

MPSA28, MPSA29

MPSA29 is a Preferred Device

Darlington Transistors

NPN Silicon

Features

- Pb-Free Packages are Available*

MAXIMUM RATINGS

Rating	Symbol	Value	Unit	
Collector-Emitter Voltage	MPSA28 MPSA29	V_{CES}	80 100	Vdc
Collector-Base Voltage	MPSA28 MPSA29	V_{CBO}	80 100	Vdc
Emitter-Base Voltage		V_{EBO}	12	Vdc
Collector Current - Continuous		I_C	500	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C		P_D	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°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	$^\circ\text{C}/\text{W}$

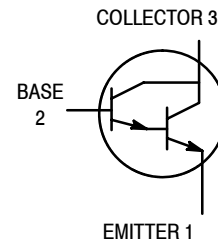
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

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

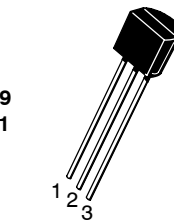


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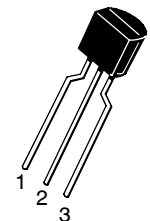
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TO-92
CASE 29
STYLE 1

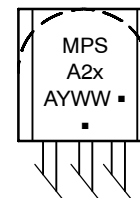


STRAIGHT LEAD
BULK PACK



BENT LEAD
TAPE & REEL
AMMO PACK

MARKING DIAGRAM



- x = 8 or 9
- A = Assembly Location
- Y = Year
- WW = Work Week
- = Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping
MPSA28RLRPG	TO-92 (Pb-Free)	2000/Ammo Pack
MPSA29G	TO-92 (Pb-Free)	5000 Units/Bulk
MPSA29RLRP	TO-92	2000/Ammo Pack
MPSA29RLRPG	TO-92 (Pb-Free)	2000/Ammo Pack

Preferred devices are recommended choices for future use and best overall value.

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

Characteristic	Symbol	Min	Typ	Max	Unit	
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $V_{BE} = 0$)	MPSA28 MPSA29	$V_{(BR)CES}$	80 100	- -	- -	Vdc
Collector-Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}$, $I_E = 0$)	MPSA28 MPSA29	$V_{(BR)CBO}$	80 100	- -	- -	Vdc
Emitter-Base Breakdown Voltage ($I_E = 10 \mu\text{Adc}$, $I_C = 0$)		$V_{(BR)EBO}$	12	-	-	Vdc
Collector Cutoff Current ($V_{CB} = 60 \text{ Vdc}$, $I_E = 0$) ($V_{CB} = 80 \text{ Vdc}$, $I_E = 0$)	MPSA28 MPSA29	I_{CBO}	- -	- -	100 100	nAdc
Collector Cutoff Current ($V_{CE} = 60 \text{ Vdc}$, $V_{BE} = 0$) ($V_{CE} = 80 \text{ Vdc}$, $V_{BE} = 0$)	MPSA28 MPSA29	I_{CES}	- -	- -	500 500	nAdc
Emitter Cutoff Current ($V_{EB} = 10 \text{ Vdc}$, $I_C = 0$)		I_{EBO}	-	-	100	nAdc
ON CHARACTERISTICS (Note 1)						
DC Current Gain ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$) ($I_C = 100 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)		h_{FE}	10,000 10,000	- -	- -	-
Collector-Emitter Saturation Voltage ($I_C = 10 \text{ mAdc}$, $I_B = 0.01 \text{ mAdc}$) ($I_C = 100 \text{ mAdc}$, $I_B = 0.1 \text{ mAdc}$)		$V_{CE(sat)}$	- -	0.7 0.8	1.2 1.5	Vdc
Base-Emitter On Voltage ($I_C = 100 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$)		$V_{BE(on)}$	-	1.4	2.0	Vdc
SMALL-SIGNAL CHARACTERISTICS						
Current-Gain - Bandwidth Product (Note 2) ($I_C = 10 \text{ mAdc}$, $V_{CE} = 5.0 \text{ Vdc}$, $f = 100 \text{ MHz}$)		f_T	125	200	-	MHz
Output Capacitance ($V_{CB} = 10 \text{ Vdc}$, $I_E = 0$, $f = 1.0 \text{ MHz}$)		Cobo	-	5.0	8.0	pF

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

2. $f_T = h_{fe} \cdot f_{test}$.

