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Please note: As part of the Fairchild Semiconductor integration, some of the Fairchild orderable part numbers will need to change in order to meet ON Semiconductor's system requirements. Since the ON Semiconductor product management systems do not have the ability to manage part nomenclature that utilizes an underscore (_), the underscore (_) in the Fairchild part numbers will be changed to a dash (-). This document may contain device numbers with an underscore (_). Please check the ON Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.onsemi.com. Please email any questions regarding the system integration to Fairchild_questions@onsemi.com.

FAIRCHILD

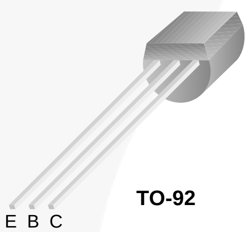
October 2014

MPSA42 / MMBTA42 / PZTA42
NPN High-Voltage Amplifier

Features

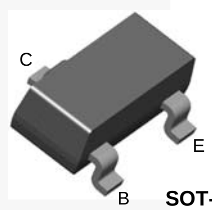
- This device is designed for application as a video output and other high-voltage applications.
- Sourced from process 48.

MPSA42



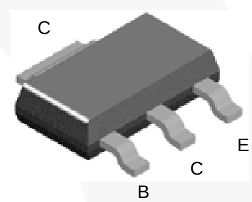
TO-92

MMBTA42



SOT-23
Mark: 1D

PZTA42



SOT-223

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(1), (2)

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°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	°C

Notes:

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

Thermal Characteristics

Values are at T_A = 25°C unless otherwise noted.

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

Notes:

3. Device is mounted on FR-4 PCB 1.6 inch x 1.6 inch x 0.06 inch.
4. 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^2.

Electrical Characteristics

Values are at T_A = 25°C unless otherwise noted.

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

Notes:

