



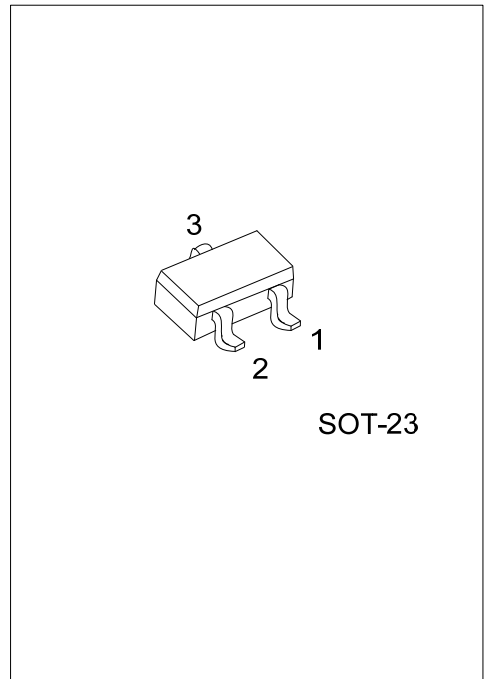
MMBT5088/MMBT5089

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.

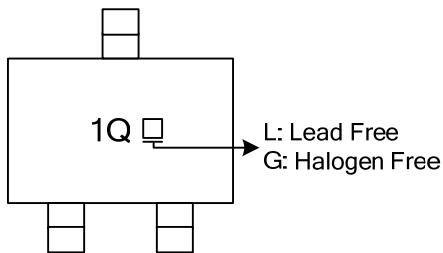


ORDERING INFORMATION

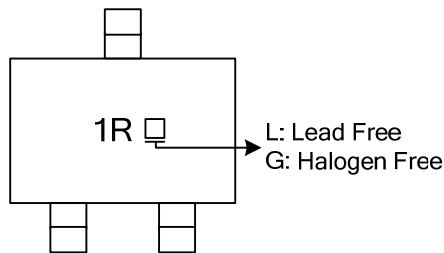
Ordering Number	Package	Pin Assignment			Packing
		1	2	3	
MMBT5088G-AE3-R	SOT-23	E	B	C	Tape Reel
MMBT5089G-AE3-R	SOT-23	E	B	C	Tape Reel

<p>MMBT5088L-AE3-R</p> <p>(1) Packing Type</p> <p>(2) Package Type</p> <p>(3) Halogen Free</p>	<p>(1) R: Tape Reel</p> <p>(2) AE3: SOT-23</p> <p>(3) G: Halogen Free</p>
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MARKING



MMBT5088



MMBT5089

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	$^\circ\text{C}$

- Note: 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 DATA ($T_A=25^\circ\text{C}$, unless otherwise specified)

