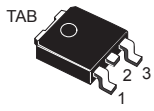
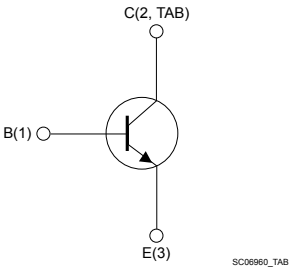
MJD31CT4-A

Datasheet

Automotive-grade low voltage NPN power transistor



DPAK



STPOWER

Features

- AEC-Q101 qualified
- Surface-mounting TO-252 power package in tape and reel
- Complementary to the PNP type MJD32CT4-A

Application

- General purpose linear and switching equipment

Description

The device is manufactured in planar technology with a “base island” layout. The resulting transistor shows exceptional high gain performance coupled with very low saturation voltage.

Product status link
MJD31CT4-A

Product summary	
Order code	MJD31CT4-A
Marking	MJD31C
Package	DPAK
Packing	Tape and reel

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1 Electrical ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0 A)	100	V
V_{CEO}	Collector-emitter voltage (I_B = 0 A)	100	V
V_{EBO}	Collector-base voltage (I_C = 0 A)	5	V
I_C	Collector current	3	A
I_{CM}	Collector peak current	5	A
I_B	Base current	1	A
P_{TOT}	Total power dissipation at T_C = 25 °C	15	W
T_{stg}	Storage temperature range	-65 to 150	°C
T_J	Operating junction temperature range		°C

Table 2. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance, junction-to-case	8.3	°C/W
R_{thJA} (1)	Thermal resistance, junction-to-ambient	50	°C/W

1. *When mounted on a standard 1 inch² area of FR-4 PCB with 2-oz copper.*

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2 Electrical characteristics

T_J = 25°C unless otherwise specified.

Table 3. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector cut-off current	V_{CE} = 100 V, V_{BE} = 0 V		-	20	µA
I_{CEO}	Collector cut-off current	V_{CB} = 60 V, I_B = 0 A		-	50	µA
I_{EBO}	Emitter cut-off current	V_{EB} = 5 V, I_C = 0 A		-	0.1	mA
$V_{CEO(sus)}$ (1)	Collector-emitter sustaining voltage	I_C = 30 mA, I_B = 0 A	100	-		V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = 3 A, I_B = 375 mA		-	1.2	V
$V_{BE(on)}$ (1)	Base-emitter on voltage	I_C = 3 A, V_{CE} = 4 V		-	1.8	V
h_{FE}	DC current gain	I_C = 1 A, V_{CE} = 4 V	25	-		
		I_C = 3 A, V_{CE} = 4 V	10	-	50	

1. *Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %.*

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2.1 Electrical characteristics (curves)

Figure 1. Safe operating area

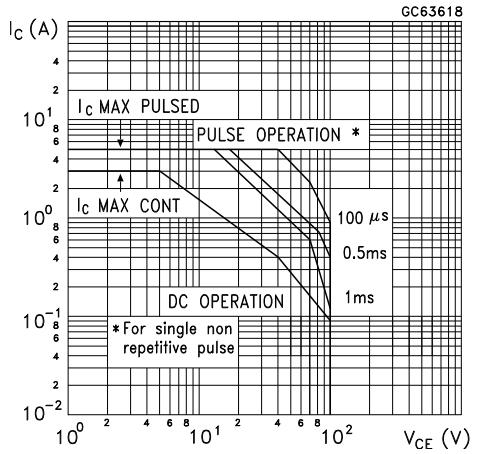


Figure 2. Derating curve

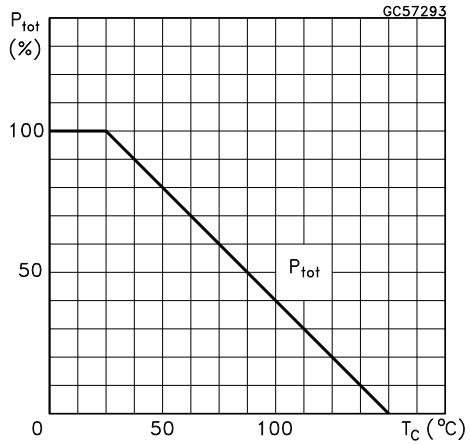


Figure 3. DC current gain (V_{CE} = 2 V)

