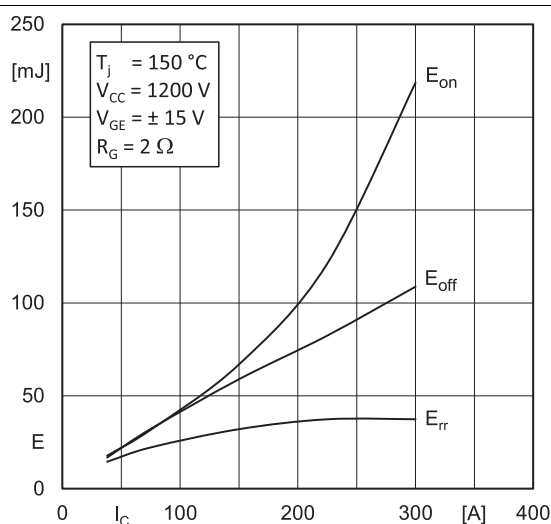


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

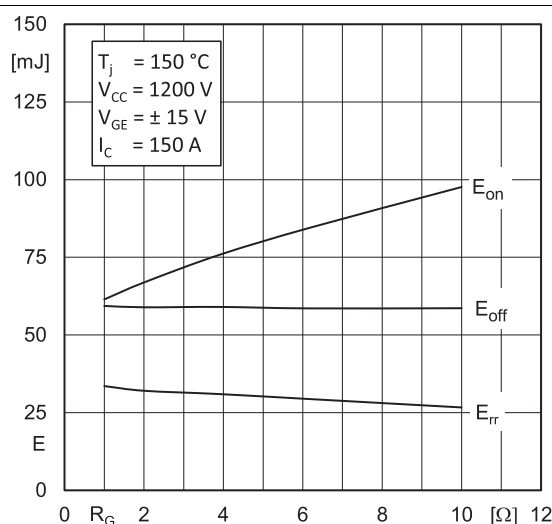


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

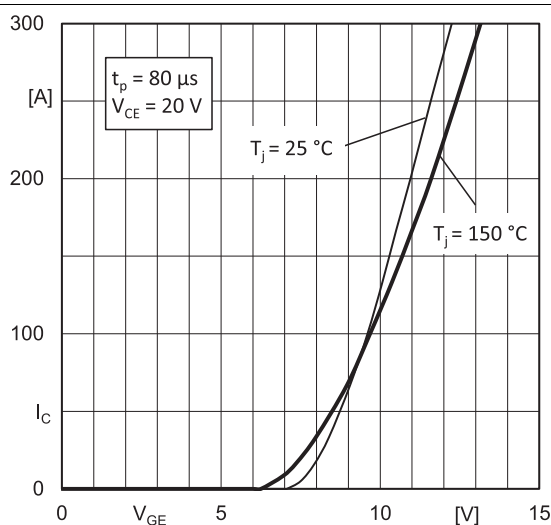


Fig. 5: Typ. transfer characteristic

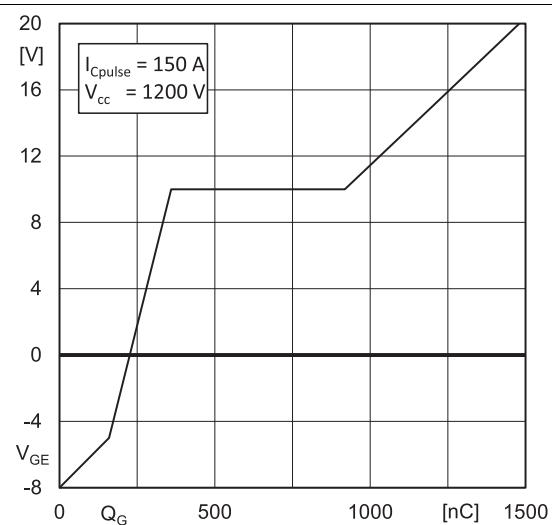
