



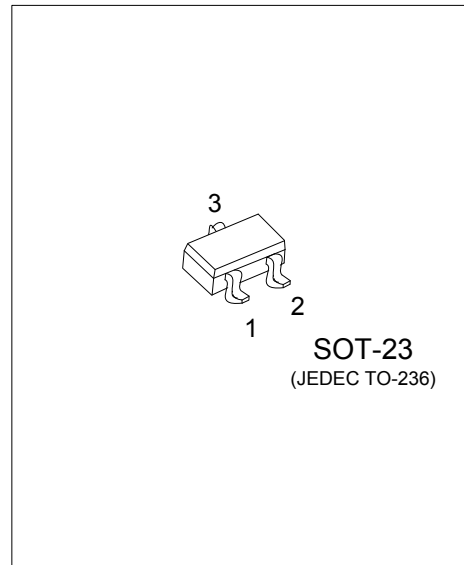
MMBT5088/MMBT5089

NPN SILICON TRANSISTOR

NPN GENERAL PURPOSE AMPLIFIER

DESCRIPTION

The devices are designed for low noise, high gain, general purpose amplifier applications at collector currents from 1μA to 50mA.



ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
MMBT5088L-AE3-R	MMBT5088G-AE3-R	SOT-23	B	E	C	Tape Reel
MMBT5089L-AE3-R	MMBT5089G-AE3-R	SOT-23	B	E	C	Tape Reel

Note: Pin Assignment: B: Base E: Emitter C: Collector

<p>MMBT5088G-AE3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(1) R: Tape Reel (2) AE3: SOT-23 (3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING

UTC MMBT5088	UTC MMBT5089
<p>L: Lead Free G: Halogen Free</p>	<p>L: Lead Free G: Halogen Free</p>

MMBT5088/MMBT5089

NPN SILICON TRANSISTOR

■ ABSOLUTE MAXIMUM RATING ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Collector-Emitter voltage	MMBT5088	V_{CEO}	30	V
	MMBT5089		25	
Collector-Base voltage	MMBT5088	V_{CBO}	35	V
	MMBT5089		30	
Emitter-base voltage		V_{EBO}	4.5	V
Collector current-continuous		I_C	100	mA
Total Device Dissipation		P_D	350	mW
Linear Derating Factor above $T_A=25^\circ\text{C}$			2.8	mW/ $^\circ\text{C}$
Junction Temperature		T_J	+125	$^\circ\text{C}$
Operating Temperature		T_{OPR}	-40 ~ +150	$^\circ\text{C}$
Storage Temperature		T_{STG}	-40 ~ +150	$^\circ\text{C}$

- Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. These ratings are based on a maximum junction temperature of 150 degrees C.
3. These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

■ THERMAL CHARACTERISTICS ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	357	$^\circ\text{C}/\text{W}$

