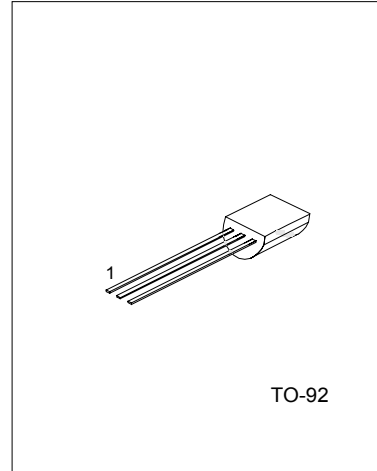


# UTC 2N5088/2N5089 NPN EPITAXIAL SILICON TRANSISTOR

## NPN GENERAL PURPOSE AMPLIFIER

### DESCRIPTION

The device is designed for low noise, high gain, general purpose amplifier applications at collector currents from 1 $\mu$ A to 50mA.



1:EMITTER 2:BASE 3:COLLECTOR

### MAXIMUM RATINGS (TA=25°C, unless otherwise noted)

RATING	SYMBOL	2N5088	2N5089	UNIT
Collector-Emitter voltage	V <sub>CEO</sub>	30	25	V
Collector-Base voltage	V <sub>CBO</sub>	35	30	V
Emitter-base voltage	V <sub>EBO</sub>	4.5		V
Collector current-continuous	I <sub>c</sub>	100		mA
Operating and Storage Junction Temperature Range	T <sub>j</sub> , T <sub>stg</sub>	-55 ~ +150		°C

Note 1: These ratings are based on a maximum junction temperature of 150 degrees C.

Note 2: These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### THERMAL CHARACTERISTICS (TA=25°C, unless otherwise noted)

PARAMETER	SYMBOL	MAX	UNIT
Total Device Dissipation Derate above 25°C	P <sub>D</sub>	625 5	mW mW/°C
Thermal Resistance, Junction to Case	R <sub>θJC</sub>	83.3	°C/W
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	200	°C/W

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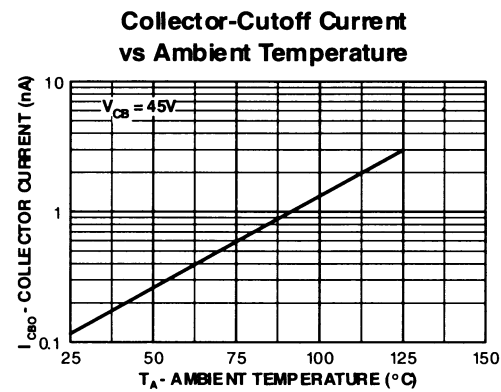
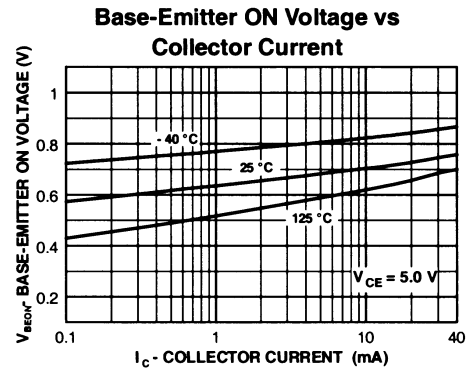
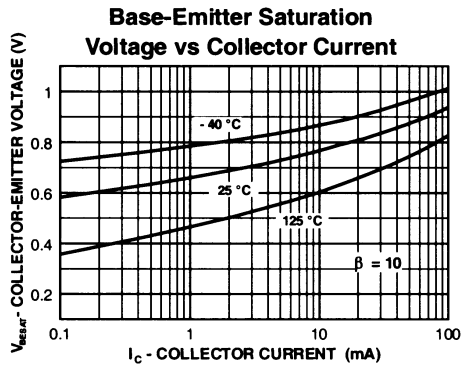
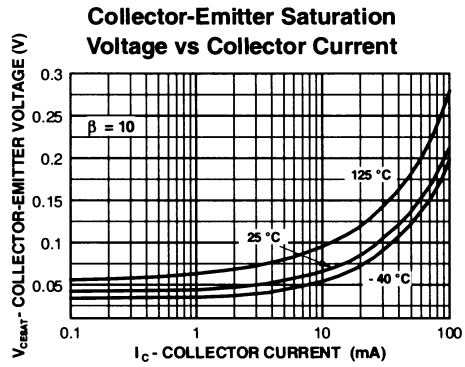
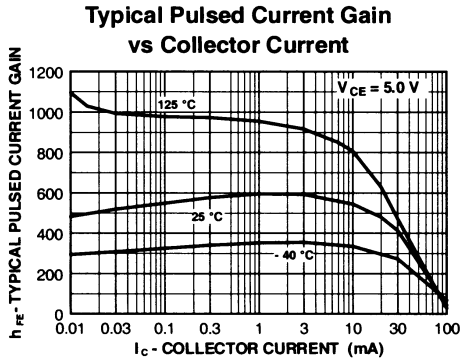
## ELECTRICAL CHARACTERISTICS (Ta=25°C, unless otherwise noted)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
<b>OFF CHARACTERISTICS</b>					
Collector-Emitter Breakdown Voltage (note) 2N5088 2N5089	V <sub>(BR)CEO</sub>	I <sub>C</sub> =1.0mA, I <sub>B</sub> =0	30 25		V V
Collector-Base Breakdown Voltage 2N5088 2N5089	V <sub>(BR)CBO</sub>	I <sub>C</sub> =100μA, I <sub>E</sub> =0	35 30		V V
Collector Cut-Off Current 2N5088 2N5089	I <sub>CBO</sub>	V <sub>CB</sub> =20V, I <sub>E</sub> =0 V <sub>CB</sub> =15V, I <sub>E</sub> =0		50 50	nA nA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =3.0V, I <sub>C</sub> =0 V <sub>EB</sub> =4.5V, I <sub>C</sub> =0		50 100	nA nA
<b>ON CHARACTERISTICS</b>					
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =5.0V, I <sub>C</sub> =100μA V <sub>CE</sub> =5.0V, I <sub>C</sub> =1.0mA V <sub>CE</sub> =5.0V, I <sub>C</sub> =10mA (NOTE)	2N5088 2N5089 2N5088 2N5089 2N5088 2N5089	300 400 350 450 300 400	900 1200
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =10mA, I <sub>B</sub> =1.0mA		0.5	V
Base-Emitter On Voltage	V <sub>BE(on)</sub>	I <sub>C</sub> =10mA, V <sub>CE</sub> =5.0V		0.8	V
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Current Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =5.0mA, I <sub>C</sub> =500μA, f=20MHz	50		MHz
Collector-Base Capacitance	C <sub>cb</sub>	V <sub>CB</sub> =5.0V, I <sub>E</sub> =0, f=100kHz		4	pF
Emitter-Base Capacitance	C <sub>eb</sub>	V <sub>EB</sub> =0.5V, I <sub>C</sub> =0, f=100kHz		10	pF
Small-Signal Current Gain 2N5088 2N5089	h <sub>FE</sub>	V <sub>CE</sub> =5.0V, I <sub>C</sub> =1.0mA, f=1.0kHz	350 450	1400 1800	
Noise Figure 2N5088 2N5089	NF	V <sub>CE</sub> =5.0V, I <sub>C</sub> =100μA, R <sub>s</sub> =10kΩ, f=10KHz to 15.7kHz		3.0 2.0	dB dB

