

# MPS4250

## Transistor

### PNP Silicon

#### Features

- This is a Pb-Free Device\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CEO}$	-40	Vdc
Collector - Emitter Voltage	$V_{CES}$	-40	Vdc
Collector - Base Voltage	$V_{CBO}$	-40	Vdc
Emitter - Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current - Continuous	$I_C$	-50	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	W mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

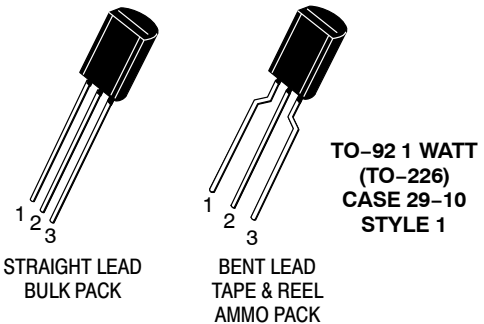
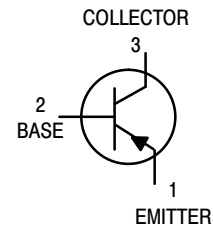
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

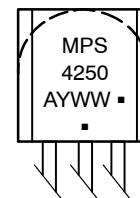


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#### MARKING DIAGRAM



- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

Device	Package	Shipping†
MPS4250G	TO-92 (Pb-Free)	5000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MPS4250

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

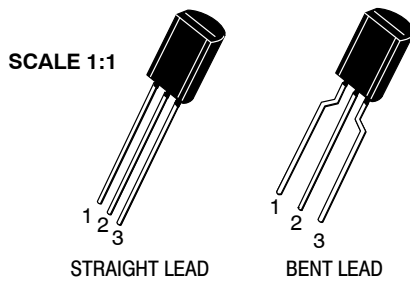
Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector – Emitter Breakdown Voltage ( $I_C = -5.0\text{ mA}$ )	$V_{(BR)CES}$	-40	-	Vdc
Collector – Emitter Sustaining Voltage (Note 1) ( $I_C = -5.0$ )	$V_{(BR)CEO(sus)}$	-40	-	Vdc
Collector – Base Breakdown Voltage ( $I_C = -10\ \mu\text{A}$ )	$V_{(BR)CBO}$	-40	-	Vdc
Emitter – Base Breakdown Voltage ( $I_E = -10\ \mu\text{A}$ )	$V_{(BR)EBO}$	-5.0	-	Vdc
Collector Cutoff Current ( $V_{CB} = -50\text{ V}$ ) ( $V_{CB} = -40\text{ V}$ , $T_A = 65^\circ\text{C}$ )	$I_{CBO}$	-	-10 -3.0	nA $\mu\text{A}$
Emitter Cutoff Current ( $V_{EB} = -3.0\text{ V}$ )	$I_{EBO}$	-	-20	nA
<b>ON CHARACTERISTICS</b>				
DC Current Gain ( $I_C = -1.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ ) ( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )	$h_{FE}$	250 250	- -	-
Collector – Emitter Saturation Voltage (Note 1) ( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ )	$V_{CE(sat)}$	-	-0.25	Vdc
Base – Emitter Saturation Voltage (Note 1) ( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ )	$V_{BE(sat)}$	-	-0.9	Vdc
<b>SMALL-SIGNAL CHARACTERISTICS</b>				
Output Capacitance ( $V_{CB} = -5.0\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{obo}$	-	6.0	pF
Input Capacitance ( $V_{EB} = -0.5\text{ V}$ , $f = 1.0\text{ MHz}$ )	$C_{ibo}$	-	16	pF
Small-Signal Current Gain ( $I_C = -1.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ , $f = 1.0\text{ kHz}$ ) ( $I_C = -0.5\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ , $f = 20\text{ MHz}$ )	$h_{fe}$	250 2.0	800 -	-
Noise Figure ( $I_C = -20\ \mu\text{A}$ , $V_{CE} = -5.0\text{ V}$ , $R_S = 10\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $P_{BW} = 150\text{ Hz}$ ) ( $I_C = -250\ \mu\text{A}$ , $V_{CE} = -5.0\text{ V}$ , $R_S = 1.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $P_{BW} = 150\text{ Hz}$ )	NF	- -	2.0 2.0	dB

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ ; Duty Cycle = 2.0%.

