



# THE DATASHEET OF MPSA93RLRMG



# MPSA92, MPSA93

## High Voltage Transistors

### PNP Silicon



ON Semiconductor®

<http://onsemi.com>

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

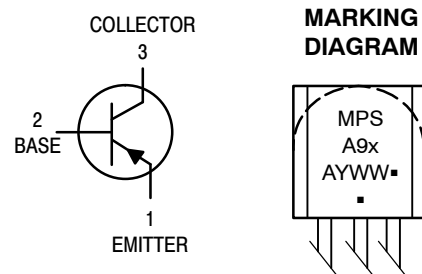
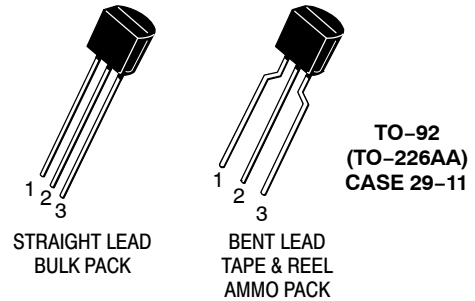
Rating	Symbol	Value	Unit
Collector–Emitter Voltage MPSA93 MPSA92	$V_{CEO}$	-200 -300	Vdc
Collector–Base Voltage MPSA93 MPSA92	$V_{CBO}$	-200 -300	Vdc
Emitter–Base Voltage	$V_{EBO}$	-5.0	Vdc
Collector Current – Continuous	$I_C$	-500	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW 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.

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



- x = 2 or 3
  - A = Assembly Location
  - Y = Year
  - WW = Work Week
  - = Pb-Free Package
- (Note: Microdot may be in either location)

#### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 3 of this data sheet.

# MPSA92, MPSA93

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector–Emitter Breakdown Voltage (Note 1) (I <sub>C</sub> = -1.0 mA <sub>dc</sub> , I <sub>B</sub> = 0)	MPSA92 MPSA93	V <sub>(BR)CEO</sub>	-300 -200	– –	V <sub>dc</sub>
Collector–Base Breakdown Voltage (I <sub>C</sub> = -100 μA <sub>dc</sub> , I <sub>E</sub> = 0)	MPSA92 MPSA93	V <sub>(BR)CBO</sub>	-300 -200	– –	V <sub>dc</sub>
Emitter–Base Breakdown Voltage (I <sub>E</sub> = -100 μA <sub>dc</sub> , I <sub>C</sub> = 0)		V <sub>(BR)EBO</sub>	-5.0	–	V <sub>dc</sub>
Collector Cutoff Current (V <sub>CB</sub> = -200 V <sub>dc</sub> , I <sub>E</sub> = 0) (V <sub>CB</sub> = -160 V <sub>dc</sub> , I <sub>E</sub> = 0)	MPSA92 MPSA93	I <sub>CBO</sub>	– –	-0.25 -0.25	μA <sub>dc</sub>
Emitter Cutoff Current (V <sub>EB</sub> = -3.0 V <sub>dc</sub> , I <sub>C</sub> = 0)		I <sub>EBO</sub>	–	-0.1	μA <sub>dc</sub>
<b>ON CHARACTERISTICS (Note 1)</b>					
DC Current Gain (I <sub>C</sub> = -1.0 mA <sub>dc</sub> , V <sub>CE</sub> = -10 V <sub>dc</sub> ) (I <sub>C</sub> = -10 mA <sub>dc</sub> , V <sub>CE</sub> = -10 V <sub>dc</sub> )  (I <sub>C</sub> = -30 mA <sub>dc</sub> , V <sub>CE</sub> = -10 V <sub>dc</sub> )	All Types All Types  MPSA92 MPSA93	h <sub>FE</sub>	25 40  25 25	– –  – –	–
Collector–Emitter Saturation Voltage (I <sub>C</sub> = -20 mA <sub>dc</sub> , I <sub>B</sub> = -2.0 mA <sub>dc</sub> )	MPSA92 MPSA93	V <sub>CE(sat)</sub>	– –	-0.5 -0.4	V <sub>dc</sub>
Base–Emitter Saturation Voltage (I <sub>C</sub> = -20 mA <sub>dc</sub> , I <sub>B</sub> = -2.0 mA <sub>dc</sub> )		V <sub>BE(sat)</sub>	–	-0.9	V <sub>dc</sub>
<b>SMALL-SIGNAL CHARACTERISTICS</b>					
Current–Gain – Bandwidth Product (I <sub>C</sub> = -10 mA <sub>dc</sub> , V <sub>CE</sub> = -20 V <sub>dc</sub> , f = 100 MHz)		f <sub>T</sub>	50	–	MHz
Collector–Base Capacitance (V <sub>CB</sub> = -20 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)	MPSA92 MPSA93	C <sub>cb</sub>	– –	6.0 8.0	pF

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2%.