MMBT5088/MMBT5089

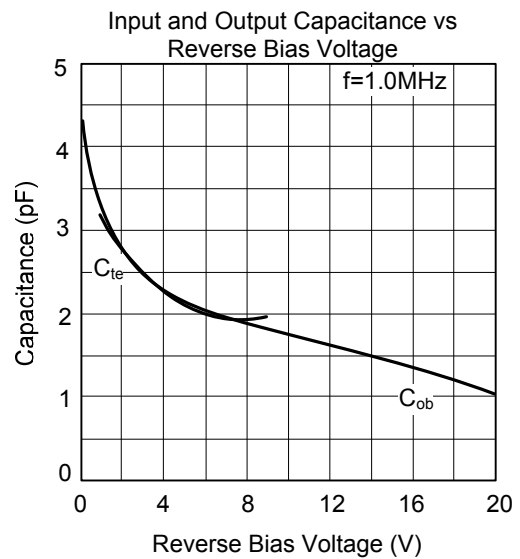
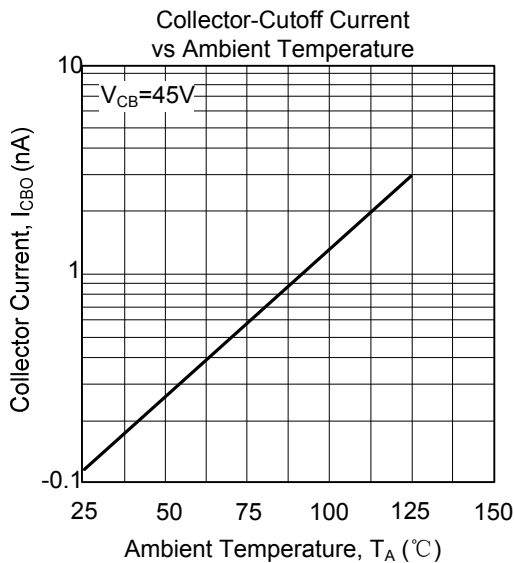
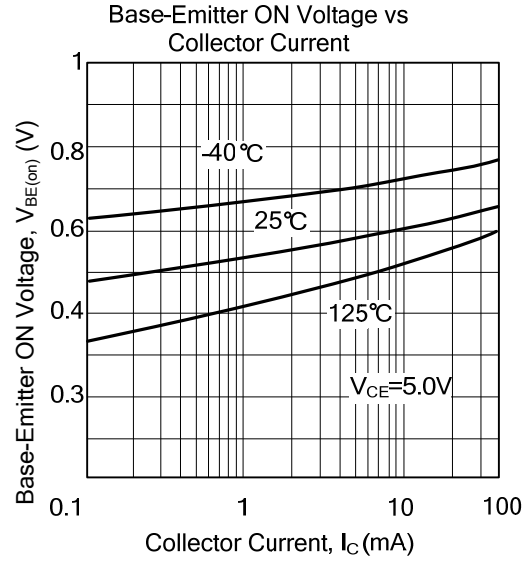
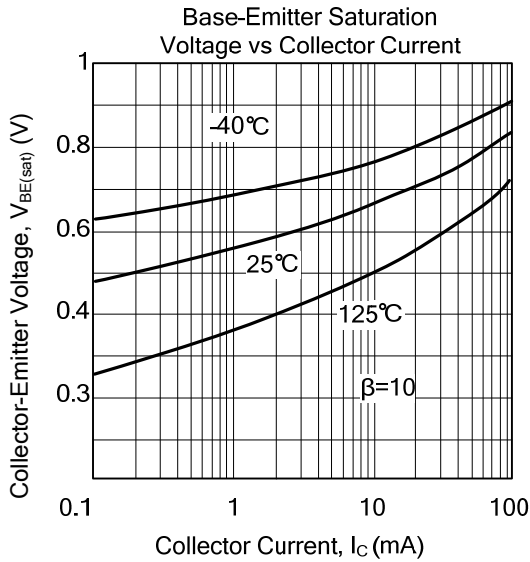
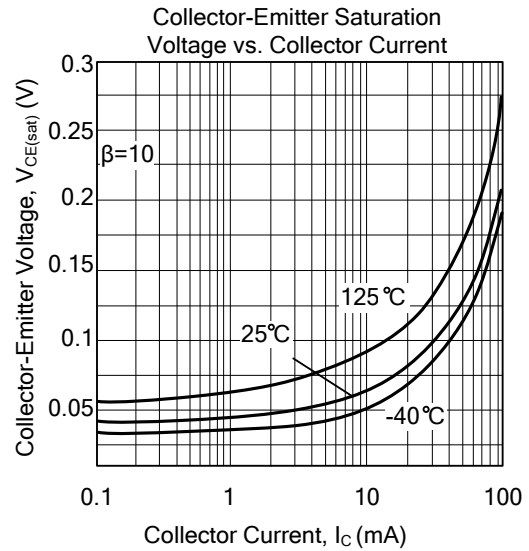
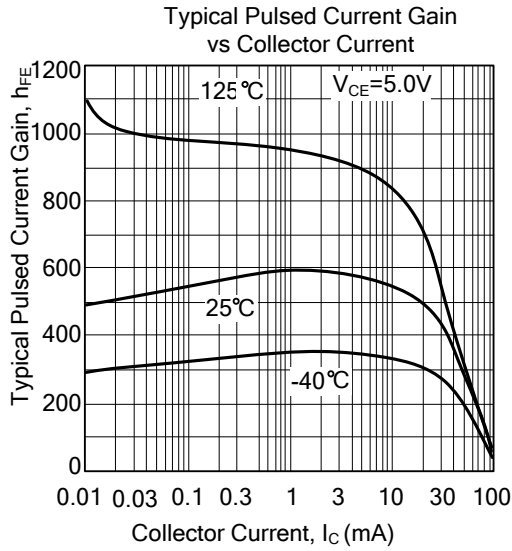
NPN SILICON TRANSISTOR

