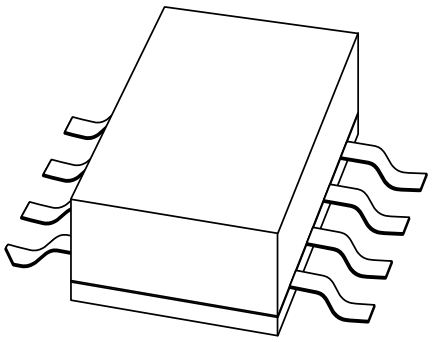
DATA SHEET



BLT52
UHF power transistor

Product specification
Supersedes data of 1997 Oct 15

1998 Jan 28

Philips
Semiconductors

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UHF power transistor BLT52

FEATURES

- Emitter ballasting resistors for an optimum temperature profile
- Gold metallization ensures excellent reliability.

APPLICATIONS

- Common emitter class-B operation in portable radio transmitters in the 470 MHz communication band.

DESCRIPTION

NPN silicon planar epitaxial power transistor encapsulated in a ceramic SOT409A SMD package.

PINNING

PIN	DESCRIPTION
1, 4, 5, 8	emitter
2, 3	base
6, 7	collector

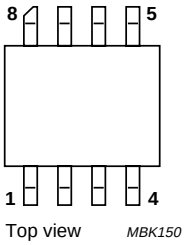


Fig.1 Simplified outline SOT409A.

QUICK REFERENCE DATA

RF performance at $T_{mb} \leq 60$ °C in a common emitter test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	P_L (W)	G_p (dB)	η_C (%)
CW, class-B	470	7.5	7	≥8 typ. 9.5	≥50 typ. 65
		6	3	≥8 typ. 9.5	≥50 typ. 55

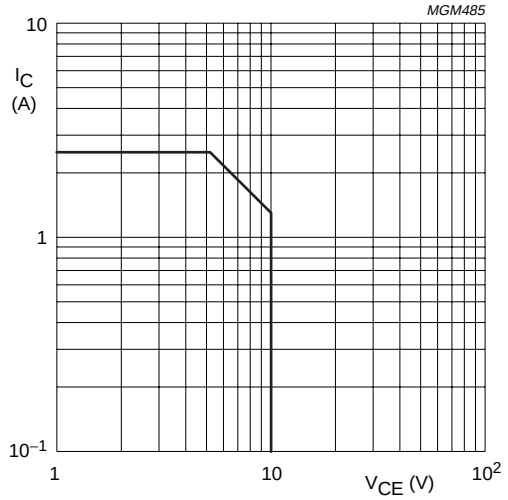
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	20	V
V_{CEO}	collector-emitter voltage	open base	–	10	V
V_{EBO}	emitter-base voltage	open collector	–	3	V
I_C	collector current (DC)		–	2.5	A
P_{tot}	total power dissipation	$T_{mb} \leq 60$ °C	–	13	W
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	200	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}mb}$	thermal resistance from junction to mounting base	P_{tot} = 13 W; $T_{mb} \leq 60$ °C	8	K/W



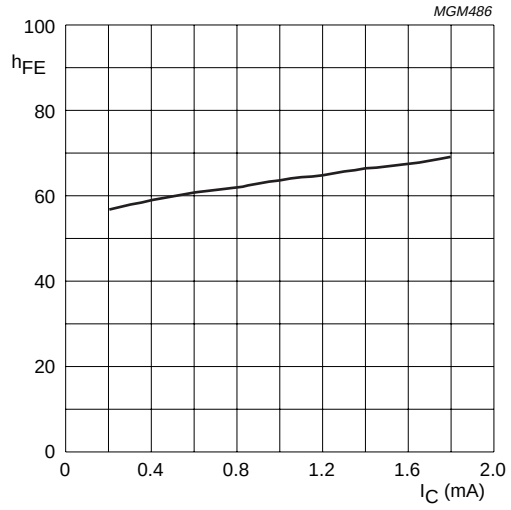
T_{mb} = 60 °C.