Note: Pulse Test: Pulse Width≤300μs, Duty Cycle≤2.0%.

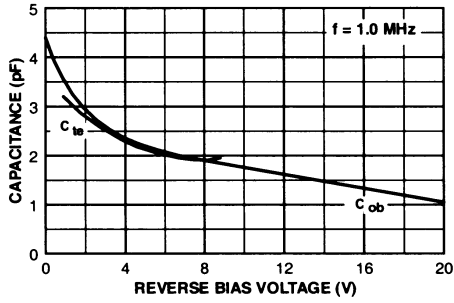
# UTC 2N5088/2N5089 NPN EPITAXIAL SILICON TRANSISTOR

## TYPICAL CHARACTERISTICS

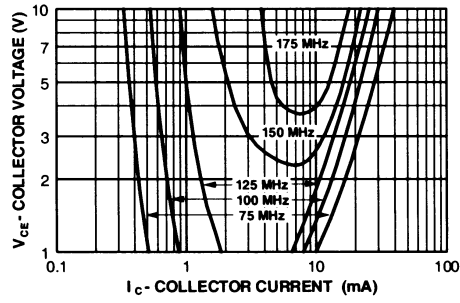


# UTC 2N5088/2N5089 NPN EPITAXIAL SILICON TRANSISTOR

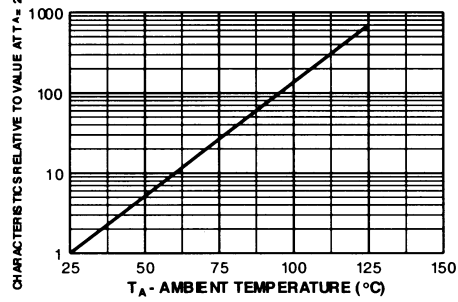
**Input and Output Capacitance vs Reverse Bias Voltage**



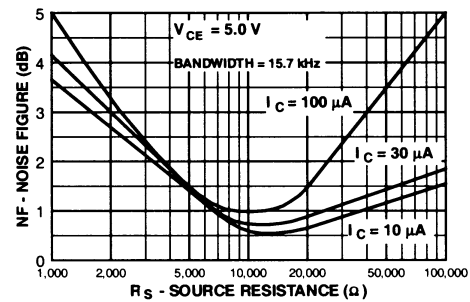
**Contours of Constant Gain Bandwidth Product ( $f_T$ )**