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

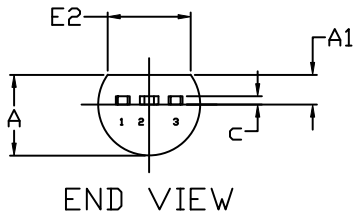
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TO-92 (TO-226) 1 WATT  
CASE 29-10  
ISSUE D

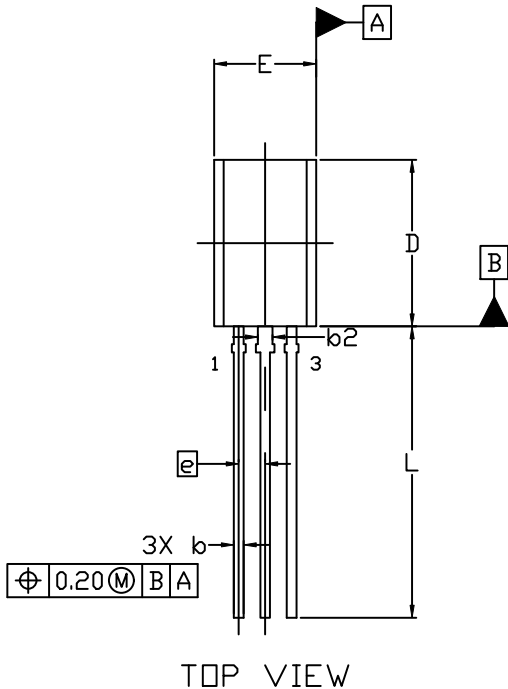
DATE 05 MAR 2021

### STRAIGHT LEAD



#### NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR GATE PROTRUSIONS.
4. DIMENSION b AND b2 DOES NOT INCLUDE DAMBAR PROTRUSION. LEAD WIDTH INCLUDING PROTRUSION SHALL NOT EXCEED 0.20. DIMENSION b2 LOCATED ABOVE THE DAMBAR PORTION OF MIDDLE LEAD.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	3.75	3.90	4.05
A1	1.28	1.43	1.58
b	0.38	0.465	0.55
b2	0.62	0.70	0.78
c	0.35	0.40	0.45
D	7.85	8.00	8.15
E	4.75	4.90	5.05
E2	3.90	---	---
e	1.27 BSC		
L	13.80	14.00	14.20

### STYLES AND MARKING ON PAGE 3

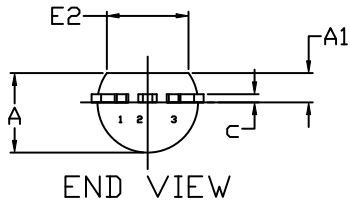
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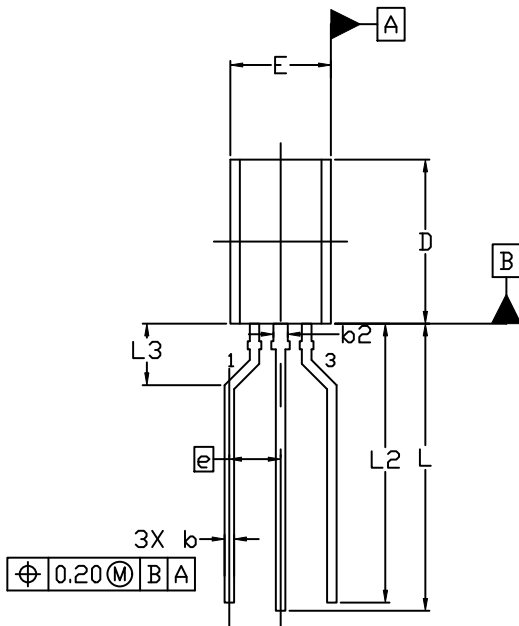
**TO-92 (TO-226) 1 WATT**  
**CASE 29-10**  
**ISSUE D**

DATE 05 MAR 2021

FORMED LEAD



END VIEW



TOP VIEW


NOTES:

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DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	3.75	3.90	4.05
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b2	0.62	0.70	0.78
c	0.35	0.40	0.45
D	7.85	8.00	8.15
E	4.75	4.90	5.05
E2	3.90	---	---
e	2.50 BSC		
L	13.80	14.00	14.20
L2	13.20	13.60	14.00
L3	3.00 REF		

**STYLES AND MARKING ON PAGE 3**

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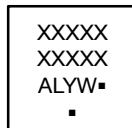
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**TO-92 (TO-226) 1 WATT  
CASE 29-10  
ISSUE D**