Fig.2 DC SOAR.

CHARACTERISTICS

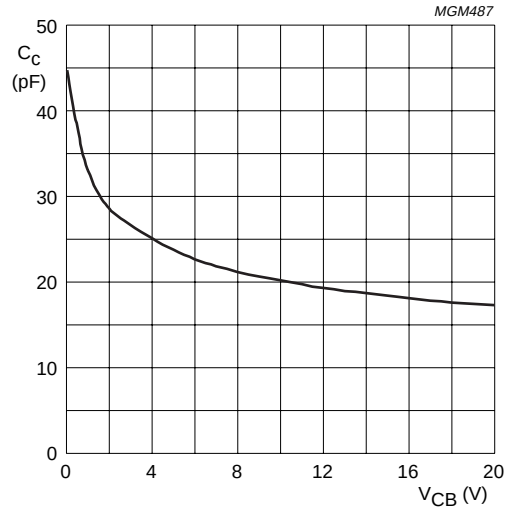
T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CBO}$	collector-base breakdown voltage	open emitter; I_C = 20 mA	20	–	–	V
$V_{(BR)CEO}$	collector-emitter breakdown voltage	open base; I_C = 40 mA	10	–	–	V
$V_{(BR)EBO}$	emitter-base breakdown voltage	open collector; I_E = 4 mA	3	–	–	V
I_{CES}	collector leakage current	V_{BE} = 0; V_{CE} = 7.5 V	–	–	1	mA
h_{FE}	DC current gain	I_C = 1.2 A; V_{CE} = 5 V	25	–	–	
C_c	collector capacitance	$I_E = i_e$ = 0; V_{CB} = 7.5 V; f = 1 MHz	–	24	–	pF
C_{re}	feedback capacitance	I_C = 0; V_{CE} = 7.5 V; f = 1 MHz	–	17	–	pF



V_{CE} = 5 V; T_j = 25 °C.
Measured under pulse conditions: $t_p \leq 300$ µs; $\delta \leq 0.001$.

Fig.3 DC current gain as a function of collector current; typical values.



$I_E = i_e$ = 0; f = 1 MHz; T_j = 25 °C.

Fig.4 Collector capacitance as a function of collector-base voltage; typical values.

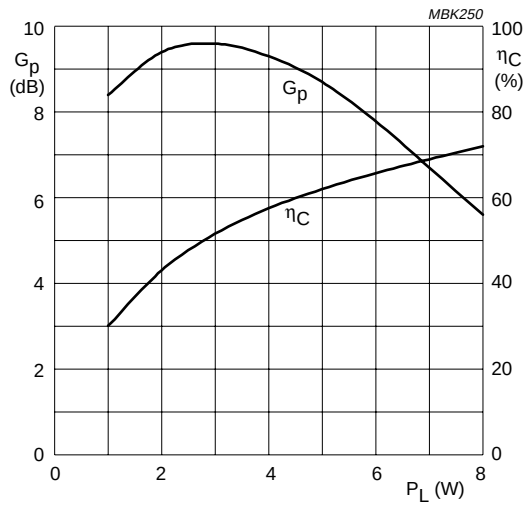
APPLICATION INFORMATION

RF performance at $T_{mb} \leq 60$ °C in a common emitter test circuit.

MODE OF OPERATION	f (MHz)	V_{CE} (V)	P_L (W)	G_p (dB)	η_C (%)
CW, class-B	470	7.5	7	≥8 typ. 9.5	≥50 typ. 65
		6	3	≥8 typ. 9.5	≥50 typ. 55

