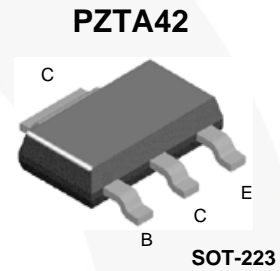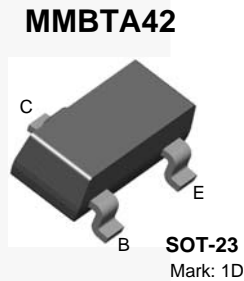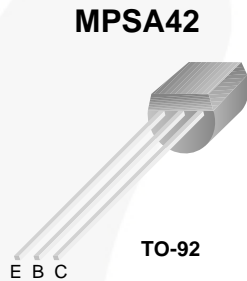October 2014

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

E B C

MMBTA42

C

E

B

SOT-23
Mark: 1D

PZTA42

C

E

C

B

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%.

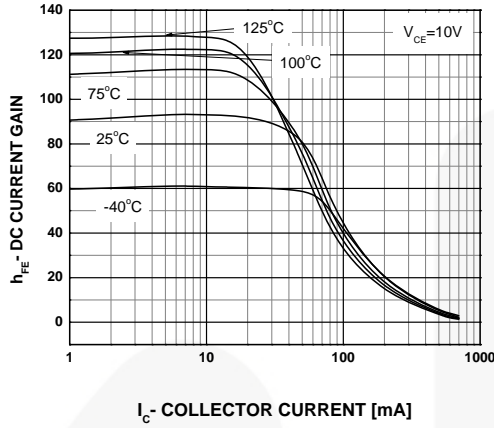## Typical Performance Characteristics

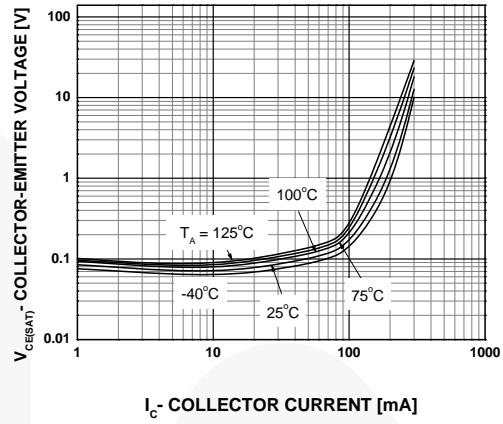**Figure 1. DC Current Gain vs. Collector Current**

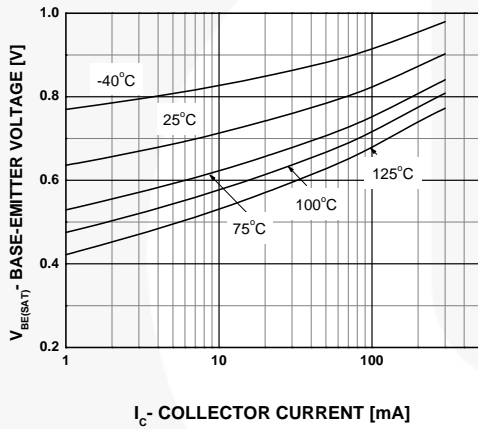**Figure 2. Collector-Emitter Saturation Voltage vs. Collector Current**

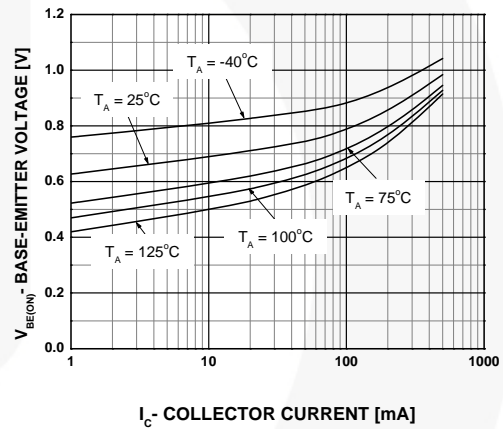**Figure 3. Base-Emitter Saturation Voltage vs. Collector Current**
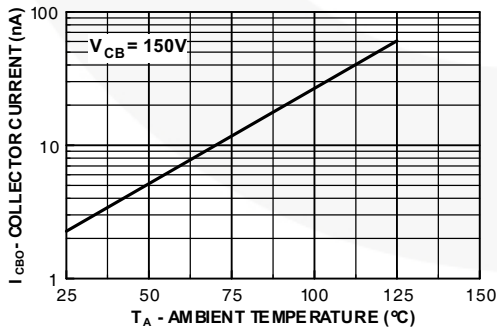
Figure 4. Base-Emitter On Voltage vs. Collector Current

