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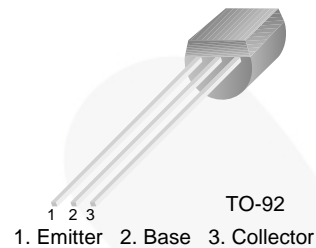
November 2014

# KSP2222A

## NPN General-Purpose Amplifier

### Features

- Collector-Emitter Voltage:  $V_{CEO} = 40\text{ V}$
- Available as PN2222A



### Ordering Information

Part Number	Marking	Package	Packing Method
KSP2222ABU	KSP2222A	TO-92 3L	Bulk
KSP2222ATA	KSP2222A	TO-92 3L	Ammo
KSP2222ATF	KSP2222A	TO-92 3L	Tape and Reel

### Absolute Maximum Ratings

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
$V_{CBO}$	Collector-Base Voltage	75	V
$V_{CEO}$	Collector-Emitter Voltage	40	V
$V_{EBO}$	Emitter-Base Voltage	6.0	V
$I_C$	Collector Current	600	mA
$T_J$	Junction Temperature	150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature	-55 to +150	$^\circ\text{C}$

**Thermal Characteristics<sup>(1)</sup>**Values are at  $T_A = 25^\circ\text{C}$  unless otherwise noted.

Symbol	Parameter	Value	Unit
$P_D$	Power Dissipation by $R_{\theta JA}$	625	mW
	Derate Above $25^\circ\text{C}$	5	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	$^\circ\text{C}/\text{W}$

**Note:**

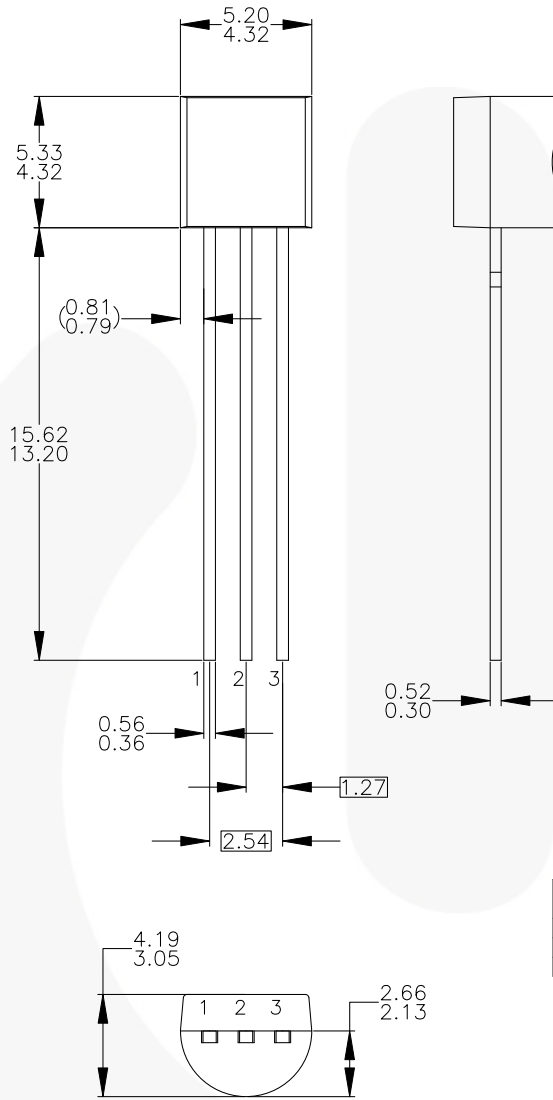
1. PCB size: FR-4, 76 mm x 114 mm x 1.57 mm (3.0 inch x 4.5 inch x 0.062 inch) with minimum land pattern size.

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

Symbol	Parameter	Conditions	Min.	Max.	Unit
$BV_{CBO}$	Collector-Base Breakdown Voltage	$I_C = 10 \mu\text{A}, I_E = 0$	75		V
$BV_{CEO}$	Collector-Emitter Breakdown Voltage	$I_C = 10 \text{ mA}, I_B = 0$	40		V
$BV_{EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10 \mu\text{A}, I_C = 0$	6.0		V
$I_{CBO}$	Collector Cut-Off Current	$V_{CB} = 60 \text{ V}, I_E = 0$		0.01	$\mu\text{A}$
$I_{EBO}$	Emitter Cut-Off Current	$V_{EB} = 3.0 \text{ V}, I_C = 0$		10	nA
$h_{FE}$	DC Current Gain	$V_{CE} = 10 \text{ V}, I_C = 0.1 \text{ mA}$	35		
		$V_{CE} = 10 \text{ V}, I_C = 1 \text{ mA}$	50		
		$V_{CE} = 10 \text{ V}, I_C = 10 \text{ mA}$	75		
		$V_{CE} = 10 \text{ V}, I_C = 150 \text{ mA}^{(2)}$	100	300	
		$V_{CE} = 10 \text{ V}, I_C = 500 \text{ mA}^{(2)}$	40		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage <sup>(2)</sup>	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$		0.3	V
		$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$		1.0	
$V_{BE(sat)}$	Base-Emitter Saturation Voltage <sup>(2)</sup>	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$	0.6	1.2	V
		$I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$		2.0	
$f_T$	Current Gain Bandwidth Product	$I_C = 20 \text{ mA}, V_{CE} = 20 \text{ V}, f = 100 \text{ MHz}$	300		MHz
$C_{ob}$	Output Capacitance	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1.0 \text{ MHz}$		8	pF
$t_{ON}$	Turn-On Time	$V_{CC} = 30 \text{ V}, I_C = 150 \text{ mA}, I_{B1} = 15 \text{ mA}, V_{BE(off)} = 0.5 \text{ V}$		35	ns
$t_{OFF}$	Turn-Off Time	$V_{CC} = 30 \text{ V}, I_C = 150 \text{ mA}, I_{B1} = I_{B2} = 15 \text{ mA}$		285	ns
NF	Noise Figure	$I_C = 100 \mu\text{A}, V_{CE} = 10 \text{ V}, R_S = 1 \text{ k}\Omega, f = 1.0 \text{ kHz}$		4	dB