5. Pulse test: pulse width ≤ 300 µs, duty cycle ≤ 2%.

Typical Performance Characteristics

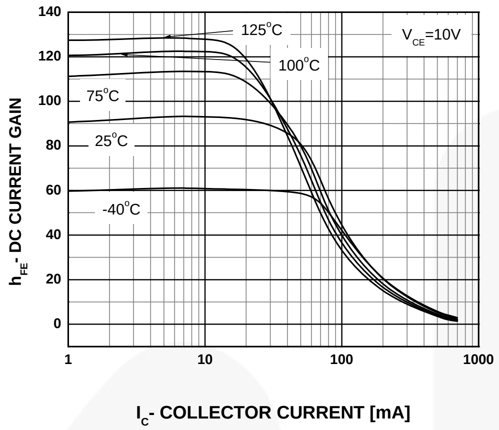


Figure 1. DC Current Gain vs. Collector Current

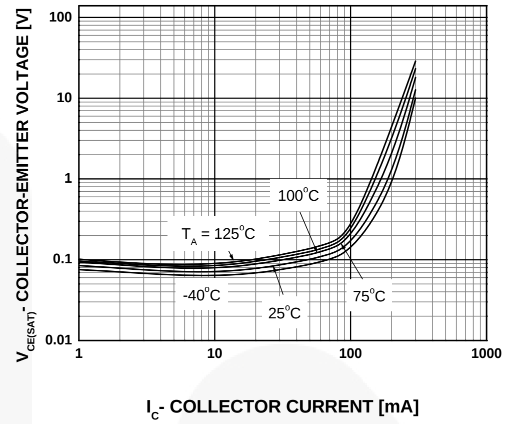


Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current

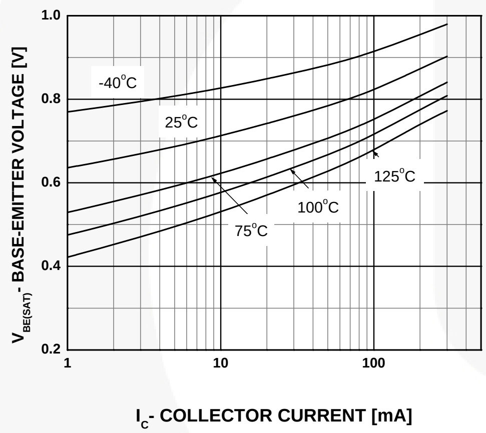


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

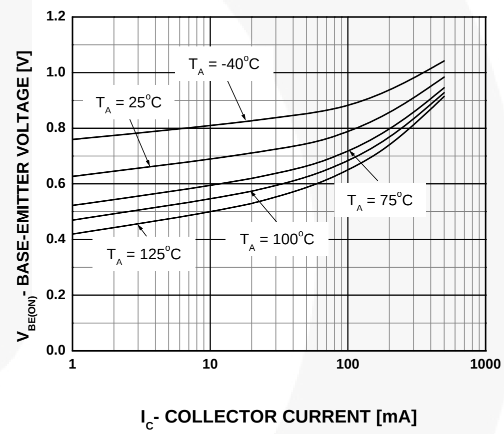


Figure 4. Base-Emitter On Voltage vs. Collector Current

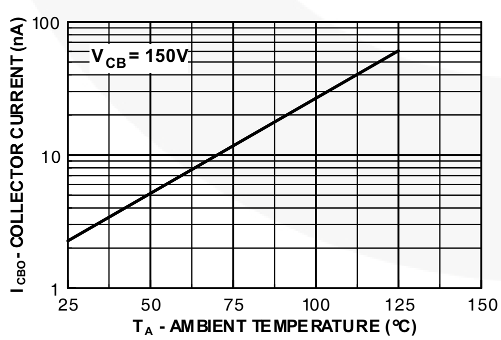


Figure 5. Collector Cut-Off Current vs. Ambient Temperature

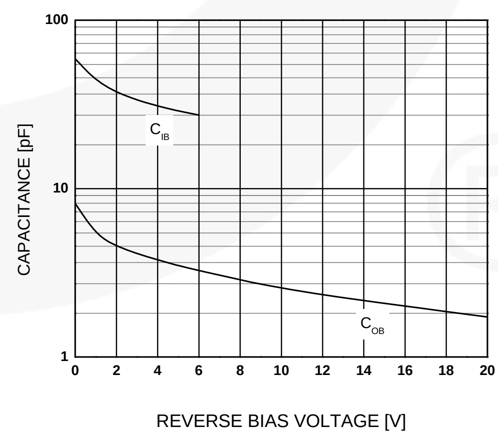


Figure 6. Collector-Base and Emitter-Base Capacitance vs. Reverse-Bias Voltage

Typical Performance Characteristics (Continued)