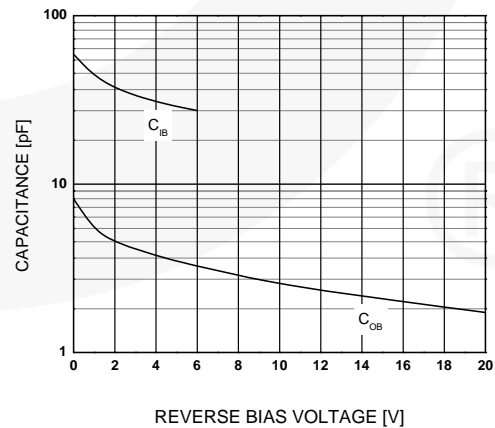**Figure 5. Collector Cut-Off Current vs. Ambient Temperature**

Figure 6. Collector-Base and Emitter-Base Capacitance vs. Reverse-Bias Voltage
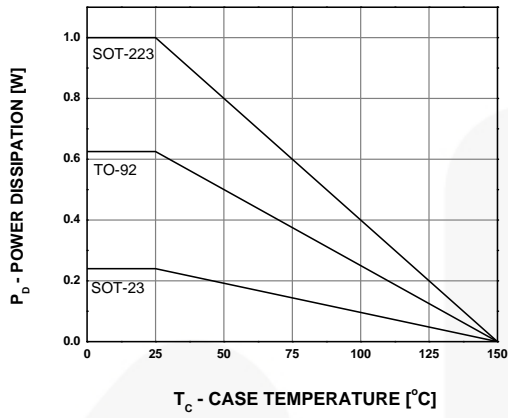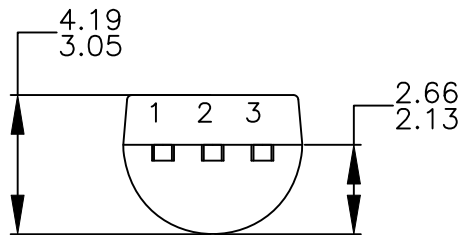
Typical Performance Characteristics (Continued)

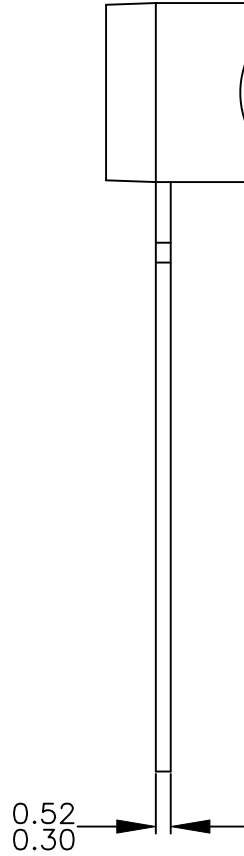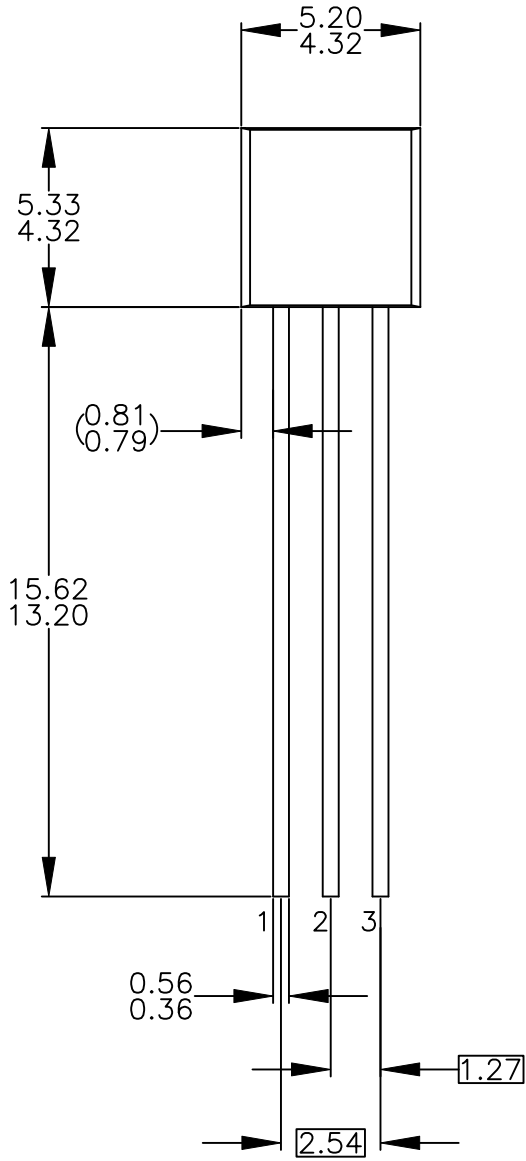**Figure 7. Power Dissipation vs. Ambient Temperature**

