

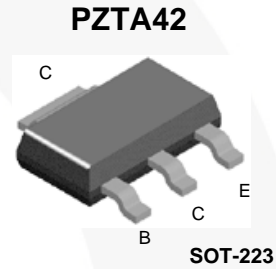
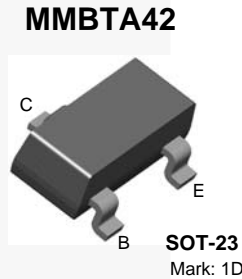
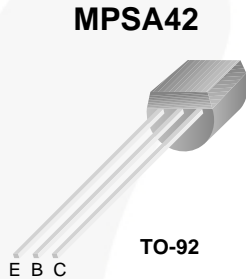


October 2014

# MPSA42 / MMBTA42 / PZTA42 NPN High-Voltage Amplifier

## Features

- This device is designed for application as a video output and other high-voltage applications.
- Sourced from process 48.



## Ordering Information

Part Number	Top Mark	Package	Packing Method
MPSA42	MPSA42	TO-92 3L	Bulk
MMBTA42	1D	SOT-23 3L	Tape and Reel
PZTA42	A42	SOT-223 4L	Tape and Reel

## Absolute Maximum Ratings<sup>(1), (2)</sup>

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only. Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$V_{CEO}$	Collector-Emitter Voltage	300	V
$V_{CBO}$	Collector-Base Voltage	300	V
$V_{EBO}$	Emitter-Base Voltage	6	V
$I_C$	Collector Current - Continuous	500	mA
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

### Notes:

1. These ratings are based on a maximum junction temperature of  $150^\circ\text{C}$ .
2. These are steady-state limits. Fairchild Semiconductor should be consulted on applications involving pulsed or low-duty-cycle operations.

MPSA42 / MMBTA42 / PZTA42 — NPN High-Voltage Amplifier

## Thermal Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Max.			Unit
		MPSA42	MMBTA42 <sup>(3)</sup>	PZTA42 <sup>(4)</sup>	
$P_D$	Total Device Dissipation	625	240	1000	mW
	Derate Above $25^\circ\text{C}$	5.00	1.92	8.00	mW/ $^\circ\text{C}$
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	83.3			$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	200	515	125	$^\circ\text{C}/\text{W}$

### Notes:

- Device is mounted on FR-4 PCB 1.6 inch x 1.6 inch x 0.06 inch.
- Device is mounted on FR-4 PCB 36 mm x 18 mm x 1.5 mm, mounting pad for the collector lead minimum 6 cm<sup>2</sup>.

## Electrical Characteristics

Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Conditions	Min.	Max.	Unit
<b>Off Characteristics</b>					
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage <sup>(5)</sup>	$I_C = 1.0 \text{ mA}, I_B = 0$	300		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100 \mu\text{A}, I_E = 0$	300		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 100 \mu\text{A}, I_C = 0$	6		V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 200 \text{ V}, I_E = 0$		0.1	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 6 \text{ V}, I_C = 0$		0.1	$\mu\text{A}$
<b>On Characteristics<sup>(5)</sup></b>					
$h_{FE}$	DC Current Gain	$V_{CE} = 10 \text{ V}, I_C = 1.0 \text{ mA}$	25		
		$V_{CE} = 10 \text{ V}, I_C = 10 \text{ mA}$	40		
		$V_{CE} = 10 \text{ V}, I_C = 30 \text{ mA}$	40		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 20 \text{ mA}, I_B = 2.0 \text{ mA}$		0.5	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	$I_C = 20 \text{ mA}, I_B = 2.0 \text{ mA}$		0.9	V
<b>Small Signal Characteristics</b>					
$f_T$	Current Gain - Bandwidth Product	$I_C = 10 \text{ mA}, V_{CE} = 20 \text{ V}, f = 100 \text{ MHz}$	50		MHz
$C_{cb}$	Collector-Base Capacitance	$V_{CB} = 20 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$		3.0	pF