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

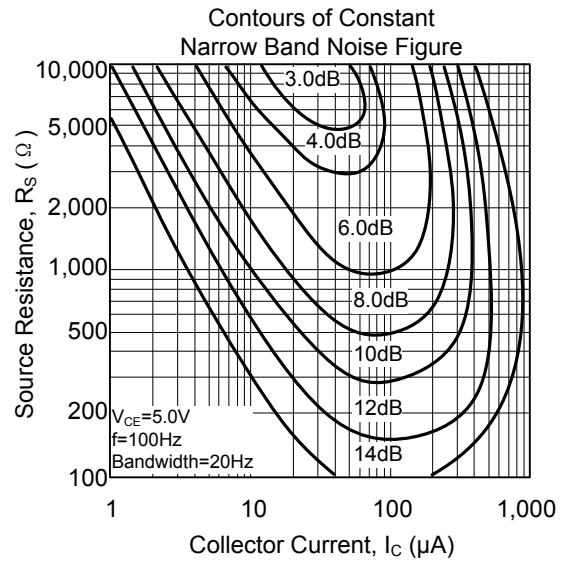
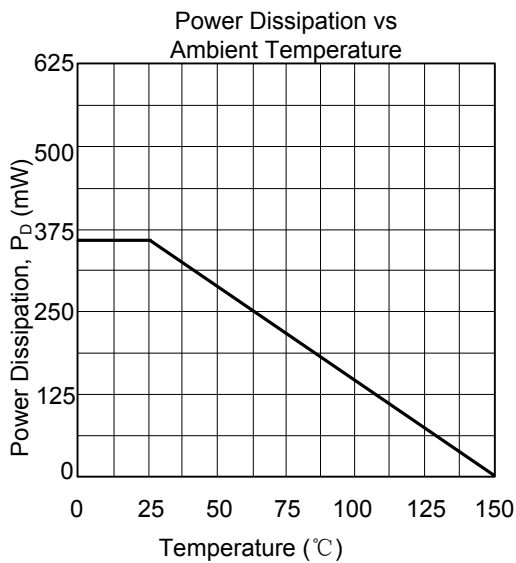
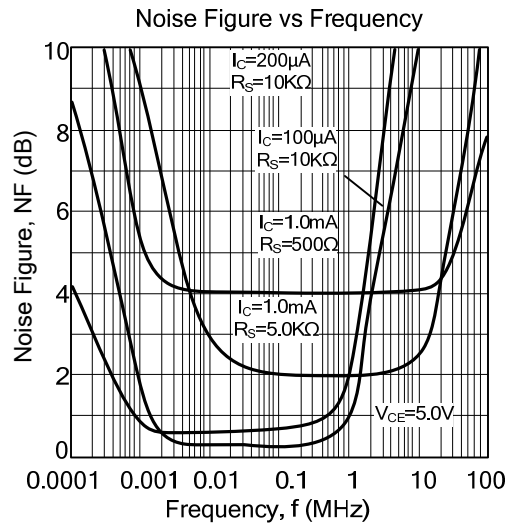
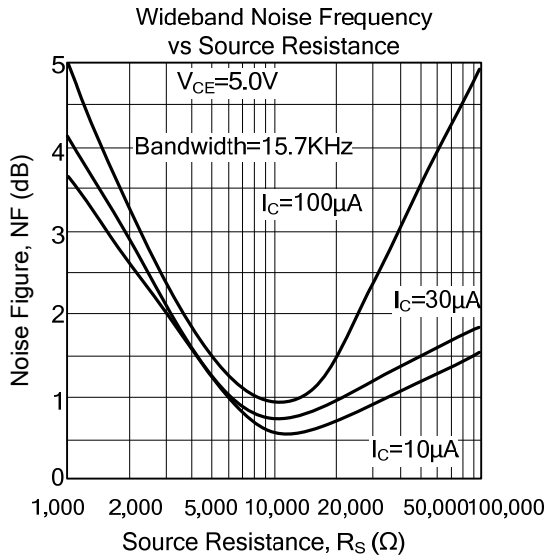
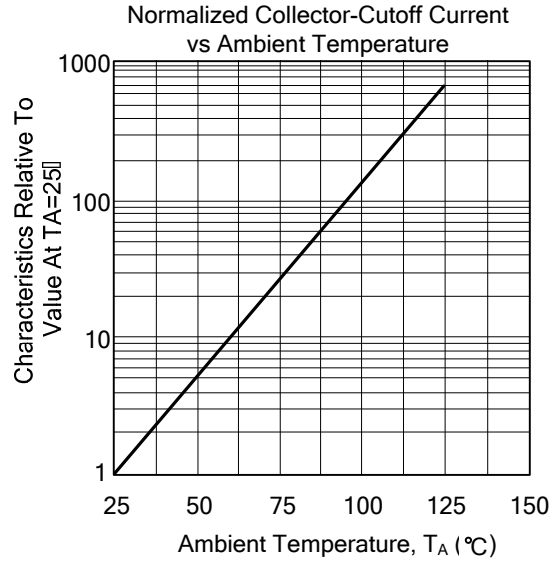
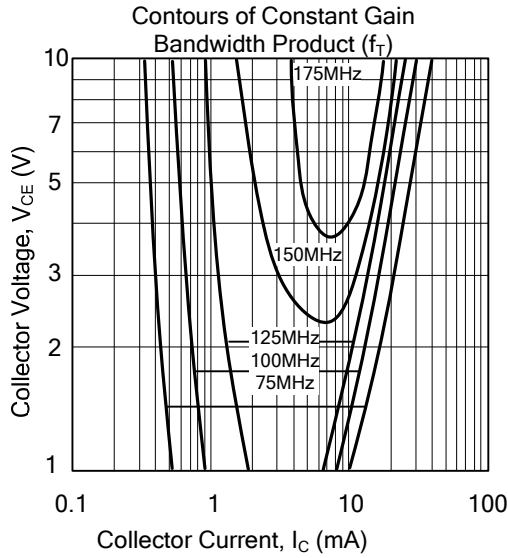
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Collector-Emitter Breakdown Voltage (Note)	MMBT5088	BV _{CEO}	I _C =1.0mA, I _B =0	30			V
	MMBT5089			25			V
Collector-Base Breakdown Voltage	MMBT5088	BV _{CBO}	I _C =100μA, I _E =0	35			V
	MMBT5089			30			V
Collector Cut-Off Current	MMBT5088	I _{CBO}	V _{CB} =20V, I _E =0			50	nA
	MMBT5089		V _{CB} =15V, I _E =0			50	nA
Emitter Cutoff Current		I _{EBO}	V _{EB} =3.0V, I _C =0			50	nA
			V _{EB} =4.5V, I _C =0			100	nA
ON CHARACTERISTICS							
DC Current Gain	MMBT5088	h _{FE}	V _{CE} =5.0V, I _C =100μA	300		900	