5.20
4.32

5.33
4.32

(0.81)
(0.79)

15.62
13.20

1   2   3

0.56
0.36

0.52
0.30

1.27

2.54

4.19
3.05

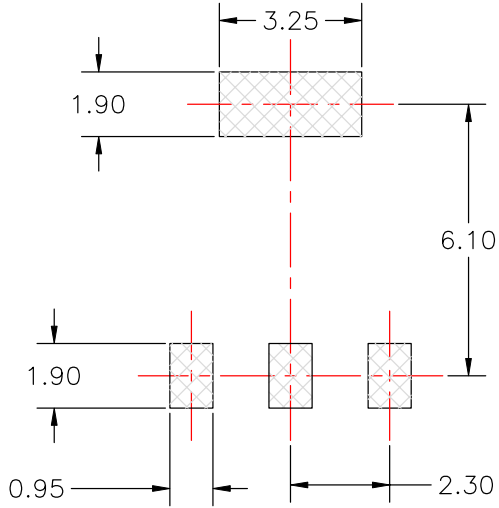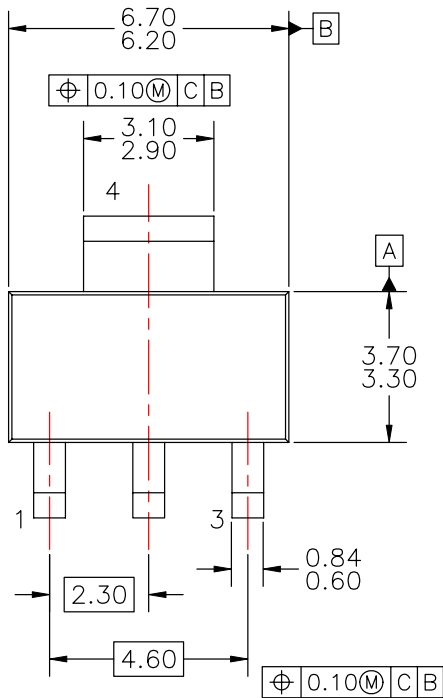1   2   3

2.66
2.13

NOTES: UNLESS OTHERWISE SPECIFIED

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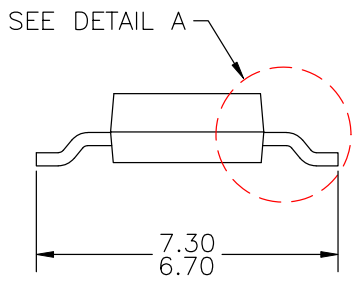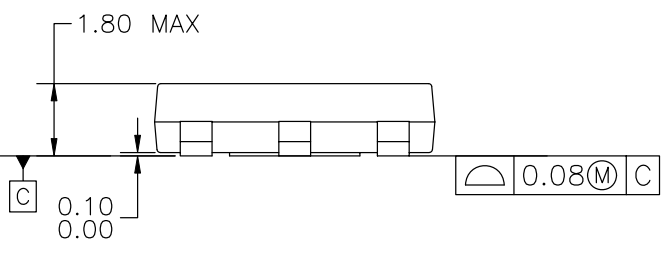C)   DRAWING CONFORMS TO ASME Y14.5M-2009.
D)   DRAWING FILENAME: MKT-ZA03DREV4.