### Notes:

- Pulse test: pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

## Typical Performance Characteristics

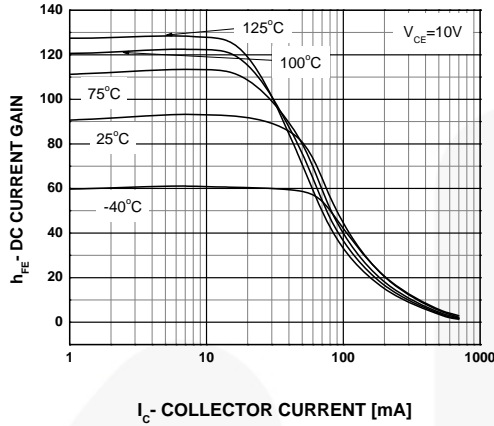


Figure 1. DC Current Gain vs. Collector Current

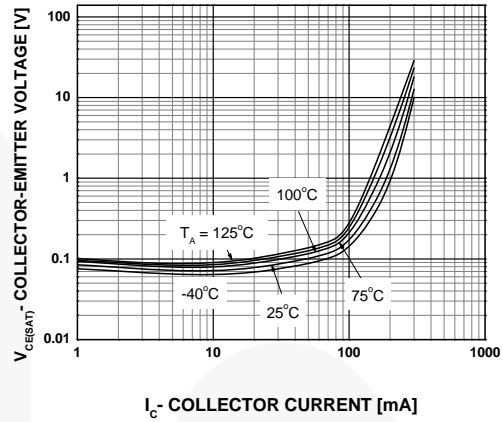


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

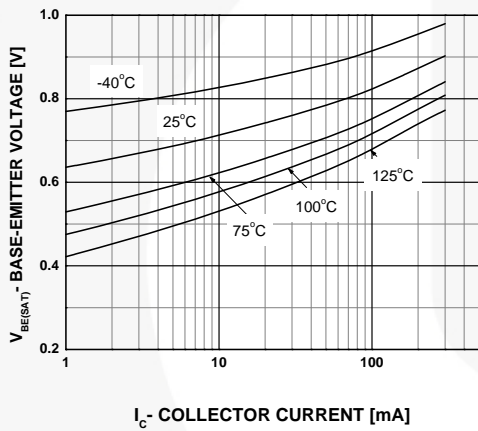


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

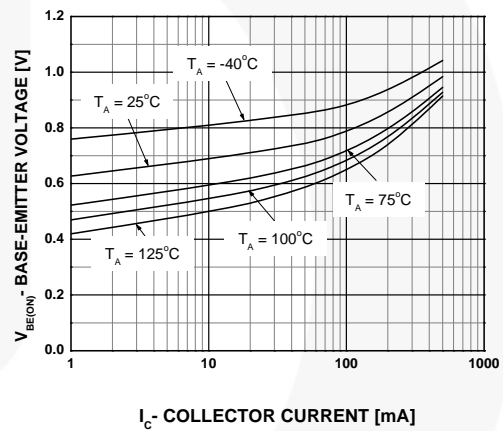


Figure 4. Base-Emitter On Voltage vs. Collector Current

