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MPSA28, MPSA29

MPSA29 is a Preferred Device

Darlington Transistors

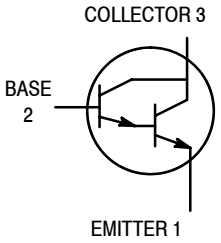
NPN Silicon

ON Semiconductor®

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Features

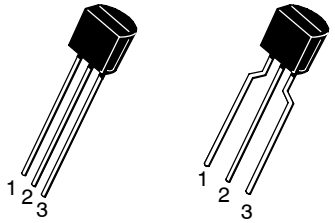
- Pb-Free Packages are Available*



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°C Derate above 25°C		P_D	625 5.0	mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C		P_D	1.5 12	W mW/°C
Operating and Storage Junction Temperature Range		T_J, T_{stg}	-55 to +150	°C

TO-92
CASE 29
STYLE 1



STRAIGHT LEAD
BULK PACK

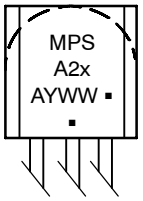
BENT LEAD
TAPE & REEL
AMMO PACK

THERMAL CHARACTERISTICS

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

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.

*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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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

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

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. $f_T = h_{fe} \bullet f_{test}$.

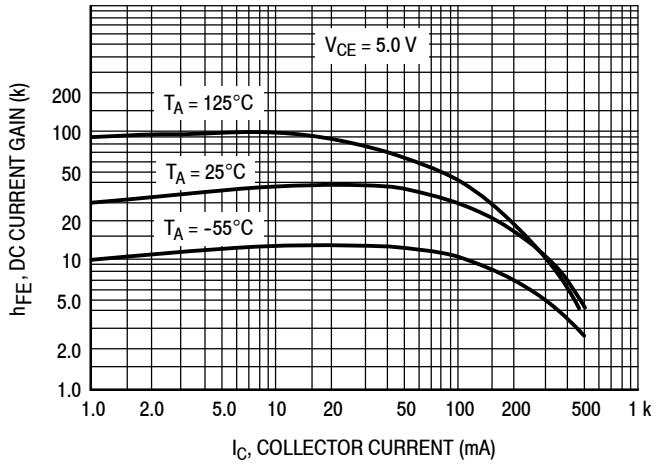


Figure 1. DC Current Gain

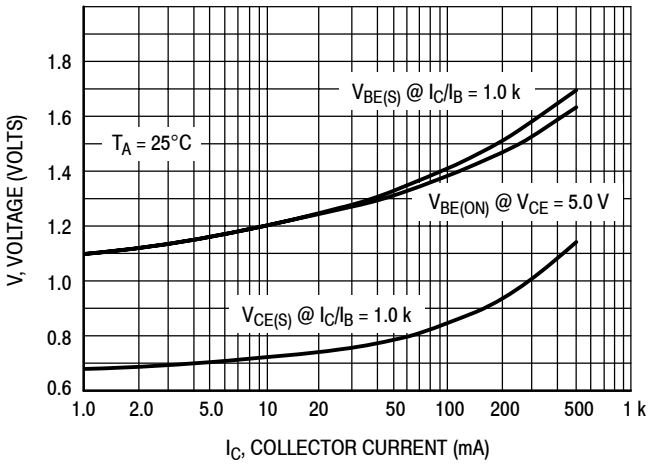


Figure 2. “ON” Voltages

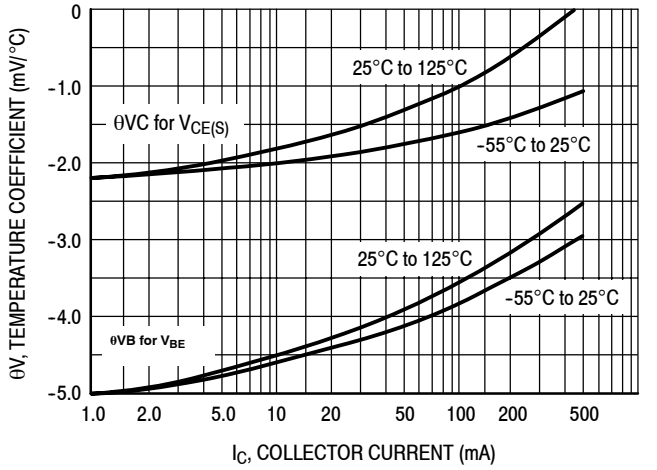


Figure 3. Temperature Coefficients

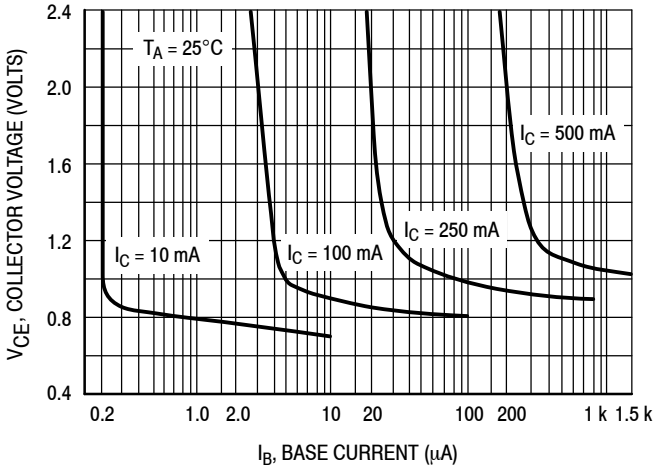


Figure 4. Collector Saturation Region

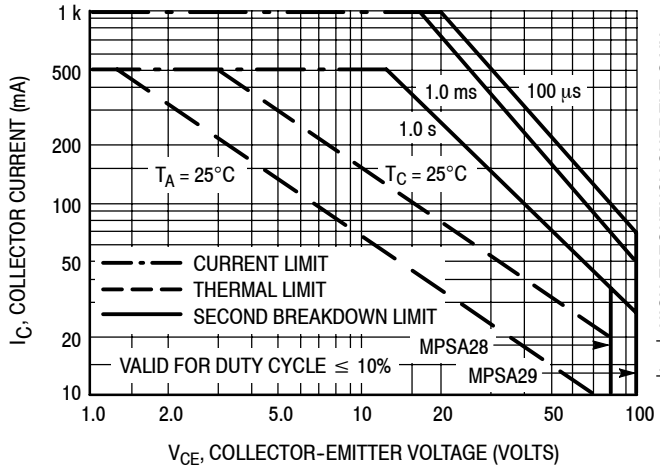


Figure 5. Active Region − Safe Operating Area

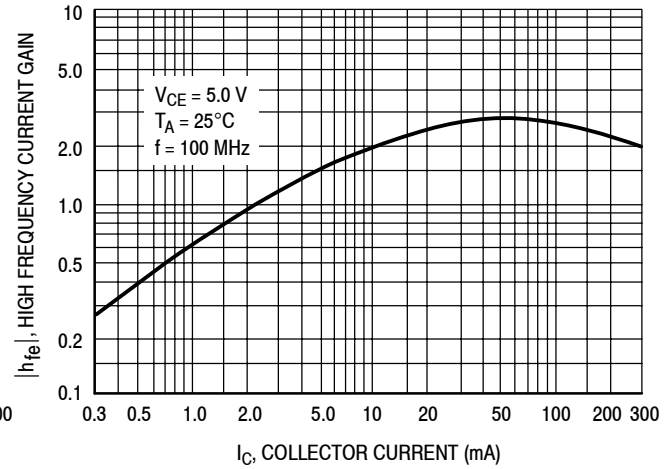
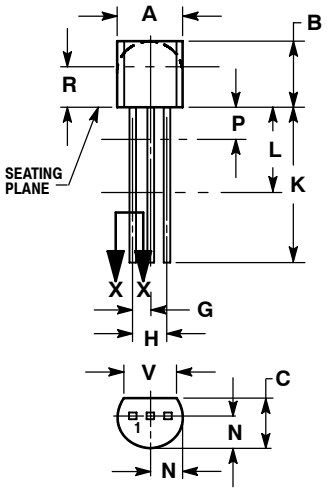


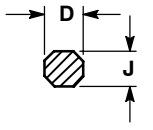
Figure 6. High Frequency Current Gain

PACKAGE DIMENSIONS

TO−92 (TO−226)
CASE 29−11
ISSUE AM



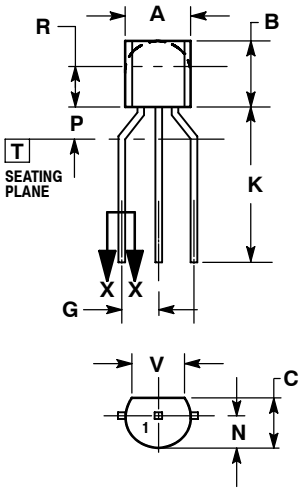
STRAIGHT LEAD
BULK PACK



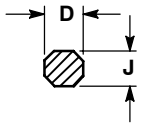
SECTION X−X

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.

	INCHES		MILLIMETERS	
DIM	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.

	MILLIMETERS	
DIM	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:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

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