FAIRCHILD™

APPROVED
July-14-2008

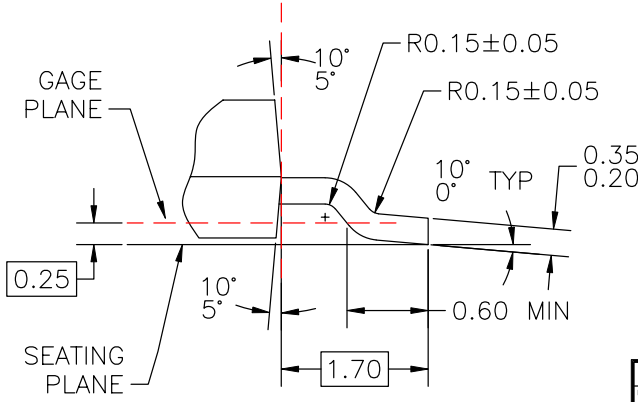|		REVISIONS		
LTR		DESCRIPTION	DATE	NAME/SITE
A	RELEASE TO DOCUMENT CONTROL		JAN.25,1996	TL/FSCP
2	CHG DWG TEMPLATE FR NATIONAL TO FAIRCHILD; CHG DIM STYLE FR DUAL INCH[MM] TO SINGLE, MM; CHG LD WID FR 0.74⁺⁰·⁰⁹ TO 0.60-0.84; REMOVE PKG THICK DIM (1.6); CHG TOTAL PKG HT FR 1.80 TO 1.80 MAX; CHG FOOT LANDING DIM FR 0.91 MIN TO 0.60 MIN; CHG LD THICKNESS FR 0.3⁺⁰·⁰⁵ TO 0.20-0.35; ADD DRAFT ANGLE OF MOLDED BODY TOP & BOT; CHG LD LGTH TO PKG EDGE DIM TO BASIC; CHG LD PITCH FR 2.29 BS TO 2.30 BS; CHG BODY WID FR 3.56⁺⁰·¹⁹ TO 3.30; CHG BODY LN FR 6.5⁺⁰·² TO 6.70; CHG TOTAL PKG WID FR 6.96⁺⁰·³² TO 7.30; CHG PAD SIZE FR 0.99 MAX TO 0.95; CHG PAD PITCH FR 2.286 TO 2.30; CHG THERMAL TAB SIZE FR 3.28 MAX TO 3.25; CHG PAD SIZE FR 1.5 TO 1.90; CHG PAD SPACE FR 6.3 TO 6.10; CHG NOTE '2' TO 'A' W/O DATE; DEL NOTE ON LD FINISH; ADD NOTES B, C, D, E & F.	12FEB08	LZSC/FSCP

6.70
6.20

[B]

⊕ |0.10 Ⓜ|C|B|

3.10
2.90

4

[A]

3.70
3.30

1   3

0.84
0.60

2.30

4.60

⊕ |0.10 Ⓜ|C|B|

3.25

1.90

6.10

1.90

0.95   2.30

LAND PATTERN RECOMMENDATION

1.80 MAX

⌒ |0.08 Ⓜ|C|

[C]

0.10
0.00

SEE DETAIL A

7.30
6.70

NOTES: UNLESS OTHERWISE SPECIFIED

A) DRAWING BASED ON JEDEC REGISTRATION TO-261, VARIATION AA.
B) DIMENSIONS ARE INCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR EXTRUSIONS.
C) ALL DIMENSIONS ARE IN MILLIMETERS.
D) DRAWING CONFORMS TO ASME Y14.5M-1994.
E) LANDPATTERN NAME: SOT230P700X180-4BN
F) DRAWING FILENAME: MKT-MA04AREV2