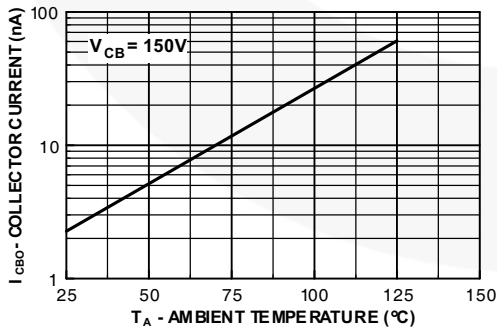


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

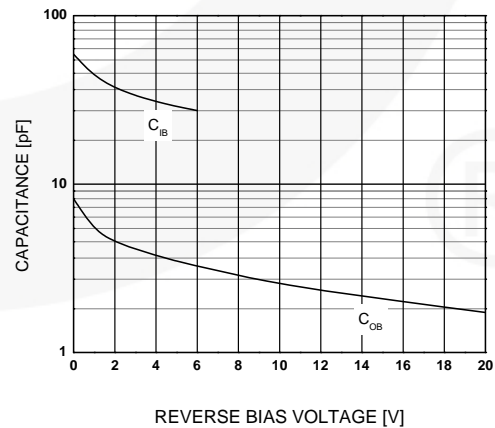


Figure 6. Collector-Base and Emitter-Base Capacitance vs. Reverse-Bias Voltage

### Typical Performance Characteristics (Continued)

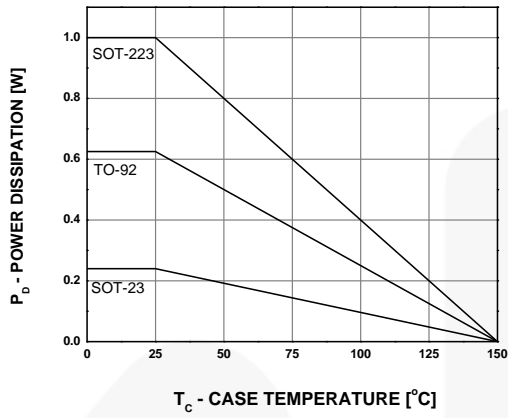
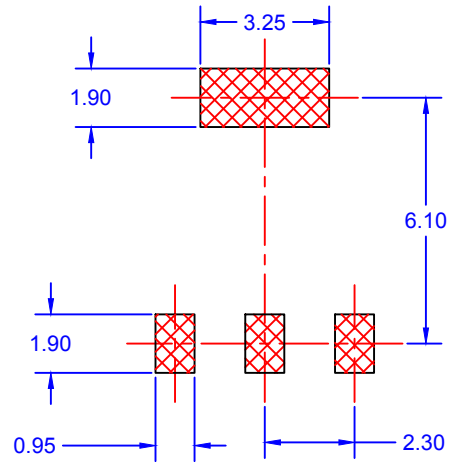
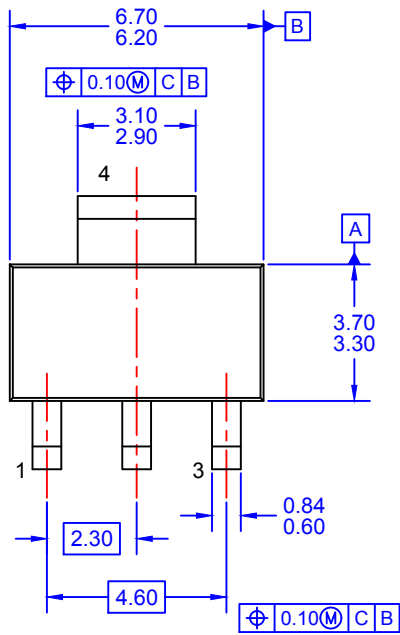
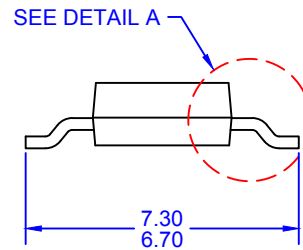
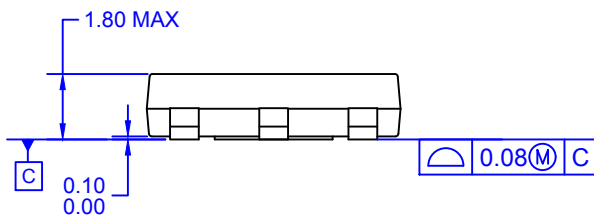