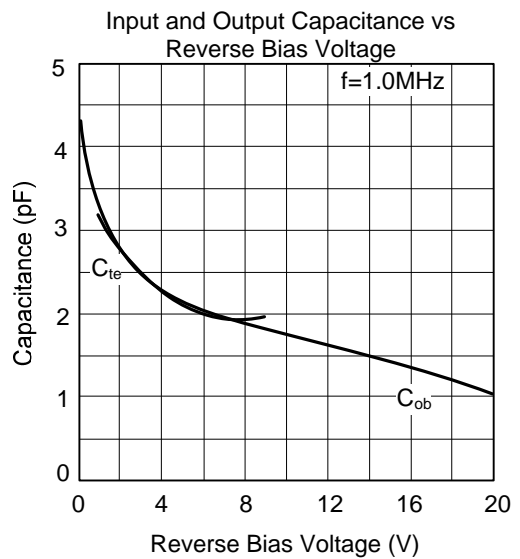
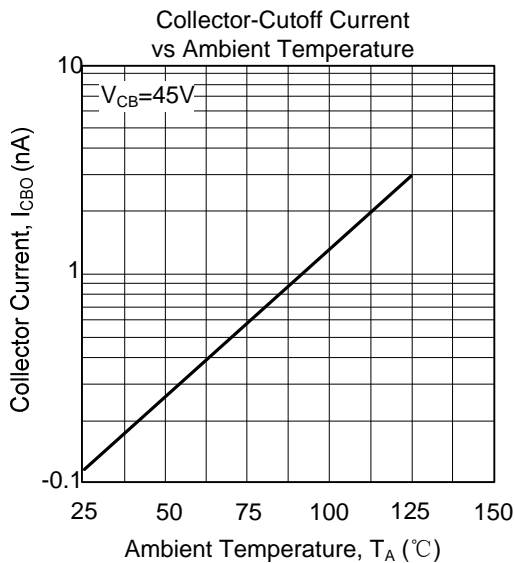
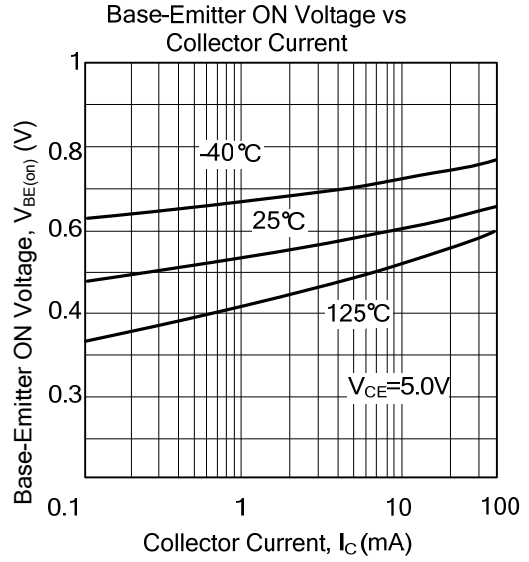
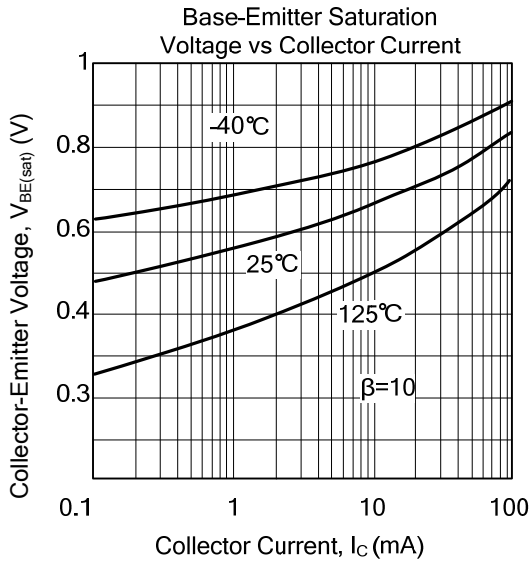
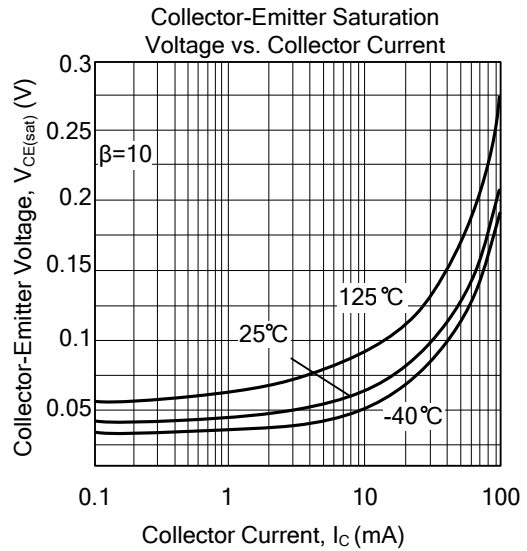
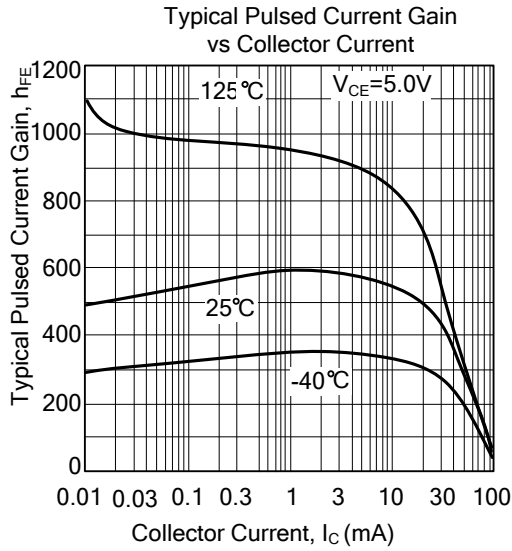
PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	357	$^\circ\text{C}/\text{W}$