GAGE PLANE

10°
5°

R0.15±0.05

R0.15±0.05

10°
0°   TYP

0.35
0.20

0.25

10°
5°

0.60 MIN

SEATING PLANE

1.70

DETAIL A
SCALE: 2:1

APPROVALS	DATE	**FAIRCHILD**
DRAWN: J.U. COMPARATIVO JR.	26FEB2008	**SEMICONDUCTOR** ™
CHECKED: L.Z. STA CRUZ		
APPROVED: M.R. GESTOLE		MOLDED PACKAGE
		SOT-223, 4 LEAD
G.S. BAJE		

PROJECTION	SCALE 1:1	SIZE A3	DRAWING NUMBER MKT-MA04A	REV 2
⊕ INCH [MM]			FORMERLY: N/A	SHEET : 1 OF 1

2.92±0.20

3

1.30 +0.20 -0.15

1   2

(0.29)

0.95

1.90

0.60
0.37

⊕ | 0.20 Ⓜ | A | B

0.95

1.40

2.20

1.90

1.00

LAND PATTERN
RECOMMENDATION

1.20 MAX

(0.93)

0.10
0.00

⌓ | 0.10 Ⓜ | C

C

SEE DETAIL A

2.40±0.30

GAGE PLANE

0.23
0.08

0.25

0.20 MIN

(0.55)