	MMBT5089			400		1200	
	MMBT5088		V _{CE} =5.0V, I _C =1.0mA	350			
	MMBT5089			450			
	MMBT5088		V _{CE} =5.0V, I _C =10mA(Note)	300			
	MMBT5089			400			
Collector-Emitter Saturation Voltage		V _{CE(SAT)}	I _C =10mA, I _B =1.0mA			0.5	V
Base-Emitter On Voltage		V _{BE(ON)}	I _C =10mA, V _{CE} =5.0V			0.8	V
SMALL SIGNAL CHARACTERISTICS							
Current Gain-Bandwidth Product		f _T	V _{CE} =5.0mA, I _C =500μA, f=20MHz	50			MHz
Collector-Base Capacitance		C _{CB}	V _{CB} =5.0V, I _E =0, f=100kHz			4	pF
Emitter-Base Capacitance		C _{EB}	V _{EB} =0.5V, I _C =0, f=100kHz			10	pF
Small-Signal Current Gain	MMBT5088	h _{FE}	V _{CE} =5.0V, I _C =1.0mA, f=1.0kHz	350		1400	
	MMBT5089			450		1800	
Noise Figure	MMBT5088	NF	V _{CE} =5.0V, I _C =100μA, R _S =10kΩ, f=10kHz ~ 15.7kHz			3.0	dB
	MMBT5089					2.0	dB