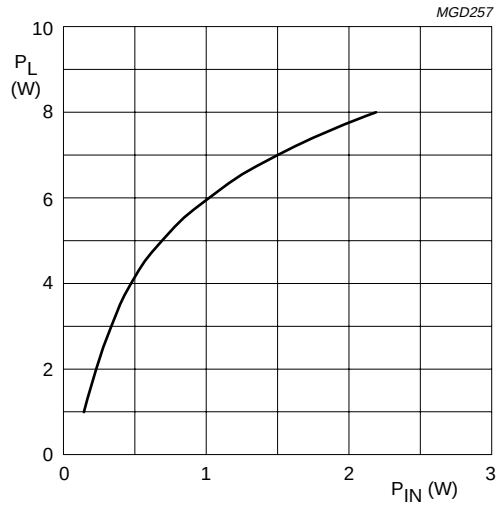
Ruggedness in class-B operation

The BLT52 is capable of withstanding a load mismatch corresponding to VSWR = 10 : 1 through all phases under the following conditions: CW, class-B operation; f = 470 MHz; V_{CE} = 9 V and P_L = 7 W; $T_{mb} \leq 60$ °C.



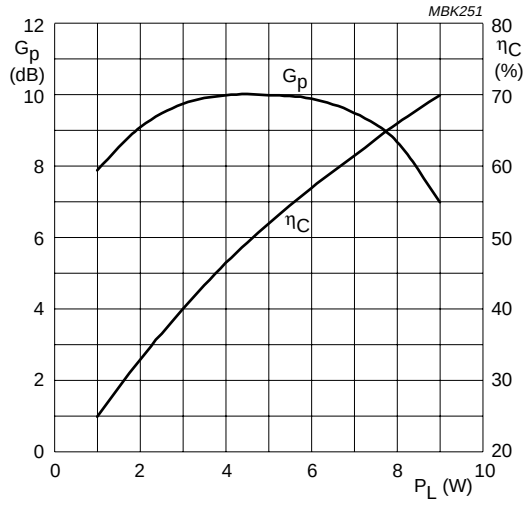
CW, class-B operation; f = 470 MHz; V_{CE} = 6 V; tuned at P_L = 3 W; $T_{mb} \leq 60$ °C.

Fig.5 Power gain and collector efficiency as functions of load power; typical values.



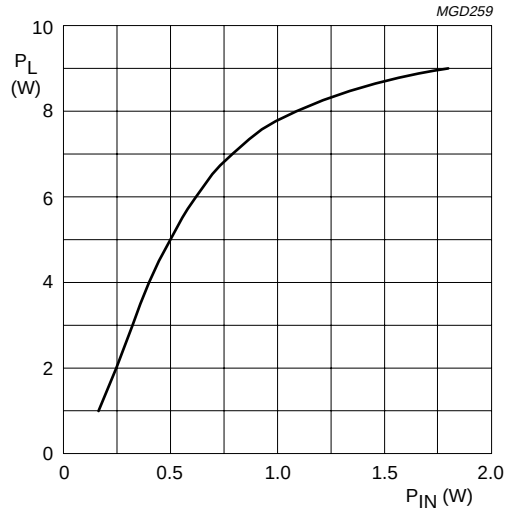
CW, class-B operation; f = 470 MHz; V_{CE} = 6 V; tuned at P_L = 3 W; $T_{mb} \leq 60$ °C.

Fig.6 Load power as a function of input power; typical values.



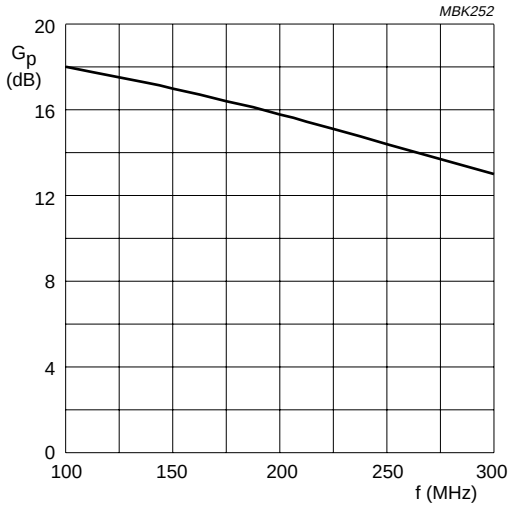
CW, class-B operation; f = 470 MHz; V_{CE} = 7.5 V; tuned at P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.7 Power gain and collector efficiency as functions of load power; typical values.