SEATING
PLANE
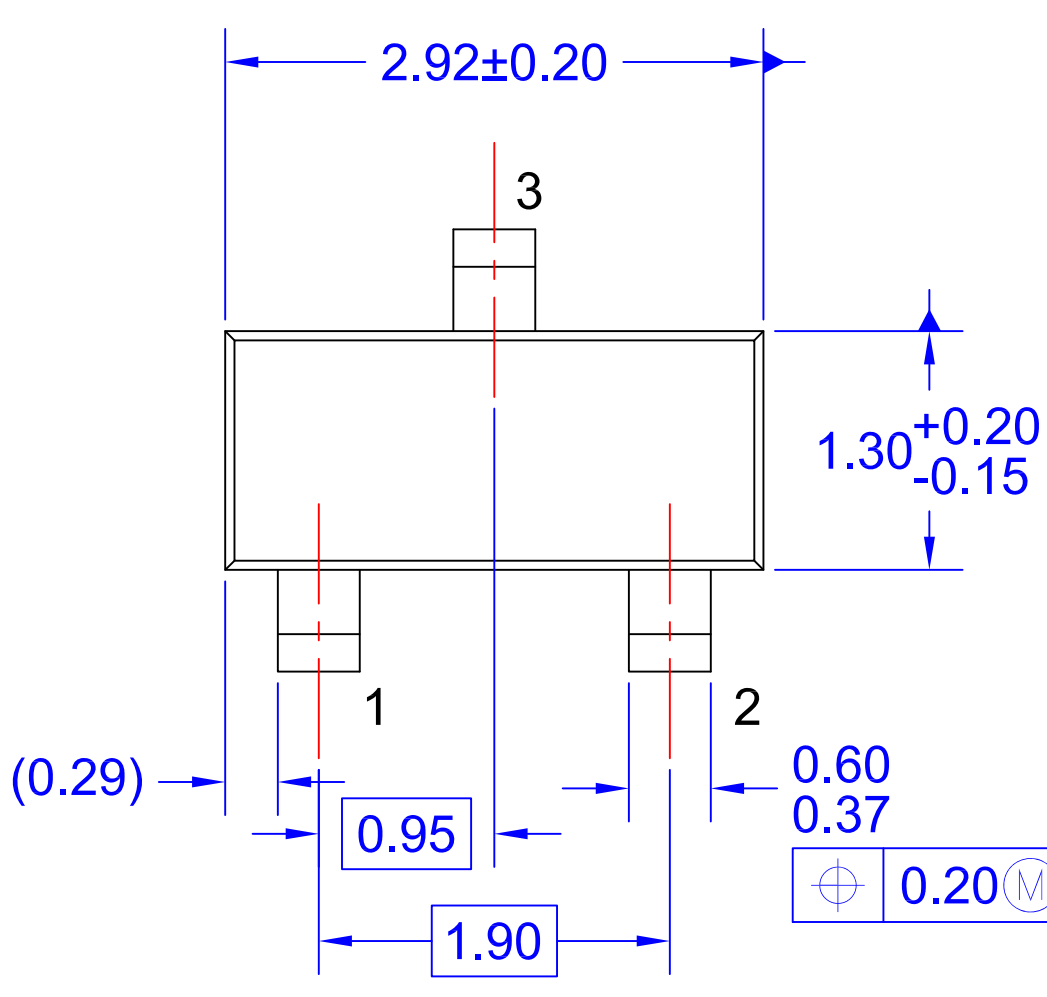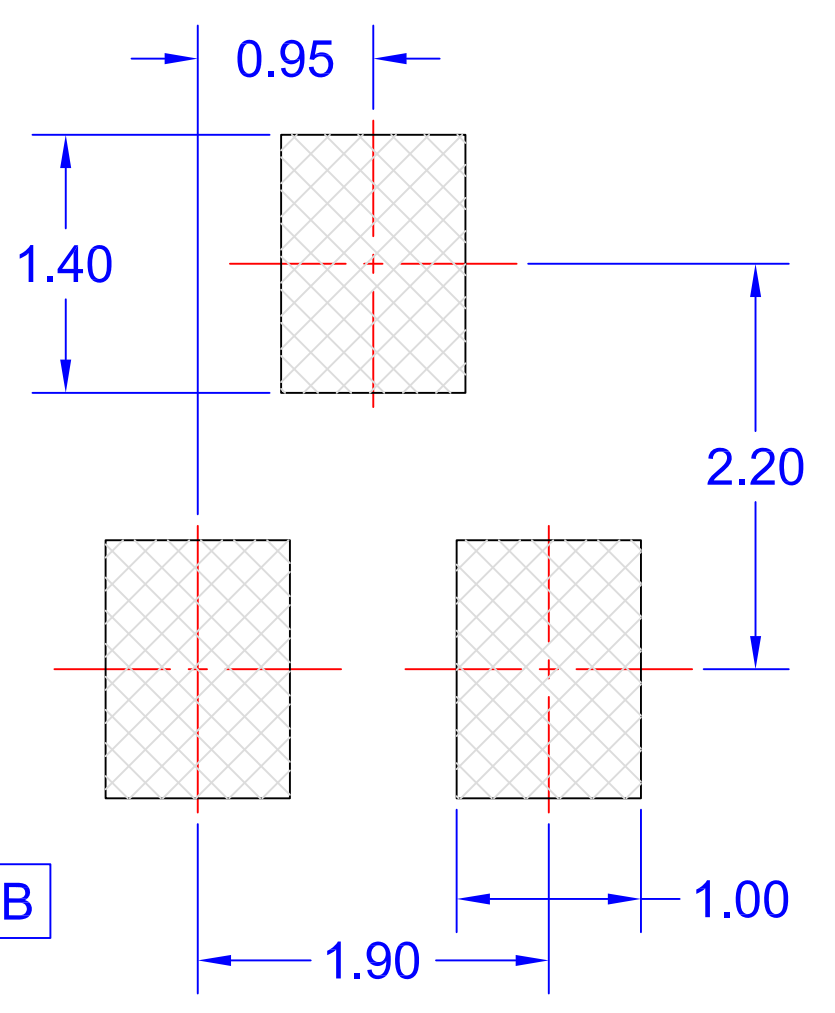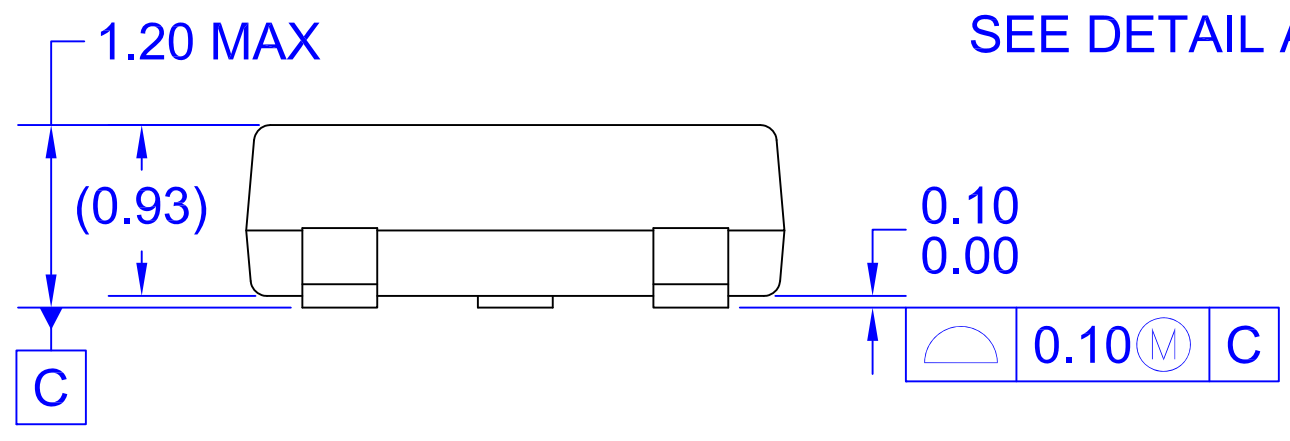