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

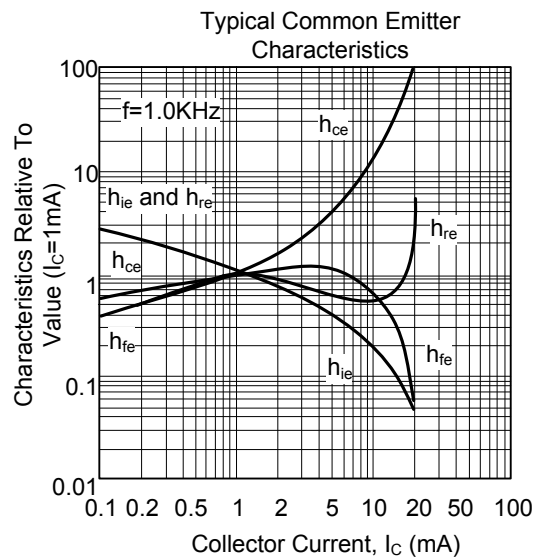
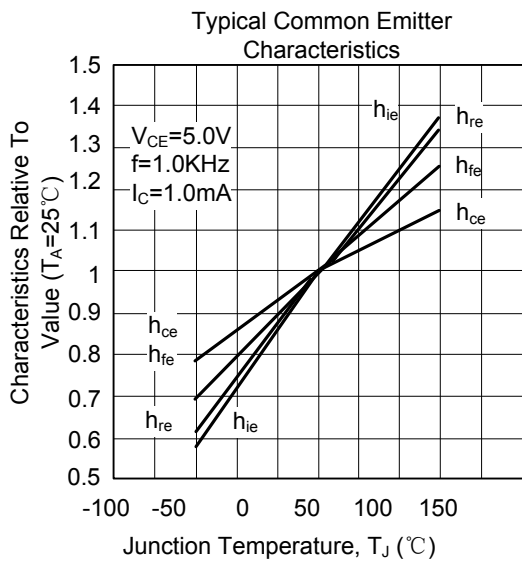
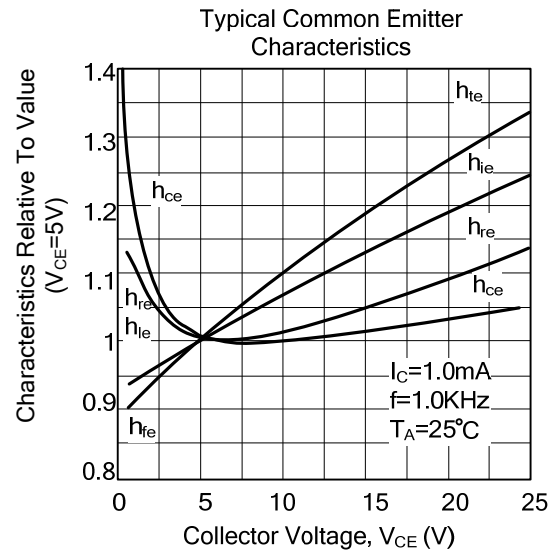
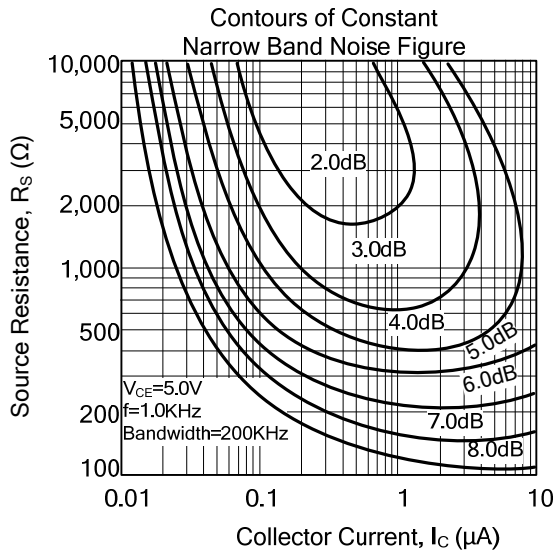