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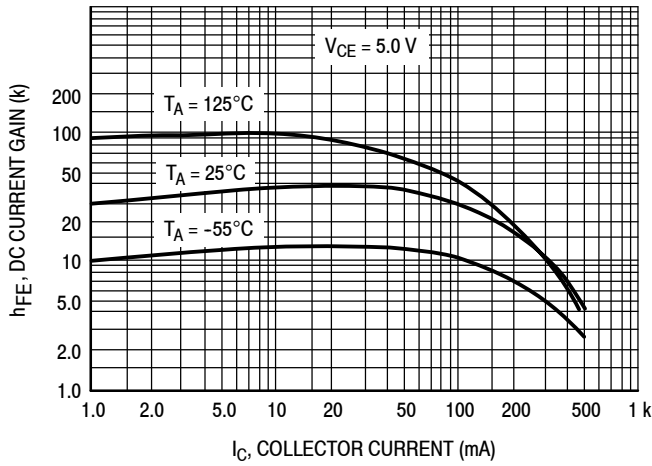


Figure 1. DC Current Gain

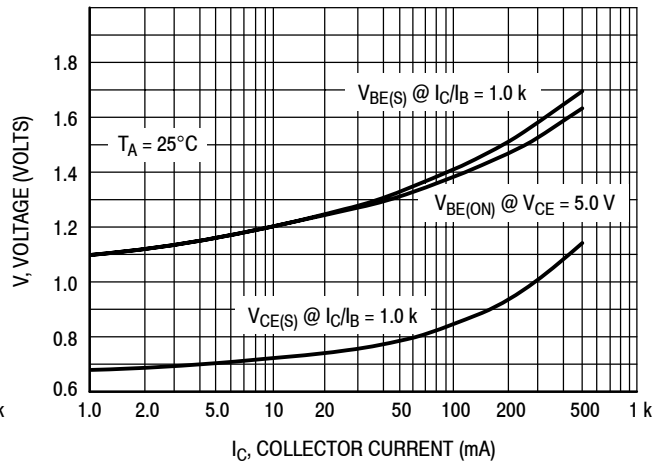


Figure 2. "ON" Voltages

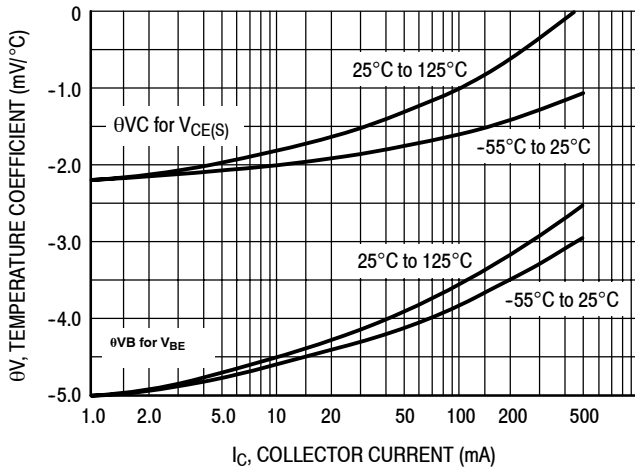


Figure 3. Temperature Coefficients

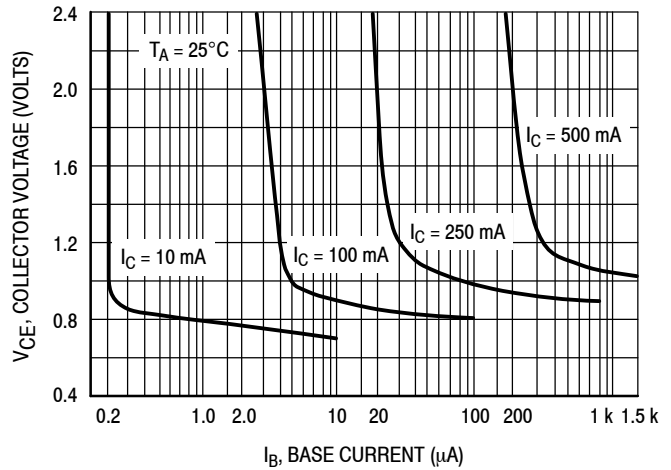


Figure 4. Collector Saturation Region

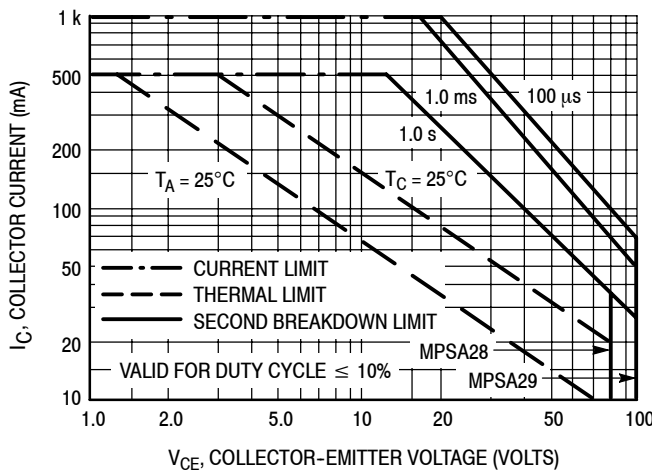


Figure 5. Active Region - Safe Operating Area

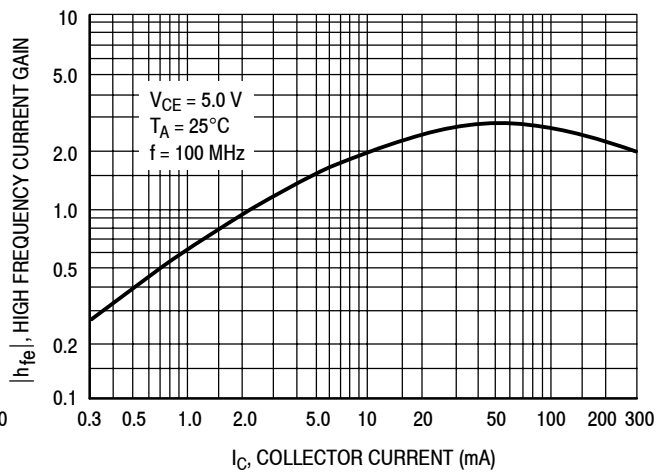
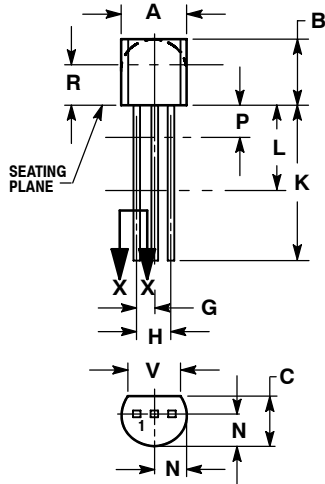


Figure 6. High Frequency Current Gain

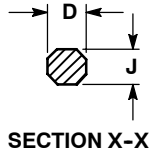