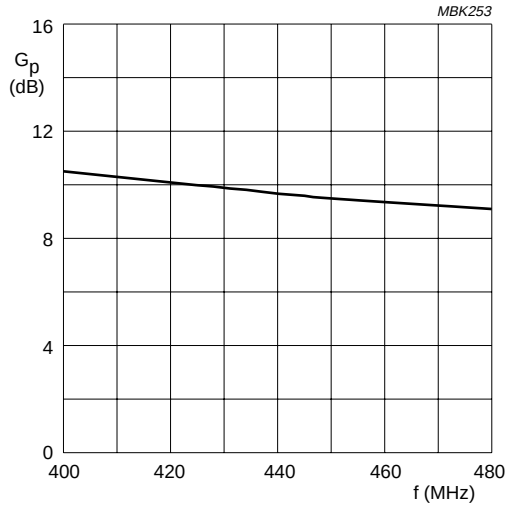
CW, class-B operation; f = 470 MHz; V_{CE} = 7.5 V; tuned at P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.8 Load power as a function of input power; typical values.



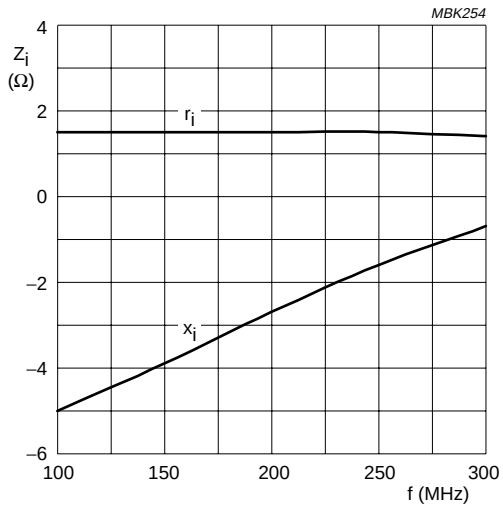
CW, class-B operation; V_{CE} = 7.5 V; P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.9 Power gain as a function of frequency; typical values.



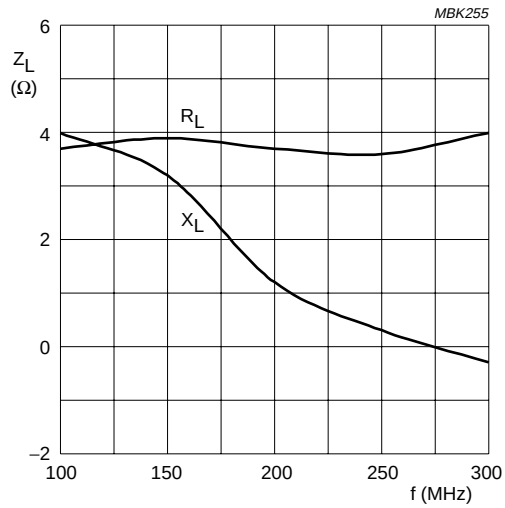
CW, class-B operation; V_{CE} = 7.5 V; P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.10 Power gain as a function of frequency; typical values.



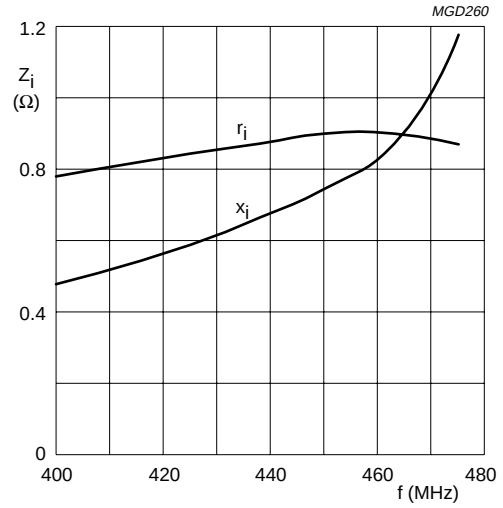
CW, class-B operation; V_{CE} = 7.5 V; P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.11 Input impedance as a function of frequency (series components); typical values.