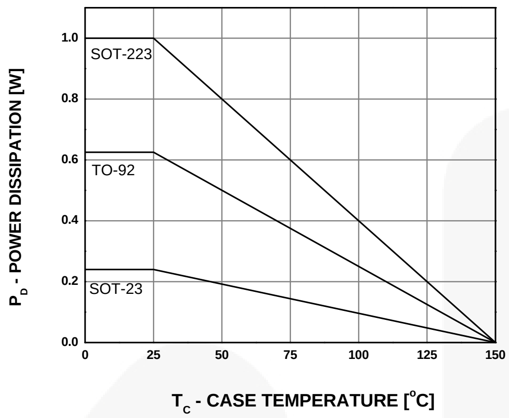
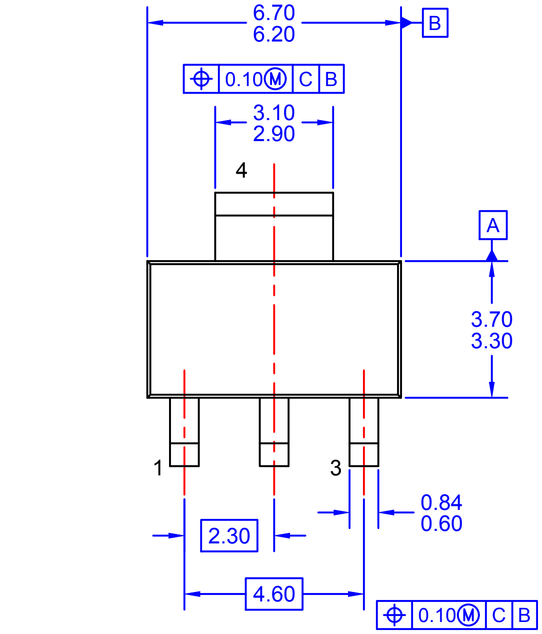
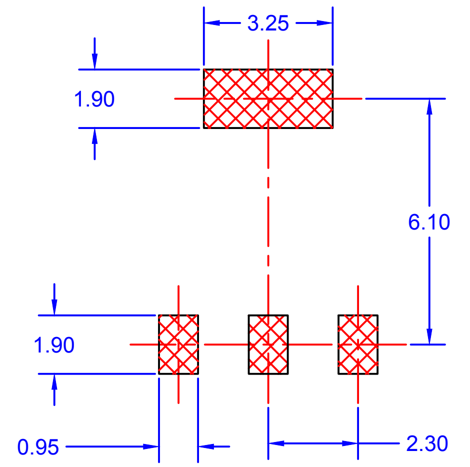
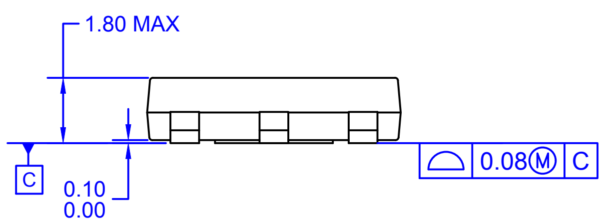


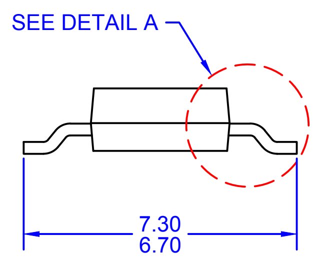
Figure 7. Power Dissipation vs. Ambient Temperature