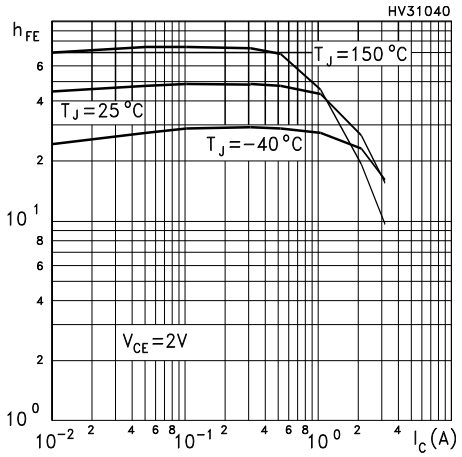


Figure 4. DC current gain (V_{CE} = 4 V)

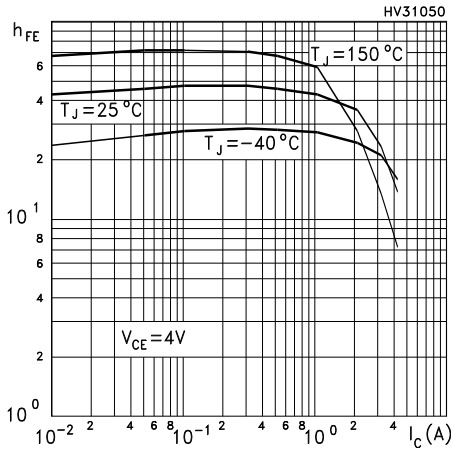


Figure 5. Collector-emitter saturation voltage

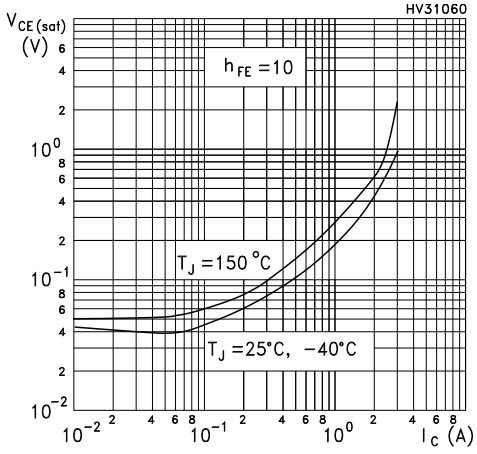
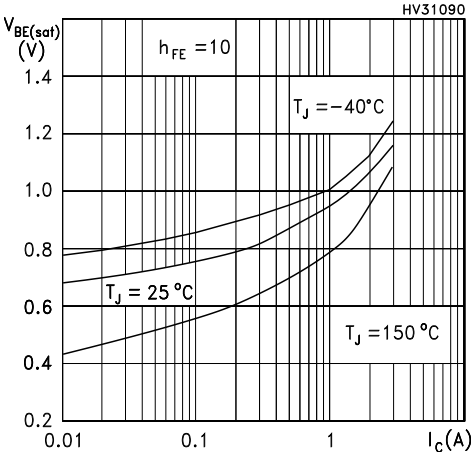


Figure 6. Base-emitter saturation voltage



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Figure 7. Base-emitter on voltage

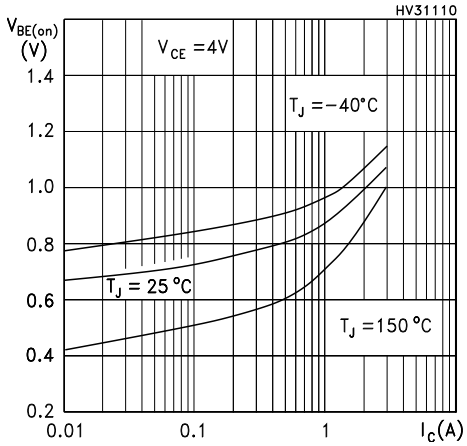


Figure 8. Resistive load switching time (on)