Figure 7. Power Dissipation vs. Ambient Temperature

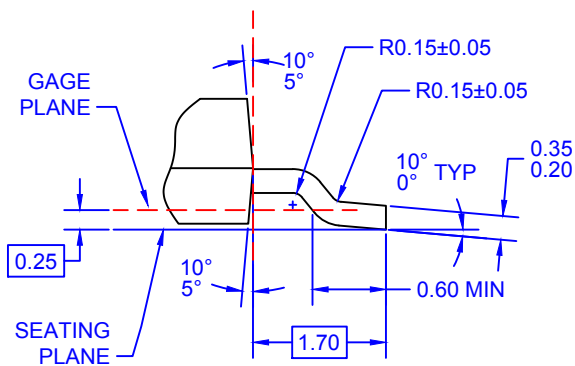




LAND PATTERN RECOMMENDATION

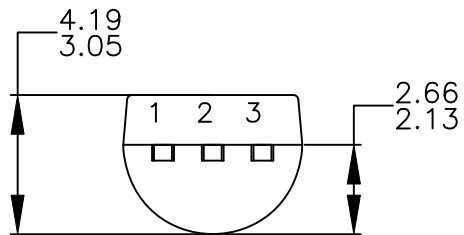
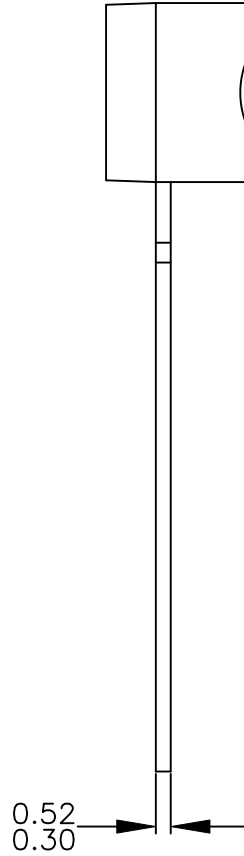
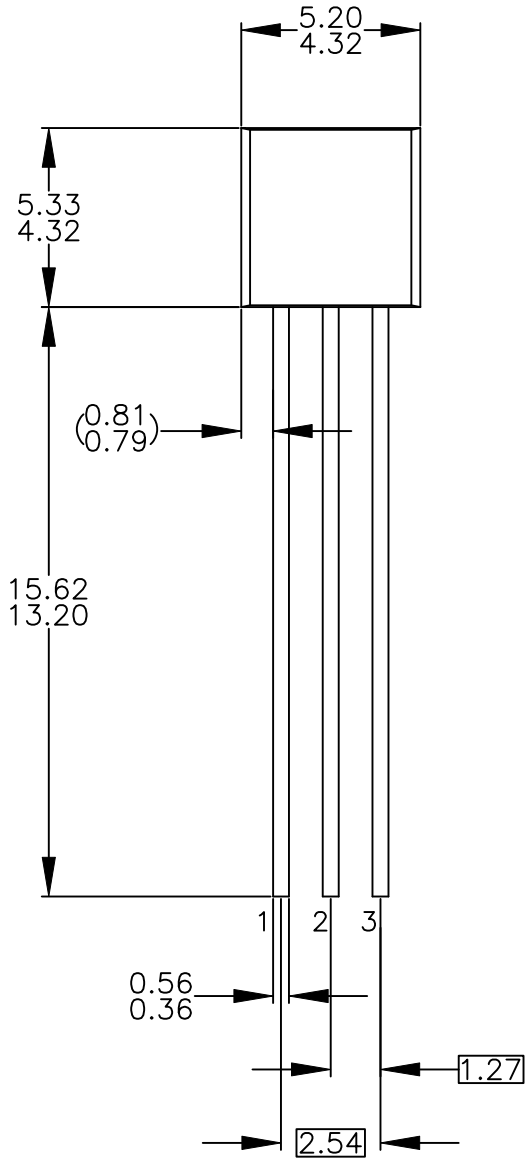


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 B) ALL DIMENSIONS ARE IN MILLIMETERS.  
 C) DIMENSIONS DO NOT INCLUDE BURRS OR MOLD FLASH. MOLD FLASH OR BURRS DOES NOT EXCEED 0.10MM.  
 D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.  
 E) LANDPATTERN NAME: SOT230P700X180-4BN  
 F) DRAWING FILENAME: MKT-MA04AREV3