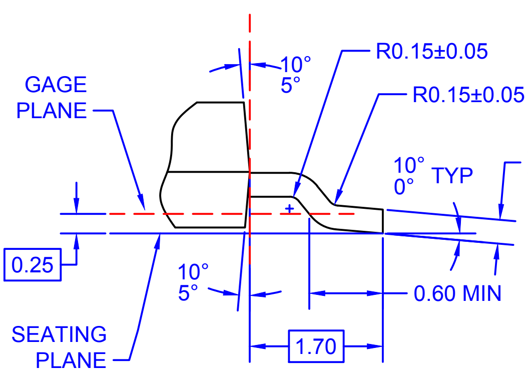




LAND PATTERN RECOMMENDATION



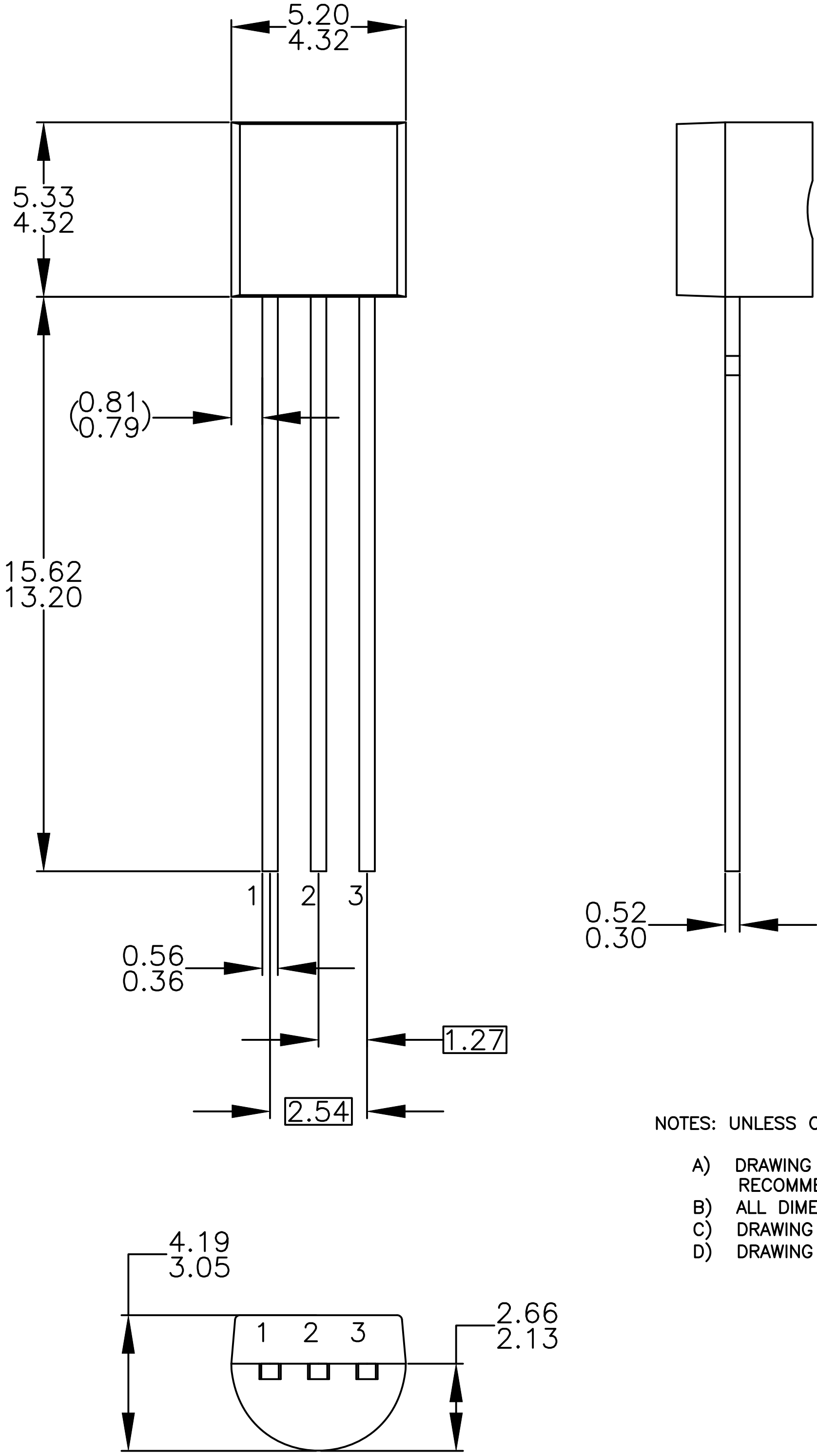




DETAIL A
SCALE: 2:1

NOTES: UNLESS OTHERWISE SPECIFIED

A) DRAWING BASED ON JEDEC REGISTRATION TO-261C, VARIATION AA.
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



NOTES: UNLESS OTHERWISE SPECIFIED

A) DRAWING WITH REFERENCE TO JEDEC TO-92 RECOMMENDATIONS.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DRAWING CONFORMS TO ASME Y14.5M-2009.
D) DRAWING FILENAME: MKT-ZA03DREV4.

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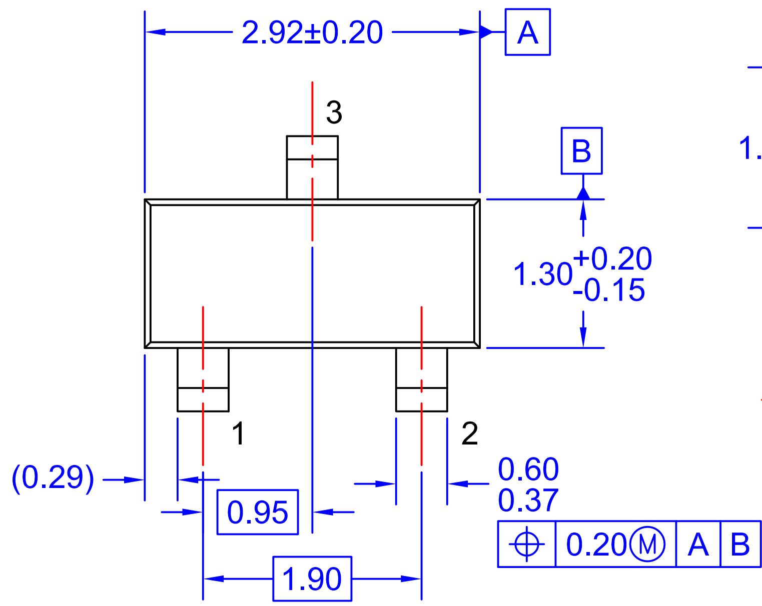