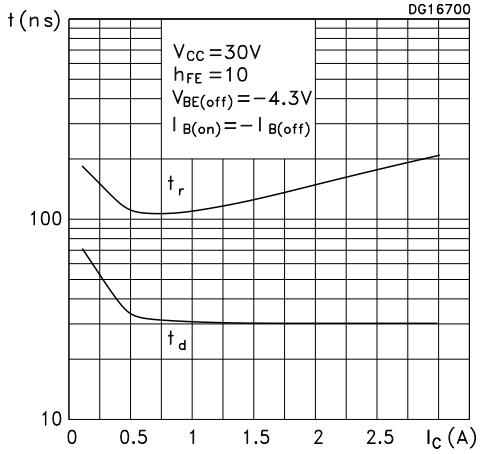
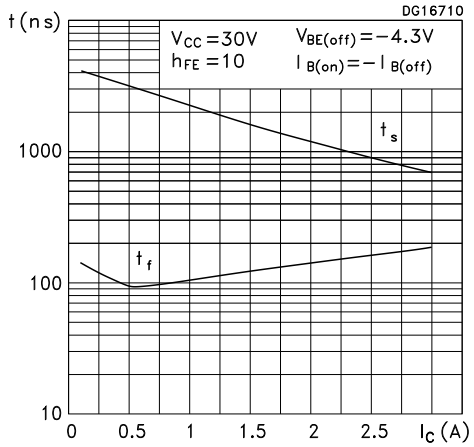


Figure 9. Resistive load switching time (off)



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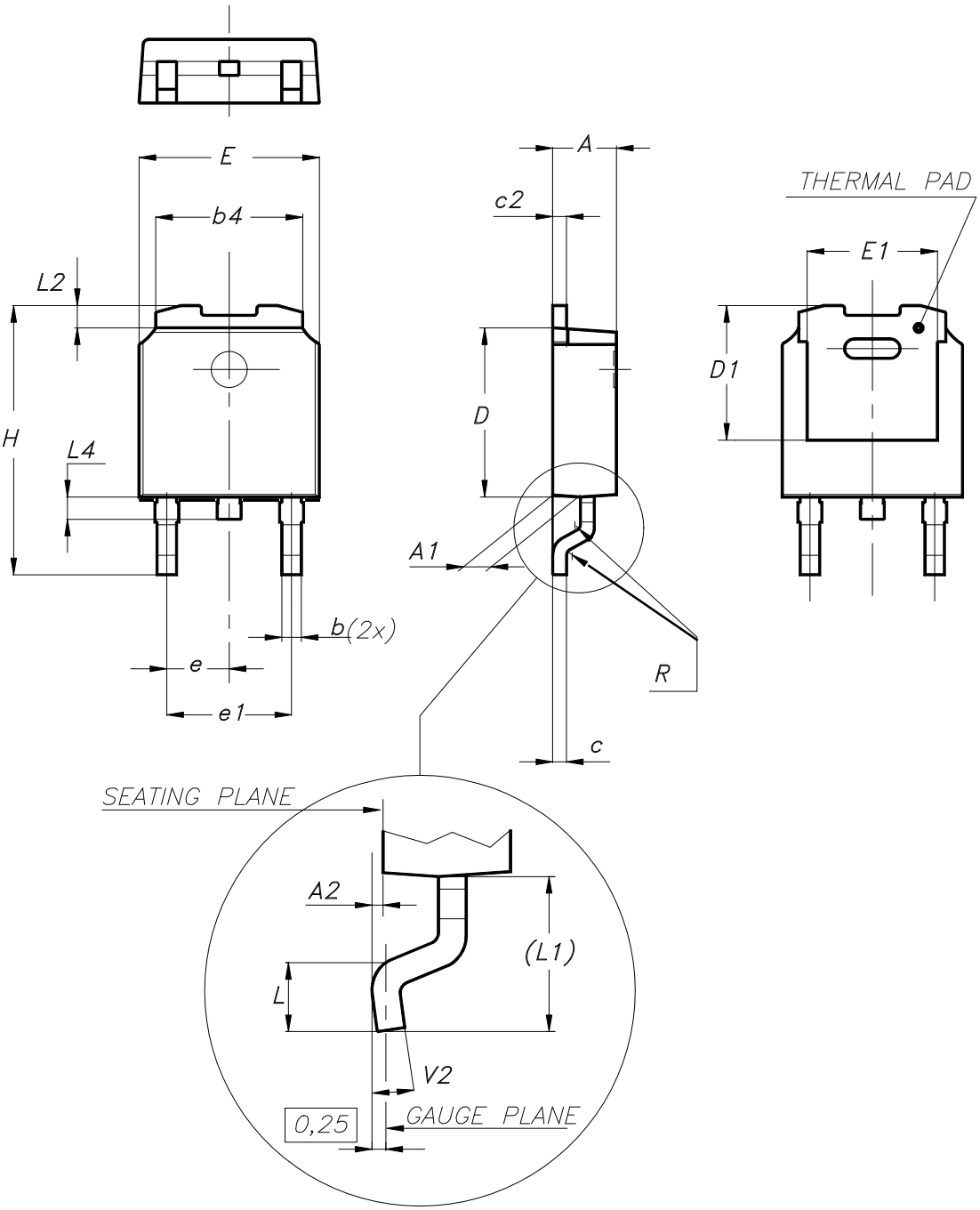
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3 Package information