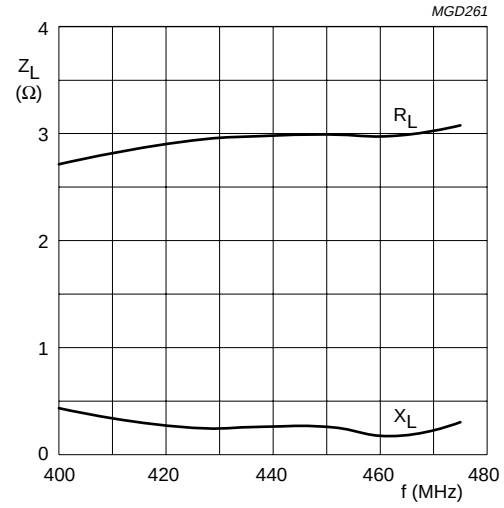
CW, class-B operation; V_{CE} = 7.5 V; P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.12 Load impedance as a function of frequency (series components); typical values.



CW, class-B operation; V_{CE} = 7.5 V; P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.13 Input impedance as a function of frequency (series components); typical values.

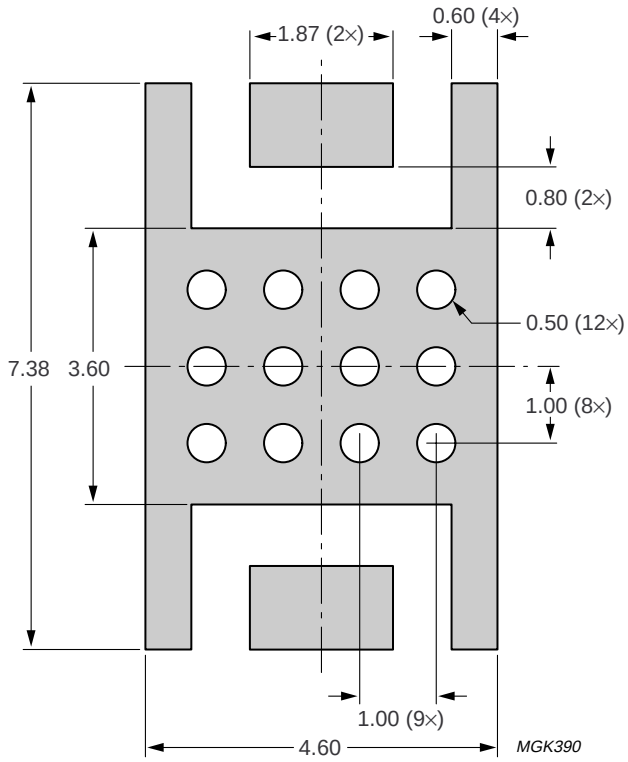


CW, class-B operation; V_{CE} = 7.5 V; P_L = 7 W; $T_{mb} \leq 60$ °C.

Fig.14 Load impedance as a function of frequency (series components); typical values.

MOUNTING RECOMMENDATIONS

Both the metallized groundplate and leads contribute to the heatflow. It is recommended that the transistor is mounted on a grounded metallized area of a maximum thickness of 0.8 mm on the printed-circuit board, equipped with at least 12 (0.5 mm diameter) through metallized holes filled with solder.
A thermal resistance $R_{th(mb-h)}$ of 5 K/W can be achieved if heatsink compound is applied when the transistor is mounted on the printed-circuit board.