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

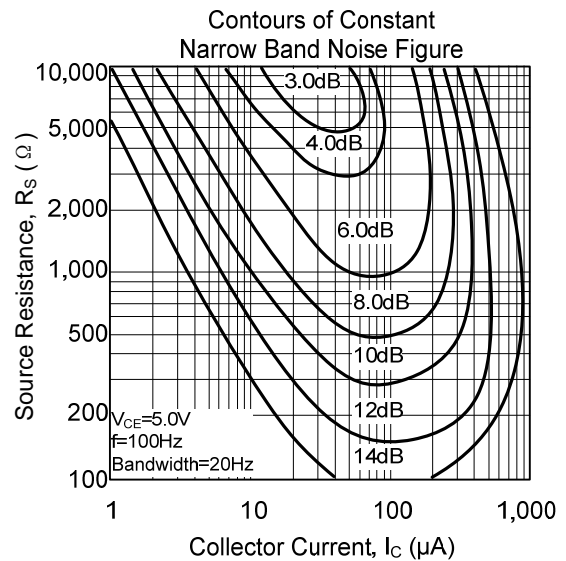
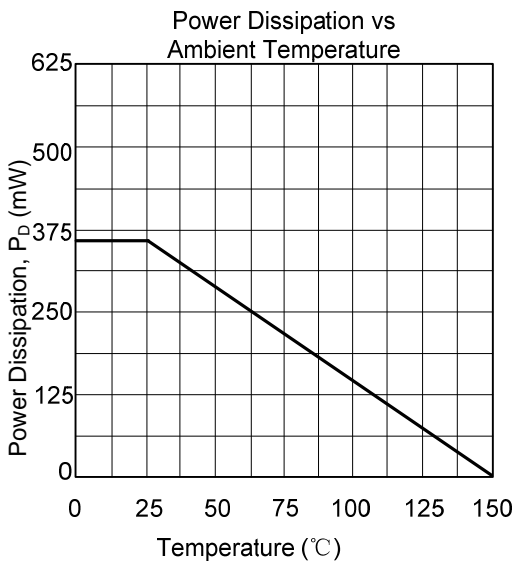
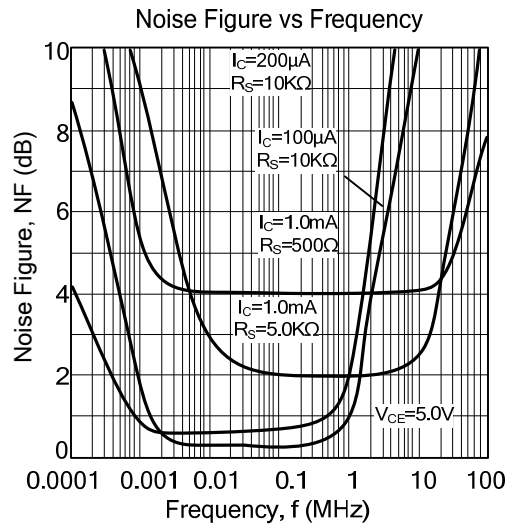
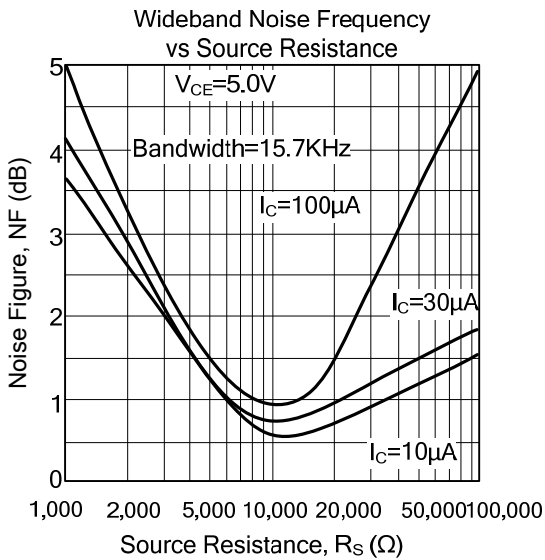
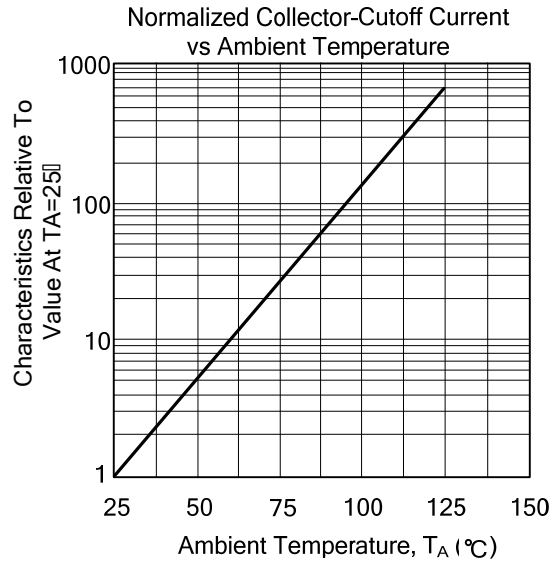
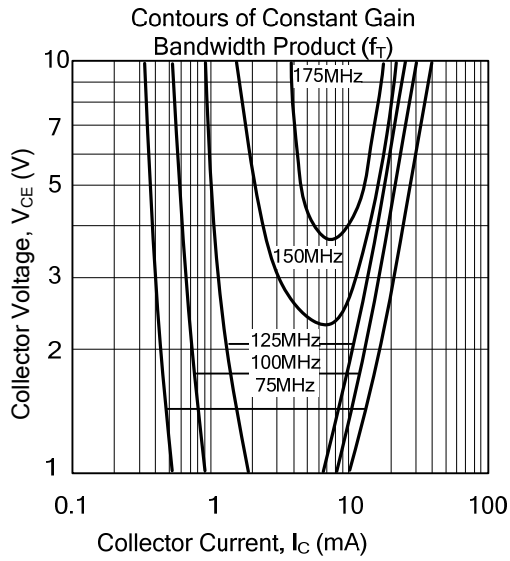
PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS							
Collector-Emitter Breakdown Voltage (Note)	MMBT5088	BV_{CEO}	$I_C=1.0\text{mA}, I_B=0$	30			V
	MMBT5089			25			V
Collector-Base Breakdown Voltage	MMBT5088	BV_{CBO}	$I_C=100\mu\text{A}, I_E=0$	35			V
	MMBT5089			30			V
Collector Cut-Off Current	MMBT5088	I_{CBO}	$V_{CB}=20\text{V}, I_E=0$			50	nA
	MMBT5089		$V_{CB}=15\text{V}, I_E=0$			50	nA
Emitter Cutoff Current			$V_{EB}=3.0\text{V}, I_C=0$			50	nA
			$V_{EB}=4.5\text{V}, I_C=0$			100	nA
ON CHARACTERISTICS							
DC Current Gain	MMBT5088	h_{FE}	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}$	300		900	
	MMBT5089			400		1200	