To meet environmental requirements, ST offers these devices in different grades of ECOPACK packages, depending on their level of environmental compliance. ECOPACK specifications, grade definitions, and product status are available at: www.st.com. ECOPACK is an ST trademark.

3.1 DPAK (TO-252) package information

Figure 10. DPAK (TO-252) type A package outline



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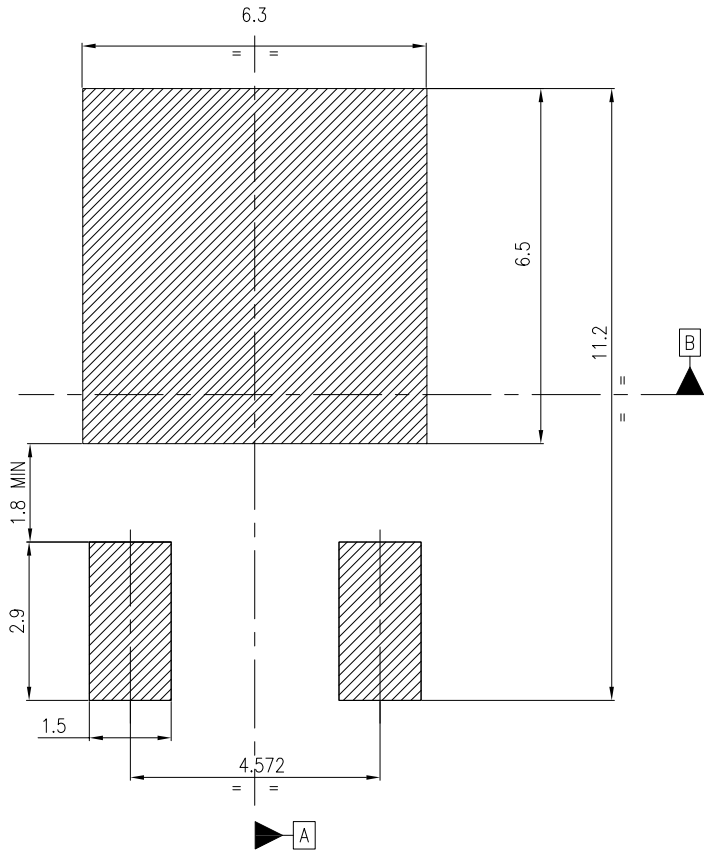
Table 4. **DPAK (TO-252) type A mechanical data**