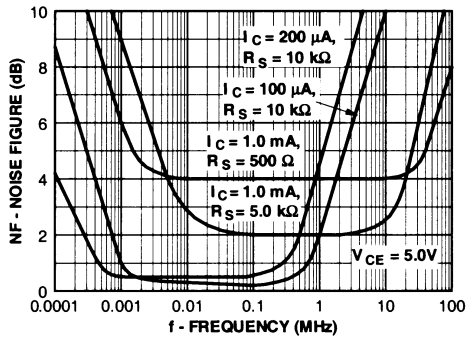
**Normalized Collector-Cutoff Current vs Ambient Temperature**



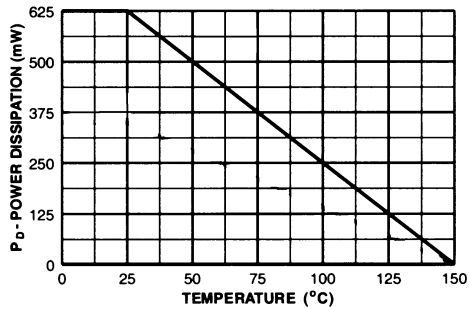
**Wideband Noise Frequency vs Source Resistance**



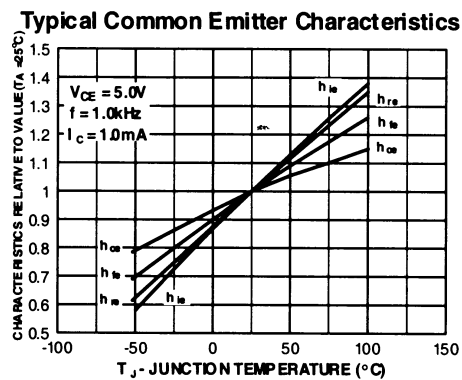
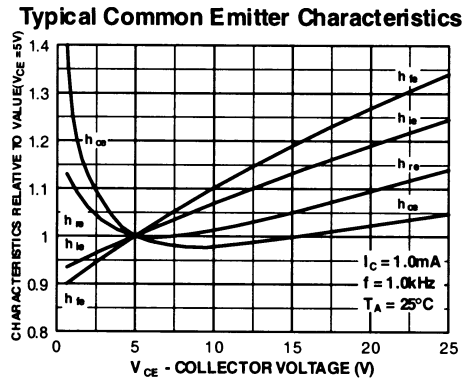
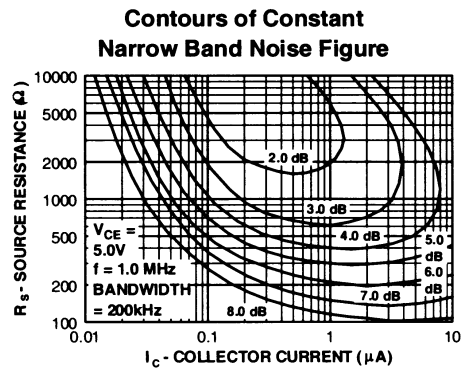
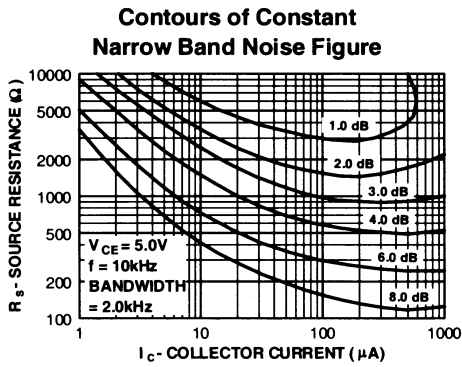
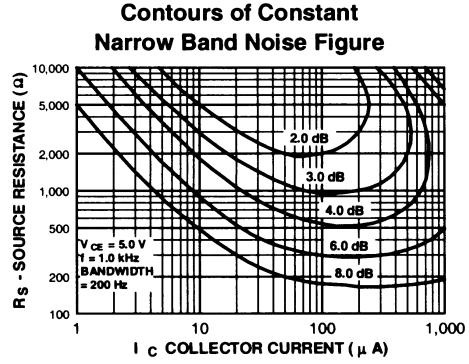
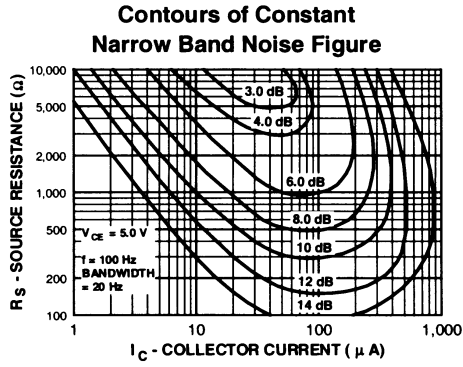
**Noise Figure vs Frequency**



**Power Dissipation vs Ambient Temperature**



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# UTC 2N5088/2N5089 NPN EPITAXIAL SILICON TRANSISTOR

Typical Common Emitter Characteristics