DATE 05 MAR 2021

- |   |  |  |   |   |
|---|--|--|---|---|
| <p>STYLE 1:<br/>PIN 1. EMITTER<br/>2. BASE<br/>3. COLLECTOR</p>             | <p>STYLE 2:<br/>PIN 1. BASE<br/>2. EMITTER<br/>3. COLLECTOR</p>                | <p>STYLE 3:<br/>PIN 1. ANODE<br/>2. ANODE<br/>3. CATHODE</p>               | <p>STYLE 4:<br/>PIN 1. CATHODE<br/>2. CATHODE<br/>3. ANODE</p>            | <p>STYLE 5:<br/>PIN 1. DRAIN<br/>2. SOURCE<br/>3. GATE</p>            |
| <p>STYLE 6:<br/>PIN 1. GATE<br/>2. SOURCE &amp; SUBSTRATE<br/>3. DRAIN</p>  | <p>STYLE 7:<br/>PIN 1. SOURCE<br/>2. DRAIN<br/>3. GATE</p>                     | <p>STYLE 8:<br/>PIN 1. DRAIN<br/>2. GATE<br/>3. SOURCE &amp; SUBSTRATE</p> | <p>STYLE 9:<br/>PIN 1. BASE 1<br/>2. EMITTER<br/>3. BASE 2</p>            | <p>STYLE 10:<br/>PIN 1. CATHODE<br/>2. GATE<br/>3. ANODE</p>          |
| <p>STYLE 11:<br/>PIN 1. ANODE<br/>2. CATHODE &amp; ANODE<br/>3. CATHODE</p> | <p>STYLE 12:<br/>PIN 1. MAIN TERMINAL 1<br/>2. GATE<br/>3. MAIN TERMINAL 2</p> | <p>STYLE 13:<br/>PIN 1. ANODE 1<br/>2. GATE<br/>3. CATHODE 2</p>           | <p>STYLE 14:<br/>PIN 1. EMITTER<br/>2. COLLECTOR<br/>3. BASE</p>          | <p>STYLE 15:<br/>PIN 1. ANODE 1<br/>2. CATHODE<br/>3. ANODE 2</p>     |
| <p>STYLE 16:<br/>PIN 1. ANODE<br/>2. GATE<br/>3. CATHODE</p>                | <p>STYLE 17:<br/>PIN 1. COLLECTOR<br/>2. BASE<br/>3. EMITTER</p>               | <p>STYLE 18:<br/>PIN 1. ANODE<br/>2. CATHODE<br/>3. NOT CONNECTED</p>      | <p>STYLE 19:<br/>PIN 1. GATE<br/>2. ANODE<br/>3. CATHODE</p>              | <p>STYLE 20:<br/>PIN 1. NOT CONNECTED<br/>2. CATHODE<br/>3. ANODE</p> |
| <p>STYLE 21:<br/>PIN 1. COLLECTOR<br/>2. EMITTER<br/>3. BASE</p>            | <p>STYLE 22:<br/>PIN 1. SOURCE<br/>2. GATE<br/>3. DRAIN</p>                    | <p>STYLE 23:<br/>PIN 1. GATE<br/>2. SOURCE<br/>3. DRAIN</p>                | <p>STYLE 24:<br/>PIN 1. EMITTER<br/>2. COLLECTOR/ANODE<br/>3. CATHODE</p> | <p>STYLE 25:<br/>PIN 1. MT 1<br/>2. GATE<br/>3. MT 2</p>              |
| <p>STYLE 26:<br/>PIN 1. V<sub>CC</sub><br/>2. GROUND 2<br/>3. OUTPUT</p>    | <p>STYLE 27:<br/>PIN 1. MT<br/>2. SUBSTRATE<br/>3. MT</p>                      | <p>STYLE 28:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. GATE</p>               | <p>STYLE 29:<br/>PIN 1. NOT CONNECTED<br/>2. ANODE<br/>3. CATHODE</p>     | <p>STYLE 30:<br/>PIN 1. DRAIN<br/>2. GATE<br/>3. SOURCE</p>           |
| <p>STYLE 31:<br/>PIN 1. GATE<br/>2. DRAIN<br/>3. SOURCE</p>                 | <p>STYLE 32:<br/>PIN 1. BASE<br/>2. COLLECTOR<br/>3. EMITTER</p>               | <p>STYLE 33:<br/>PIN 1. RETURN<br/>2. INPUT<br/>3. OUTPUT</p>              | <p>STYLE 34:<br/>PIN 1. INPUT<br/>2. GROUND<br/>3. LOGIC</p>              | <p>STYLE 35:<br/>PIN 1. GATE<br/>2. COLLECTOR<br/>3. EMITTER</p>      |

**GENERIC  
MARKING DIAGRAM\***



- XXXX = Specific Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

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