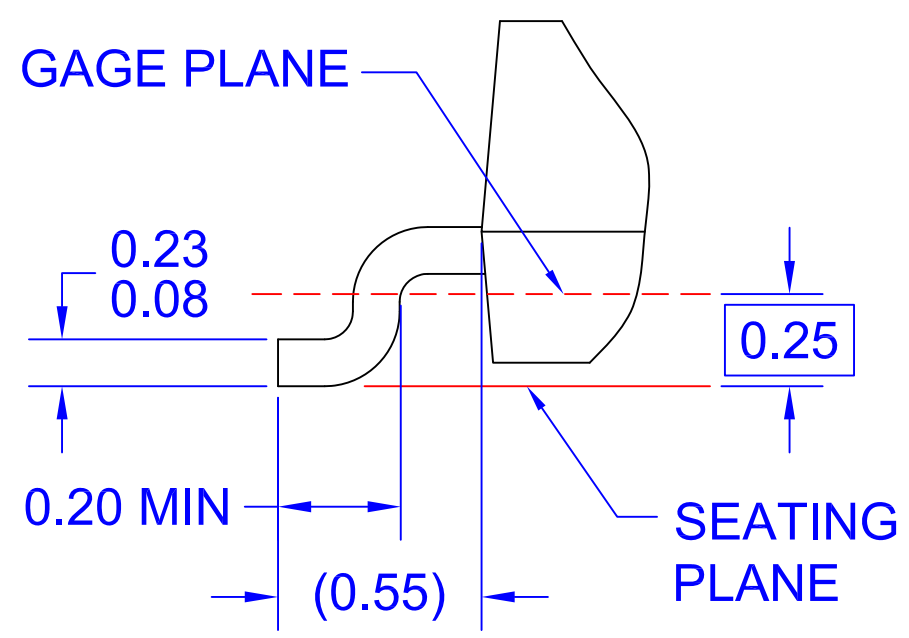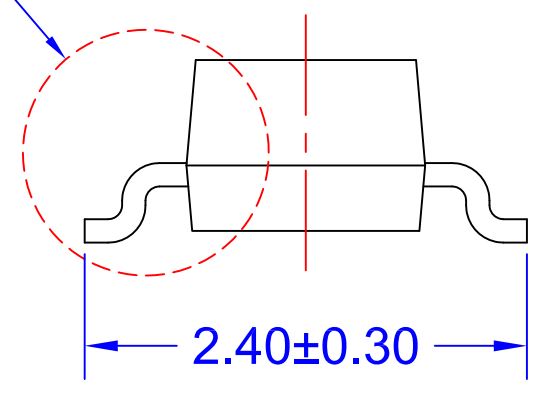
DETAIL A
SCALE: 2X