# MPSA92, MPSA93

## ORDERING INFORMATION

Device	Package	Shipping†
MPSA92G	TO-92 (Pb-Free)	5000 Units / Box
MPSA92RL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSA92RLRA	TO-92	2000 / Tape & Reel
MPSA92RLRAG	TO-92 (Pb-Free)	2000 / Tape & Reel
MPSA92RLRMG	TO-92 (Pb-Free)	2000 / Ammo Pack
MPSA92RLRPG	TO-92 (Pb-Free)	2000 / Ammo Pack
MPSA92ZL1G	TO-92 (Pb-Free)	2000 / Ammo Pack
MPSA93G	TO-92 (Pb-Free)	5000 Units / Box
MPSA93RLRMG	TO-92 (Pb-Free)	2000 / Ammo Pack

†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.

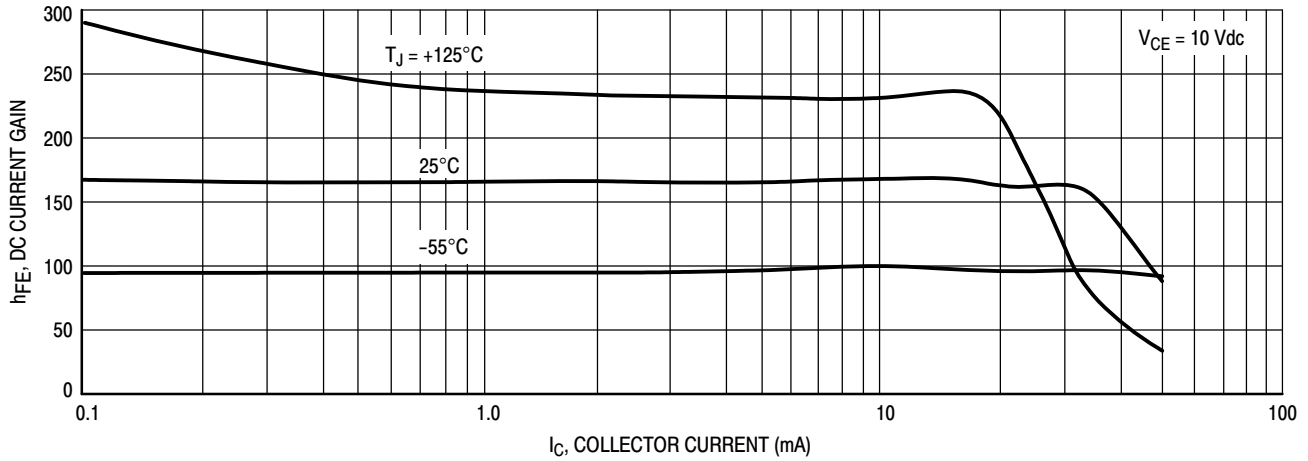


Figure 1. DC Current Gain

# MPSA92, MPSA93

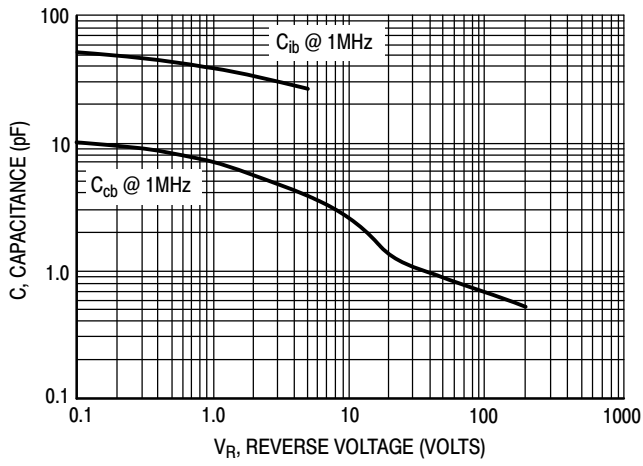


Figure 2. Capacitance

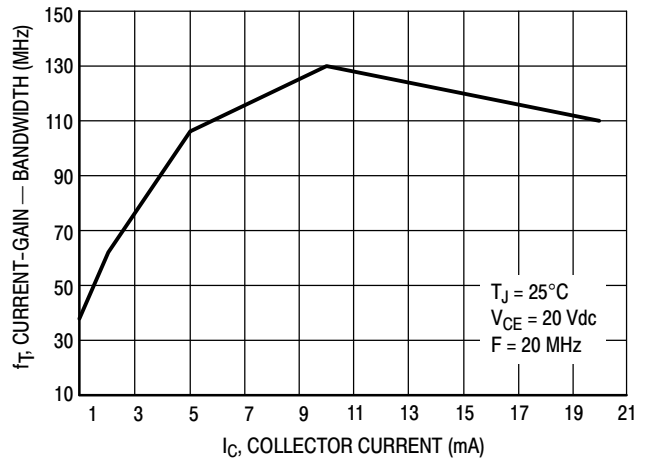


Figure 3. Current-Gain - Bandwidth

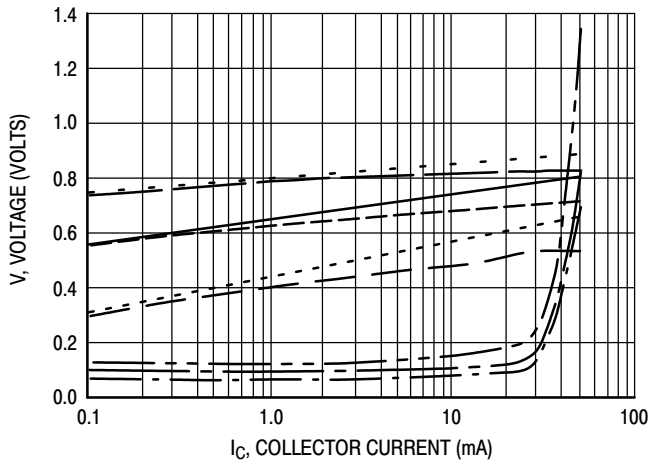


Figure 4. "ON" Voltages

- $V_{CE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{CE(sat)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $25^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $125^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(sat)}$  @  $-55^\circ\text{C}$ ,  $I_C/I_B = 10$