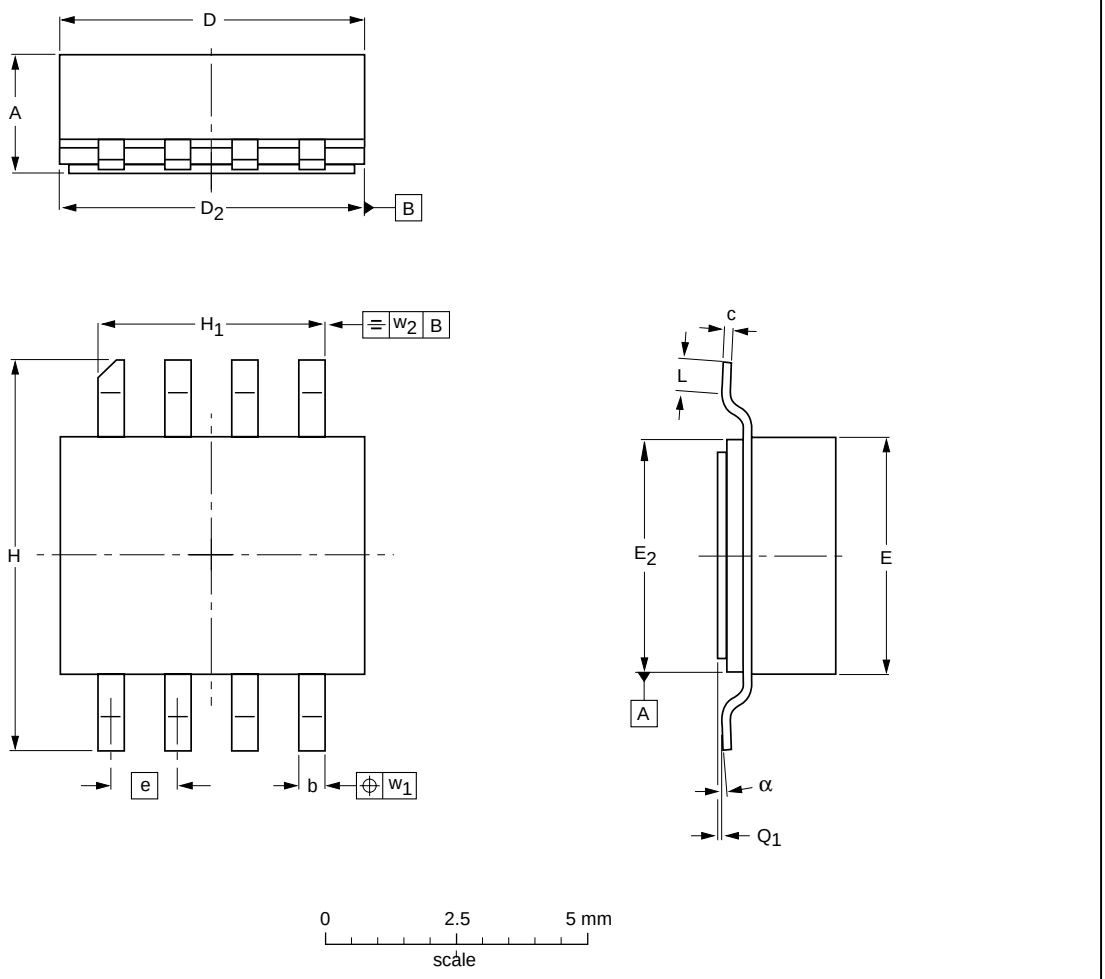


Dimensions in mm.

Fig.15 Reflow soldering footprint for SOT409A.

PACKAGE OUTLINE

Ceramic surface mounted package; 8 leads **SOT409A**



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	b	c	D	D_2	E	E_2	e	H	H_1	L	Q_1	w_1	w_2	α
mm	2.36 2.06	0.58 0.43	0.23 0.18	5.94 5.03	5.16 5.00	4.93 4.01	4.14 3.99	1.27	7.47 7.26	4.39 4.24	1.02 0.51	0.10 0.00	0.25	0.25	7° 0°
inches	0.093 0.081	0.023 0.017	0.009 0.007	0.234 0.198	0.203 0.197	0.194 0.158	0.163 0.157	0.050	0.294 0.286	0.173 0.167	0.040 0.020	0.004 0.000	0.010	0.010	7° 0°

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT409A						97-06-28

DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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