

## 2N5088, 2N5089

### Amplifier Transistors

NPN Silicon

#### MAXIMUM RATINGS

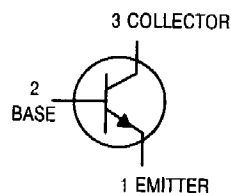
Rating	Symbol	Value	Unit
Collector - Emitter Voltage	$V_{CEO}$	30	Vdc
	2N5088	25	
	2N5089		
Collector - Base Voltage	$V_{CBO}$	35	Vdc
	2N5088	30	
	2N5089		
Emitter - Base Voltage	$V_{EBO}$	3.0	Vdc
Collector Current - Continuous	$I_C$	50	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$	$P_D$	625	mW
Derate above $25^\circ\text{C}$		5.0	mW/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	1.5	W
Derate above $25^\circ\text{C}$		12	mW/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	°C

#### THERMAL CHARACTERISTICS

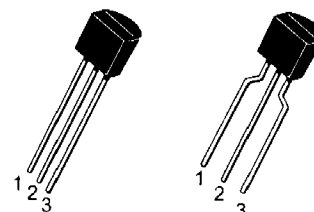
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient (Note 1)	$R_{\theta JA}$	200	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	°C/W

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.

1.  $R_{\theta JA}$  is measured with the device soldered into a typical printed circuit board.



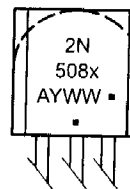
TO-92



STRAIGHT LEAD  
BULK PACK

BENT LEAD  
TAPE & REEL  
AMMO PACK

#### MARKING DIAGRAM



x = 8 or 9

A = Assembly Location

Y = Year

WW = Work Week



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**Quality Semi-Conductors**

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit	
<b>OFF CHARACTERISTICS</b>					
Collector - Emitter Breakdown Voltage (Note 2) ( $I_C = 1.0 \text{ mAdc}$ , $I_B = 0$ )	2N5088 2N5089	$V_{(BR)CEO}$	30 25	- -	Vdc
Collector - Base Breakdown Voltage ( $I_C = 100 \mu\text{Adc}$ , $I_E = 0$ )	2N5088 2N5089	$V_{(BR)CBO}$	35 30	- -	Vdc
Collector Cutoff Current ( $V_{CB} = 20 \text{ Vdc}$ , $I_E = 0$ ) ( $V_{CB} = 15 \text{ Vdc}$ , $I_E = 0$ )	2N5088 2N5089	$I_{CBO}$	- -	50 50	nAdc
Emitter Cutoff Current ( $V_{EB(off)} = 3.0 \text{ Vdc}$ , $I_C = 0$ ) ( $V_{EB(off)} = 4.5 \text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	- -	50 100	nAdc

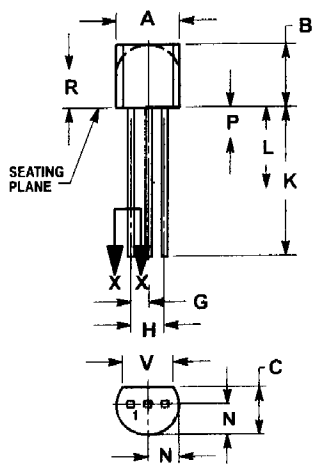
**ON CHARACTERISTICS**

DC Current Gain ( $I_C = 100 \mu\text{Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	2N5088 2N5089	$h_{FE}$	300 400	900 1200	-
( $I_C = 1.0 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ )	2N5088 2N5089		350 450	- -	
( $I_C = 10 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ ) (Note 2)	2N5088 2N5089		300 400	- -	
Collector - Emitter Saturation Voltage ( $I_C = 10 \text{ mAdc}$ , $I_B = 1.0 \text{ mAdc}$ )		$V_{CE(sat)}$	-	0.5	Vdc
Base - Emitter On Voltage ( $I_C = 10 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ ) (Note 2)		$V_{BE(on)}$	-	0.8	Vdc

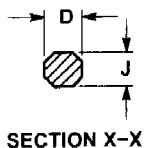
**SMALL-SIGNAL CHARACTERISTICS**

Current - Gain - Bandwidth Product ( $I_C = 500 \mu\text{Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 20 \text{ MHz}$ )		$f_T$	50	-	MHz
Collector - Base Capacitance ( $V_{CB} = 5.0 \text{ Vdc}$ , $I_E = 0$ , $f = 1.0 \text{ MHz}$ )		$C_{cb}$	-	4.0	pF
Emitter - Base Capacitance ( $V_{EB} = 0.5 \text{ Vdc}$ , $I_C = 0$ , $f = 1.0 \text{ MHz}$ )		$C_{eb}$	-	10	pF
Small-Signal Current Gain ( $I_C = 1.0 \text{ mAdc}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $f = 1.0 \text{ kHz}$ )	2N5088 2N5089	$h_{fe}$	350 450	1400 1800	-
Noise Figure ( $I_C = 100 \mu\text{Adc}$ , $V_{CE} = 5.0 \text{ Vdc}$ , $R_S = 1.0 \text{ k}\Omega$ , $f = 1.0 \text{ kHz}$ )	2N5088 2N5089	NF	- -	3.0 2.0	dB

2. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



**STRAIGHT LEAD  
BULK PACK**



**NOTES:**

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
- 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	---