Dim.	mm		
	Min.	Typ.	Max.
A	2.20		2.40
A1	0.90		1.10
A2	0.03		0.23
b	0.64		0.90
b4	5.20		5.40
c	0.45		0.60
c2	0.48		0.60
D	6.00		6.20
D1	4.95	5.10	5.25
E	6.40		6.60
E1	4.60	4.70	4.80
e	2.159	2.286	2.413
e1	4.445	4.572	4.699
H	9.35		10.10
L	1.00		1.50
(L1)	2.60	2.80	3.00
L2	0.65	0.80	0.95
L4	0.60		1.00
R		0.20	
V2	0°		8°

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Figure 11. **DPAK (TO-252) recommended footprint (dimensions are in mm)**



Notes:

1) This footprint is able to ensure insulation up to 630 Vrms (according to CEI IEC 664−1)

2) The device must be positioned within ⌖ 0.05 A B

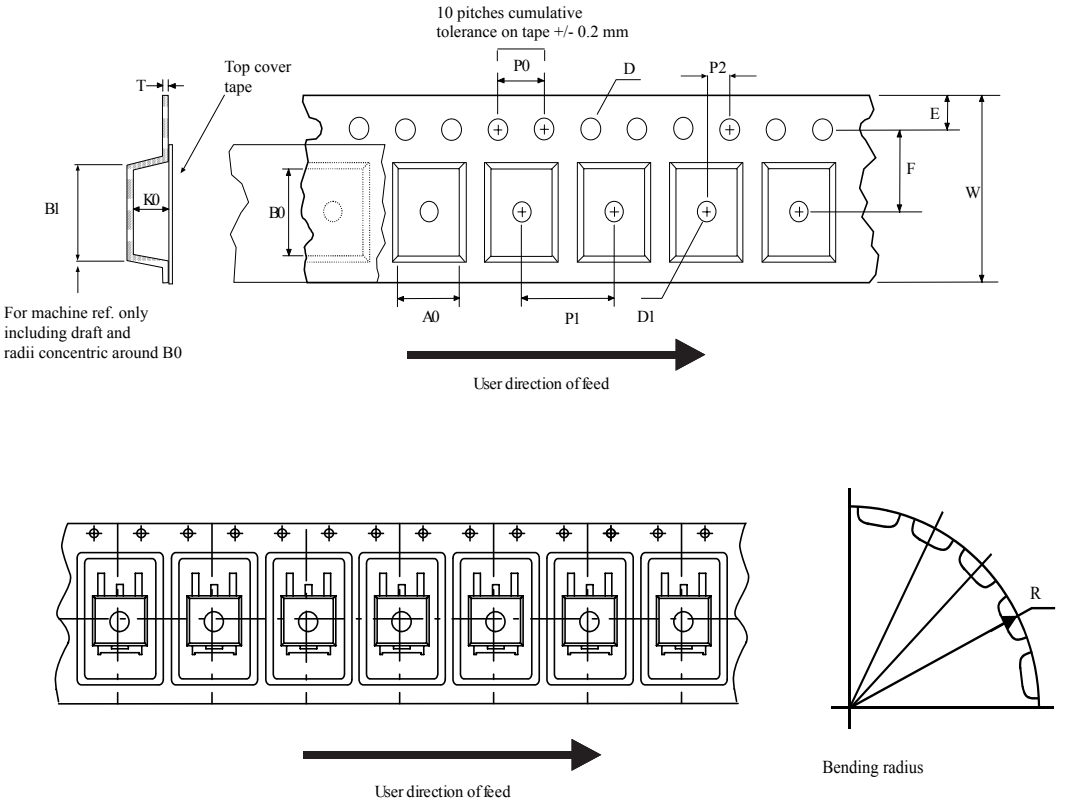
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3.2 DPAK (TO-252) packing information