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: MA03DREV11

FAIRCHILD™

TRADEMARKS

The following includes registered and unregistered trademarks and service marks, owned by Fairchild Semiconductor and/or its global subsidiaries, and is not intended to be an exhaustive list of all such trademarks.

AccuPower™
AttitudeEngine™
Awinda®
AX-CAP®*
BitSiC™
Build it Now™
CorePLUS™
CorePOWER™
CROSSVOLT™
CTL™
Current Transfer Logic™
DEUXPEED®
Dual Cool™
EcoSPARK®
EfficientMax™
ESBC™
F®
Fairchild®
Fairchild Semiconductor®
FACT Quiet Series™
FACT®
FastvCore™
FETBench™
FPS™

F-PFS™
FRFET®
Global Power Resource℠
GreenBridge™
Green FPS™
Green FPS™ e-Series™
Gmax™
GTO™
IntelliMAX™
ISOPLANAR™
Making Small Speakers Sound Louder and Better™
MegaBuck™
MICROCOUPLER™
MicroFET™
MicroPak™
MicroPak2™
MillerDrive™
MotionMax™
MotionGrid®
MTi®
MTx®
MVN®
mWSaver®
OptoHiT™
OPTOLOGIC®

OPTOPLANAR®

®

Power Supply WebDesigner™
PowerTrench®
PowerXS™
Programmable Active Droop™
QFET®
QS™
Quiet Series™
RapidConfigure™

™
Saving our world, 1mW/W/kW at a time™
SignalWise™
SmartMax™
SMART START™
Solutions for Your Success™
SPM®
STEALTH™
SuperFET®
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SupreMOS®
SyncFET™
Sync-Lock™

SYSTEM GENERAL®*

TinyBoost®
TinyBuck®
TinyCalc™
TinyLogic®
TINYOPTO™
TinyPower™
TinyPWM™
TinyWire™
TranSiC™
TriFault Detect™
TRUECURRENT®*
µSerDes™

µSerDes™
UHC®
Ultra FRFET™
UniFET™
VCX™
VisualMax™
VoltagePlus™
XS™
Xsens™
仙童™

* Trademarks of System General Corporation, used under license by Fairchild Semiconductor.

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION, OR DESIGN. TO OBTAIN THE LATEST, MOST UP-TO-DATE DATASHEET AND PRODUCT INFORMATION, VISIT OUR WEBSITE AT HTTP://WWW.FAIRCHILDSEMI.COM. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS. THESE SPECIFICATIONS DO NOT EXPAND THE TERMS OF FAIRCHILD'S WORLDWIDE TERMS AND CONDITIONS, SPECIFICALLY THE WARRANTY THEREIN, WHICH COVERS THESE PRODUCTS.

AUTHORIZED USE

Unless otherwise specified in this data sheet, this product is a standard commercial product and is not intended for use in applications that require extraordinary levels of quality and reliability. This product may not be used in the following applications, unless specifically approved in writing by a Fairchild officer: (1) automotive or other transportation, (2) military/aerospace, (3) any safety critical application – including life critical medical equipment – where the failure of the Fairchild product reasonably would be expected to result in personal injury, death or property damage. Customer's use of this product is subject to agreement of this Authorized Use policy. In the event of an unauthorized use of Fairchild's product, Fairchild accepts no liability in the event of product failure. In other respects, this product shall be subject to Fairchild's Worldwide Terms and Conditions of Sale, unless a separate agreement has been signed by both Parties.

ANTI-COUNTERFEITING POLICY

Fairchild Semiconductor Corporation's Anti-Counterfeiting Policy. Fairchild's Anti-Counterfeiting Policy is also stated on our external website, www.fairchildsemi.com, under Terms of Use

Counterfeiting of semiconductor parts is a growing problem in the industry. All manufacturers of semiconductor products are experiencing counterfeiting of their parts. Customers who inadvertently purchase counterfeit parts experience many problems such as loss of brand reputation, substandard performance, failed applications, and increased cost of production and manufacturing delays. Fairchild is taking strong measures to protect ourselves and our customers from the proliferation of counterfeit parts. Fairchild strongly encourages customers to purchase Fairchild parts either directly from Fairchild or from Authorized Fairchild Distributors who are listed by country on our web page cited above. Products customers buy either from Fairchild directly or from Authorized Fairchild Distributors are genuine parts, have full traceability, meet Fairchild's quality standards for handling and storage and provide access to Fairchild's full range of up-to-date technical and product information. Fairchild and our Authorized Distributors will stand behind all warranties and will appropriately address any warranty issues that may arise. Fairchild will not provide any warranty coverage or other assistance for parts bought from Unauthorized Sources. Fairchild is committed to combat this global problem and encourage our customers to do their part in stopping this practice by buying direct or from authorized distributors.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative / In Design	Datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

Rev. I76

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Fairchild Semiconductor](#):
  [MPSA42](#)