MPSA28, MPSA29

PACKAGE DIMENSIONS

TO-92 (TO-226)
CASE 29-11
ISSUE AM



STRAIGHT LEAD
BULK PACK

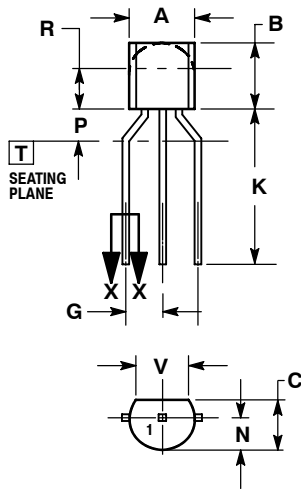


SECTION X-X

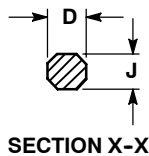
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---



BENT LEAD
TAPE & REEL
AMMO PACK



SECTION X-X

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	MILLIMETERS	
	MIN	MAX
A	4.45	5.20
B	4.32	5.33
C	3.18	4.19
D	0.40	0.54
G	2.40	2.80
J	0.39	0.50
K	12.70	---
N	2.04	2.66
P	1.50	4.00
R	2.93	---
V	3.43	---

STYLE 1:

1. EMITTER
2. BASE
3. COLLECTOR

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