Figure 12. **DPAK (TO-252) tape outline**

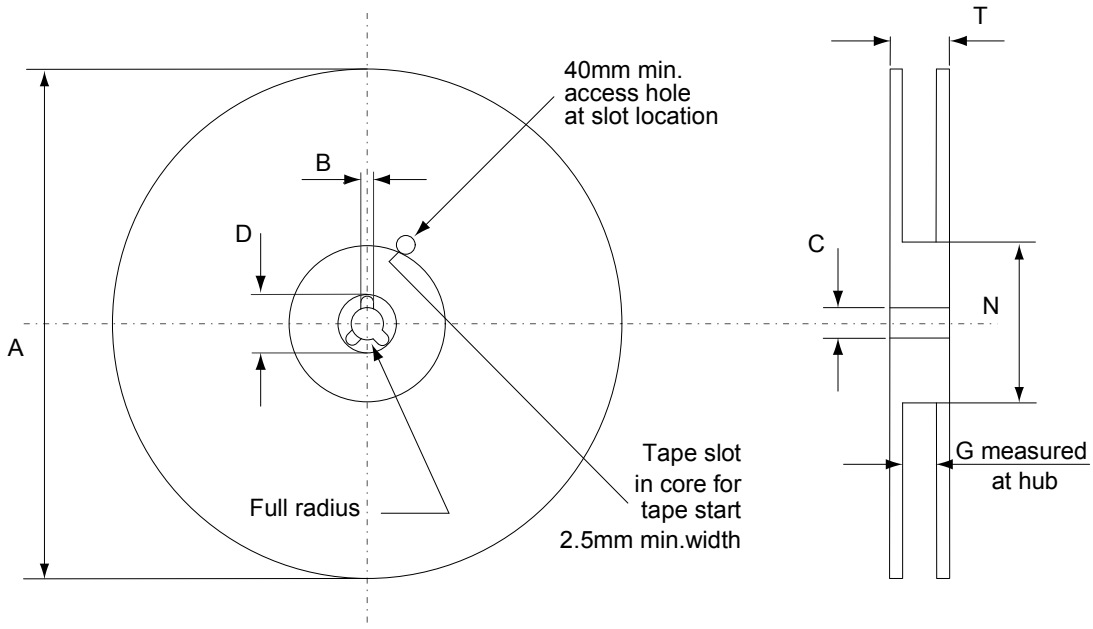


AM08852v1

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Figure 13. **DPAK (TO-252) reel outline**



AM06038v1

Table 5. **DPAK (TO-252) tape and reel mechanical data**

Tape			Reel		
Dim.	mm		Dim.	mm	
	Min.	Max.		Min.	Max.
A0	6.8	7	A		330
B0	10.4	10.6	B	1.5	
B1		12.1	C	12.8	13.2
D	1.5	1.6	D	20.2	
D1	1.5		G	16.4	18.4
E	1.65	1.85	N	50	
F	7.4	7.6	T		22.4
K0	2.55	2.75			
P0	3.9	4.1	Base qty.		2500
P1	7.9	8.1	Bulk qty.		2500
P2	1.9	2.1			
R	40				
T	0.25	0.35			
W	15.7	16.3			

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Revision history

Table 6. **Document revision history**

Date	Revision	Changes
24-Apr-2007	1	Initial release.
09-Nov-2009	2	Updated package mechanical data.
14-Jan-2010	3	Modified *Table 3* on *page 2*.
19-Jun-2012	4	Modified: mechanical data
04-Jul-2024	5	Updated *Features* on cover page. Removed section test circuits. Updated *Section 3.1: DPAK (TO-252) package information.* Minor text changes.
16-Jun-2025	6	Updated Table 3. Electrical characteristics. Minor text changes.

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