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

Physical Dimensions



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-1994.
- D) TO-92 (92,94,96,97,98) PIN CONFIGURATION:

PIN	92			94			96			97			98		
	P	F	M	P	F	M	B	F	M	P	F	M	P	F	M
1	E	S	S	E	S	S	B	D	G	C	G	D	C	G	D
2	B	D	G	C	G	D	E	S	S	B	D	G	E	S	S
3	C	G	D	B	D	G	C	G	D	E	S	S	B	D	G

LEGEND:

- P - BIPOLAR
- F - JFET
- M - DMOS
- E - EMITTER
- B - BASE
- C - COLLECTOR
- D - DRAIN
- S - SOURCE
- G - GATE

- E) FOR PACKAGE 92, 94, 96, 97 AND 98: PIN CONFIGURATION DRAIN "D" AND SOURCE "S" ARE INTERCHANGEABLE AT JFET "F" OPTION.
- F) DRAWING FILENAME: MKT-ZA03DREV3.

Figure 1. 3-Lead, TO-92, JEDEC TO-92 Compliant Straight Lead Configuration, Bulk Type

Physical Dimensions (Continued)

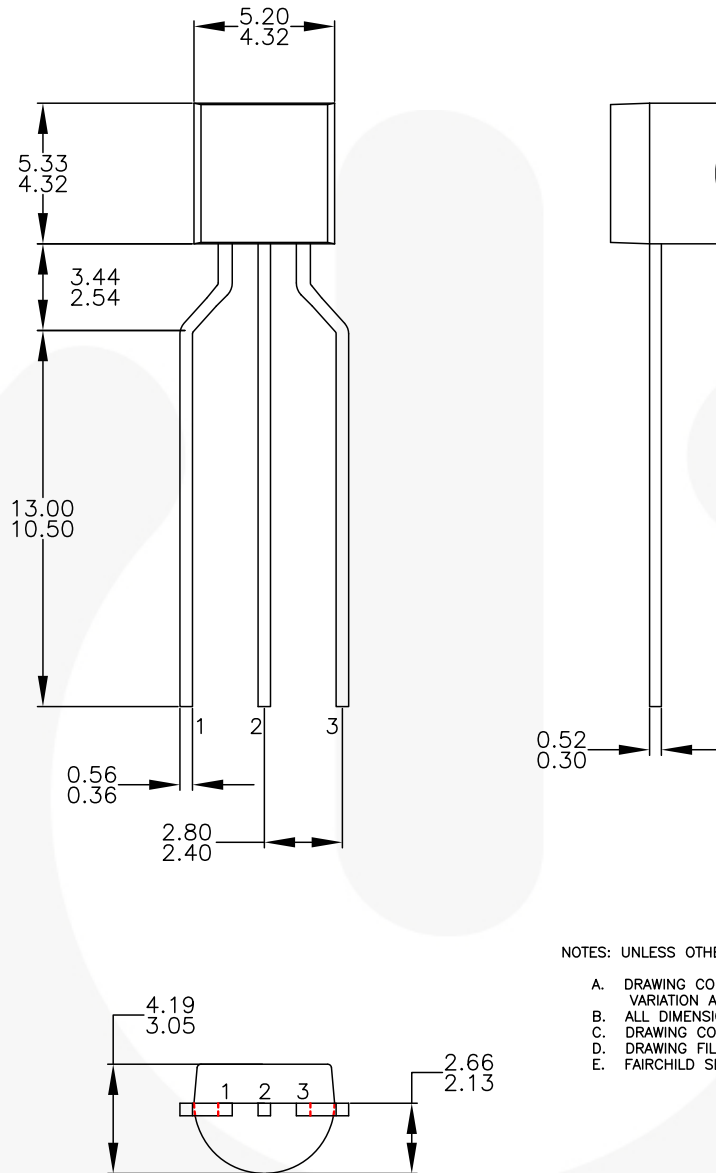


Figure 2. 3-Lead, TO-92, Molded, 0.2 In Line Spacing Lead Form, Ammo, Tape and Reel Type



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