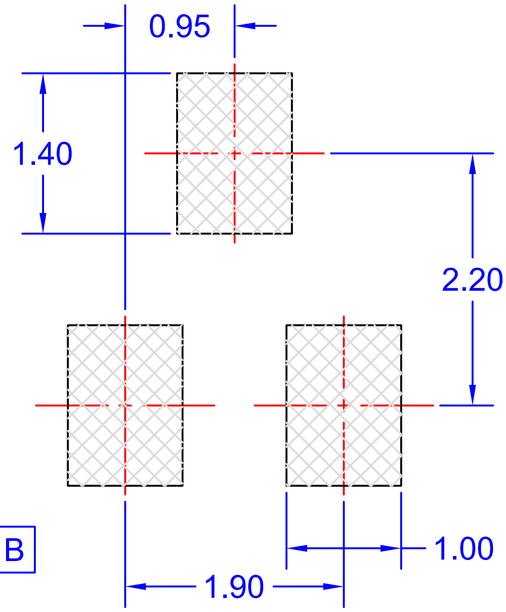

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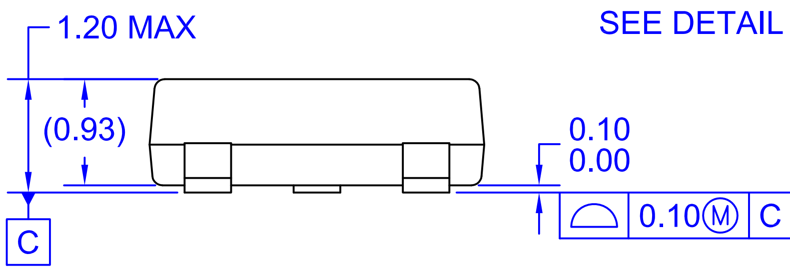
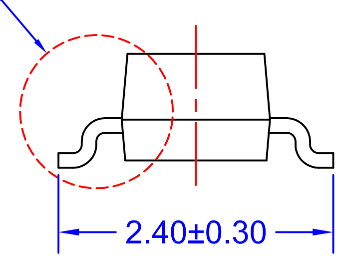
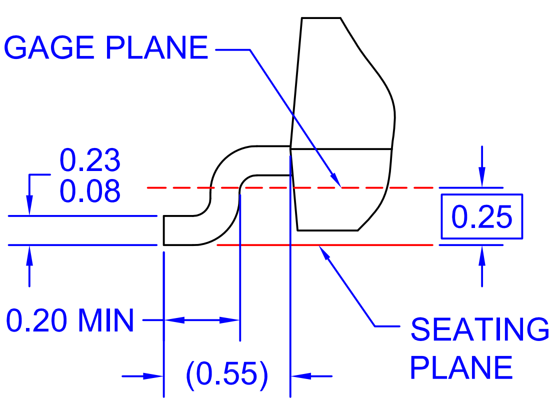




NOTES: UNLESS OTHERWISE SPECIFIED

A) REFERENCE JEDEC REGISTRATION TO-236, VARIATION AB, ISSUE H.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
D) DIMENSIONING AND TOLERANCING PER ASME Y14.5M - 2009.
E) DRAWING FILE NAME: MA03DREV12



DETAIL A
SCALE: 2X

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