DETAIL A  
 SCALE: 2:1

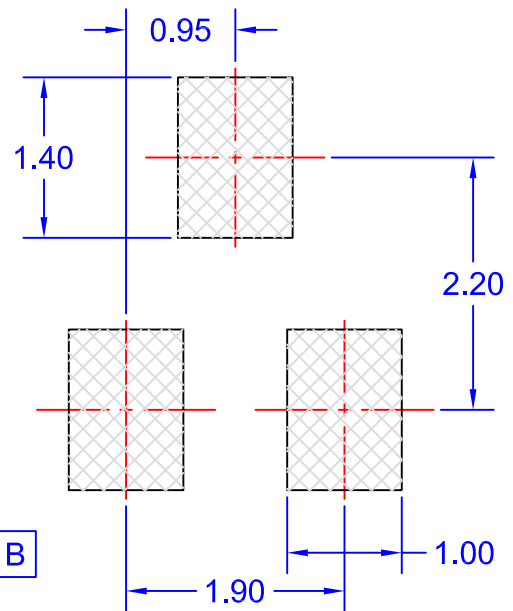
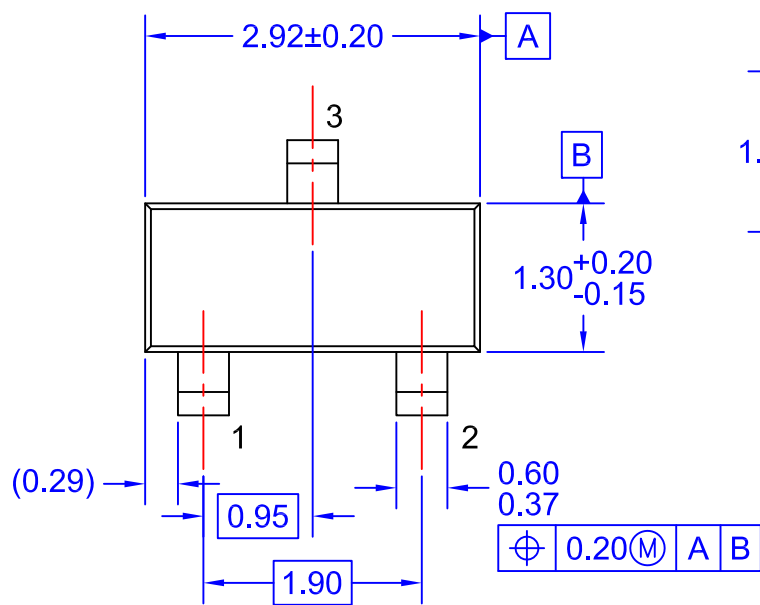




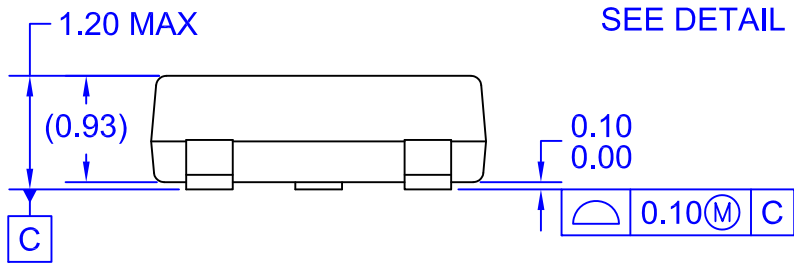
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- D) DRAWING FILENAME: MKT-ZA03DREV4.

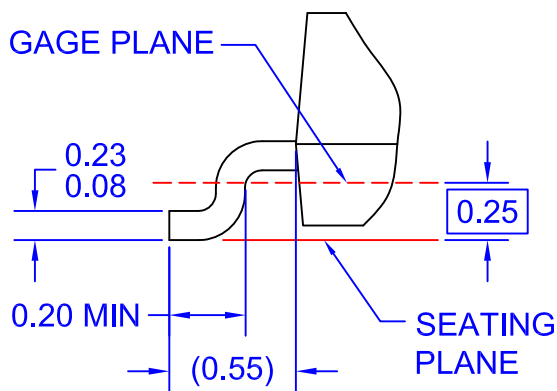
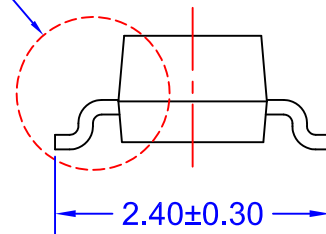




LAND PATTERN  
RECOMMENDATION



SEE DETAIL A



**DETAIL A**  
SCALE: 2X

NOTES: UNLESS OTHERWISE SPECIFIED

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- C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
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