- $V_{BE(on)}$  @  $25^\circ\text{C}$ ,  $V_{CE} = 10\text{ V}$
- $V_{BE(on)}$  @  $125^\circ\text{C}$ ,  $V_{CE} = 10\text{ V}$
- $V_{BE(on)}$  @  $-55^\circ\text{C}$ ,  $V_{CE} = 10\text{ V}$

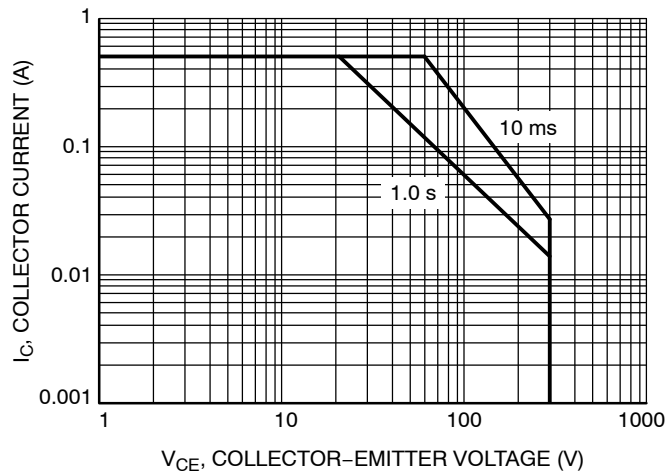
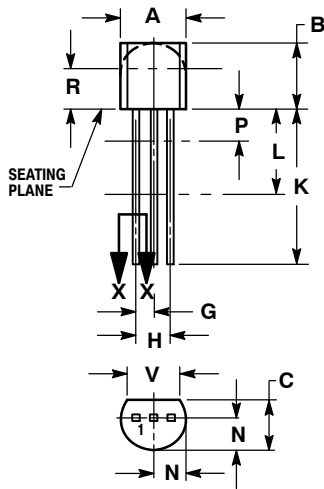


Figure 5. Safe Operating Area

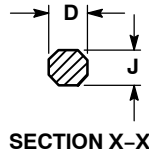
# MPSA92, MPSA93

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 029-11  
ISSUE AM



STRAIGHT LEAD  
BULK PACK



SECTION X-X

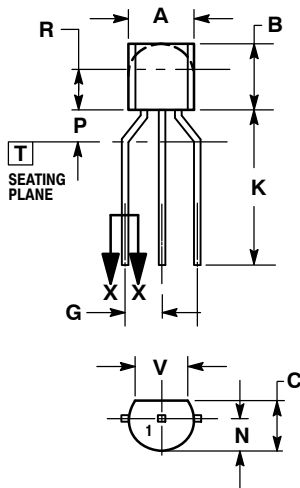
NOTES:

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.

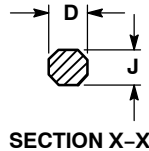
DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R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

STYLE 14:

1. PIN 1. EMITTER
2. COLLECTOR
3. BASE



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	---

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