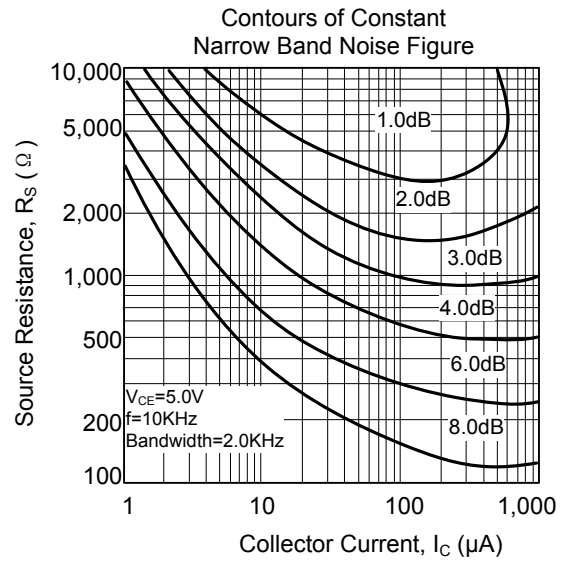
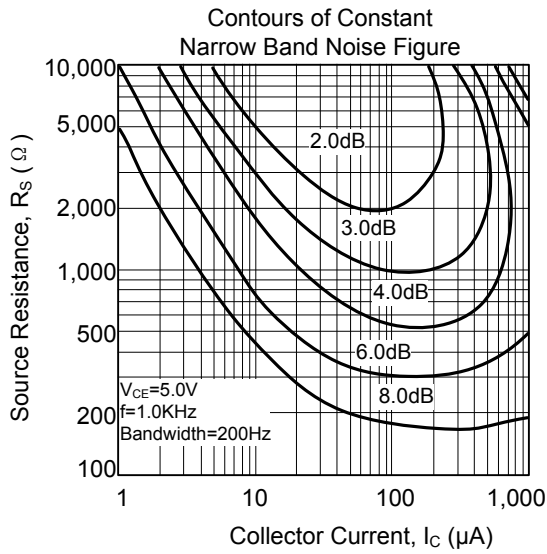
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS (Cont.)



■ TYPICAL CHARACTERISTICS (Cont.)



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