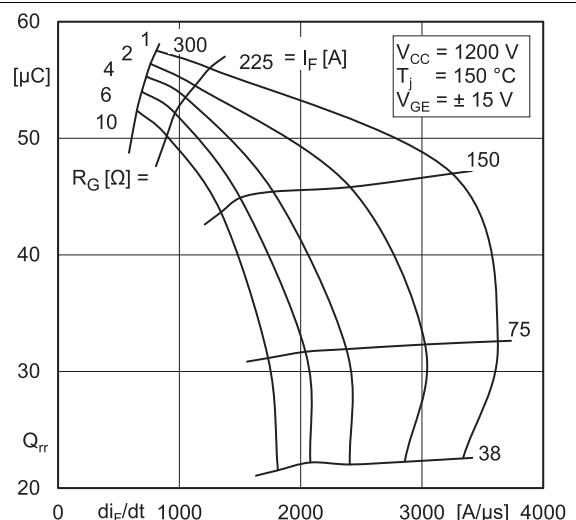
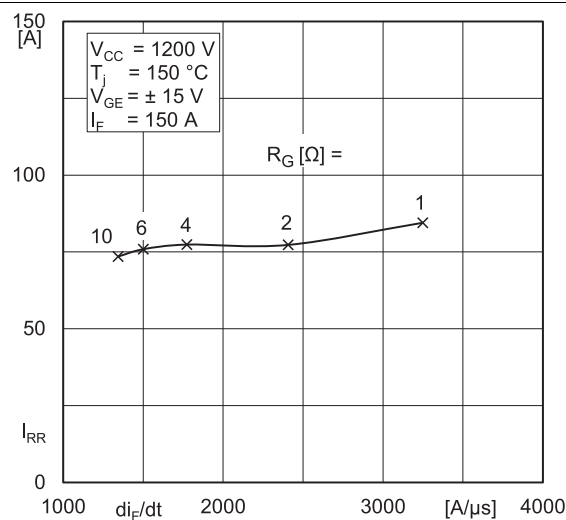
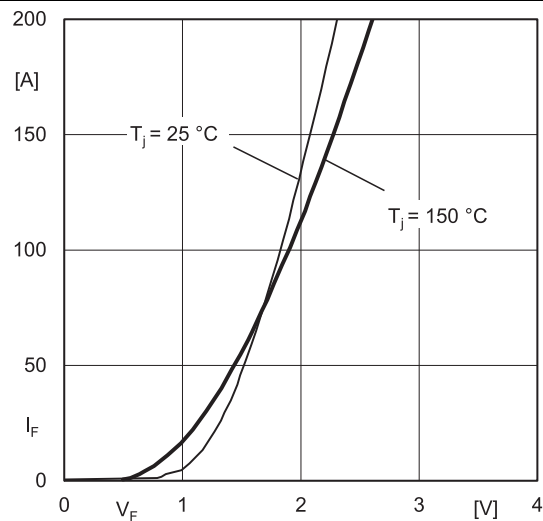
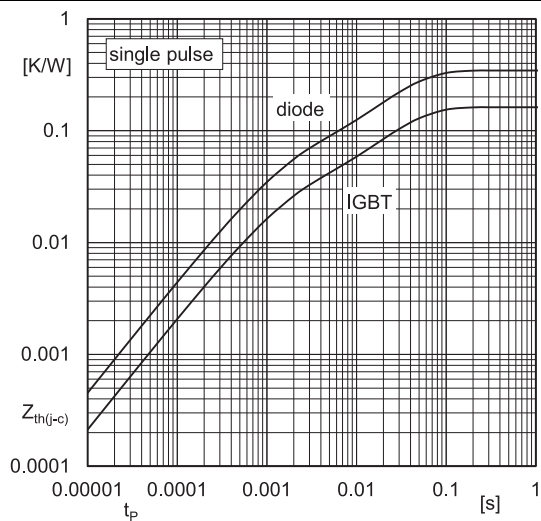
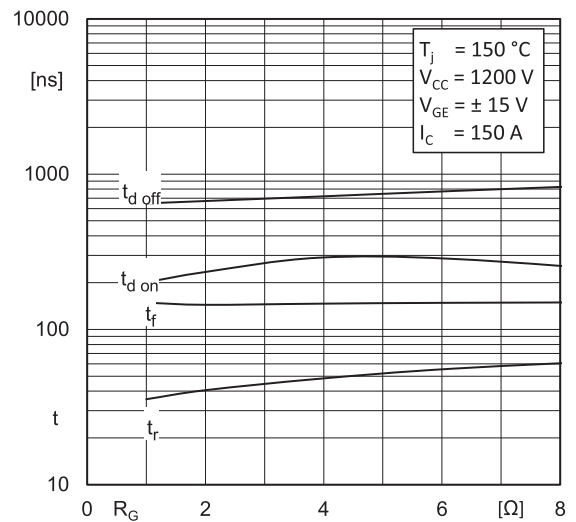
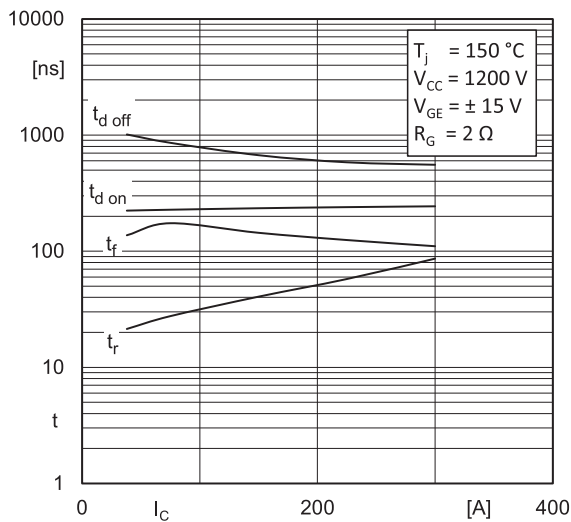
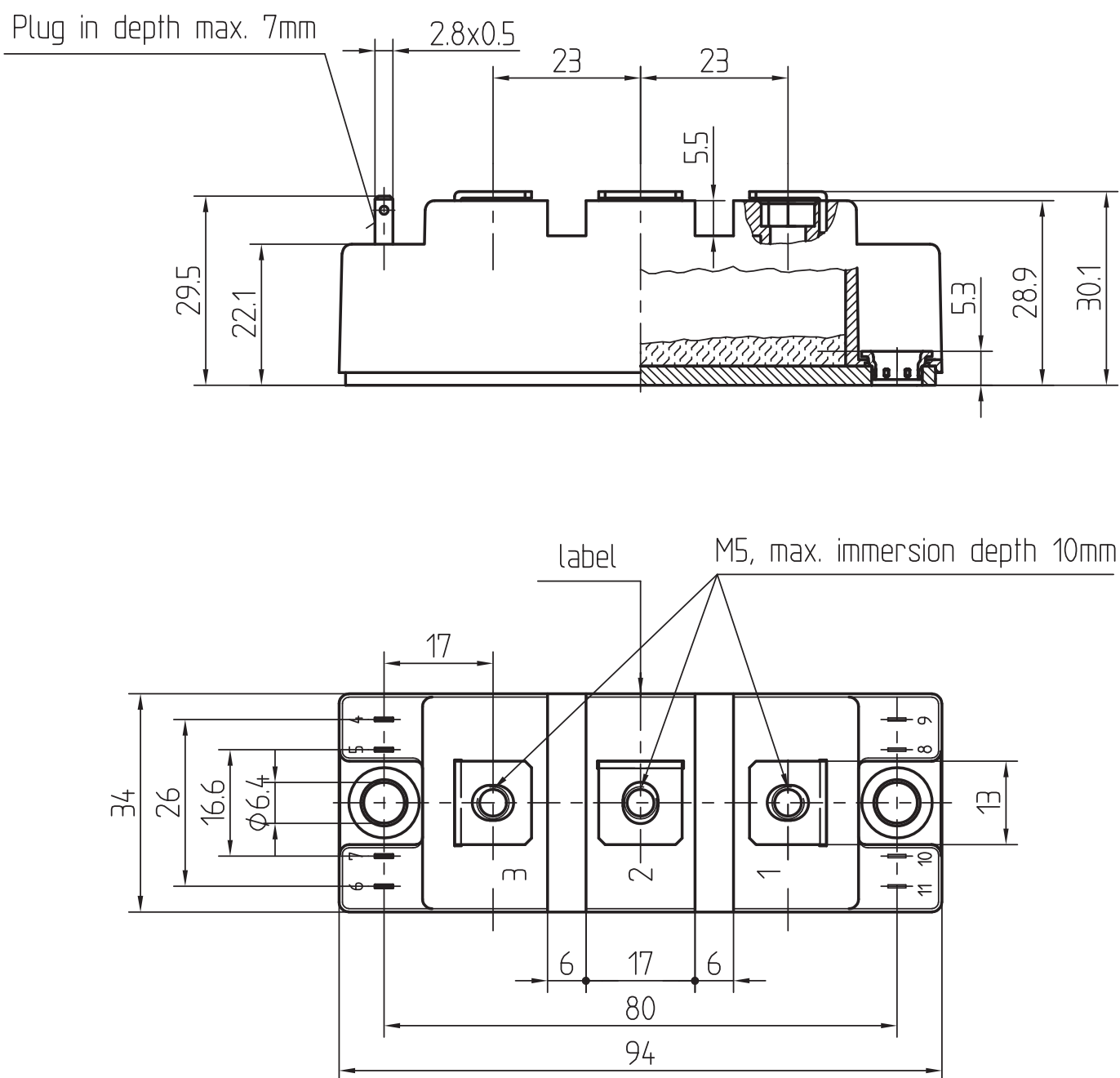


Fig. 6: Typ. gate charge characteristic

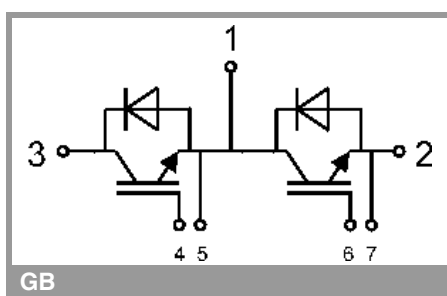


Dimensions in mm



General tolerance ± 0.5 mm

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This is an electrostatic discharge sensitive device (ESDS) due to international standard IEC 61340.

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