	MMBT5088		$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}$	350			
	MMBT5089			450			
	MMBT5088			$V_{CE}=5.0\text{V}, I_C=10\text{mA}(\text{Note})$	300		
MMBT5089	400						
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	$I_C=10\text{mA}, I_B=1.0\text{mA}$			0.5	V
Base-Emitter On Voltage		$V_{BE(ON)}$	$I_C=10\text{mA}, V_{CE}=5.0\text{V}$			0.8	V
SMALL SIGNAL CHARACTERISTICS							
Current Gain-Bandwidth Product		f_T	$V_{CE}=5.0\text{mA}, I_C=500\mu\text{A}, f=20\text{MHz}$	50			MHz
Collector-Base Capacitance		C_{CB}	$V_{CB}=5.0\text{V}, I_E=0, f=100\text{kHz}$			4	pF
Emitter-Base Capacitance		C_{EB}	$V_{EB}=0.5\text{V}, I_C=0, f=100\text{kHz}$			10	pF
Small-Signal Current Gain	MMBT5088	h_{FE}	$V_{CE}=5.0\text{V}, I_C=1.0\text{mA}, f=1.0\text{kHz}$	350		1400	
	MMBT5089			450		1800	
Noise Figure	MMBT5088	NF	$V_{CE}=5.0\text{V}, I_C=100\mu\text{A}, R_S=10\text{k}\Omega, f=10\text{kHz} \sim 15.7\text{kHz}$			3.0	dB
	MMBT5089					2.0	dB

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

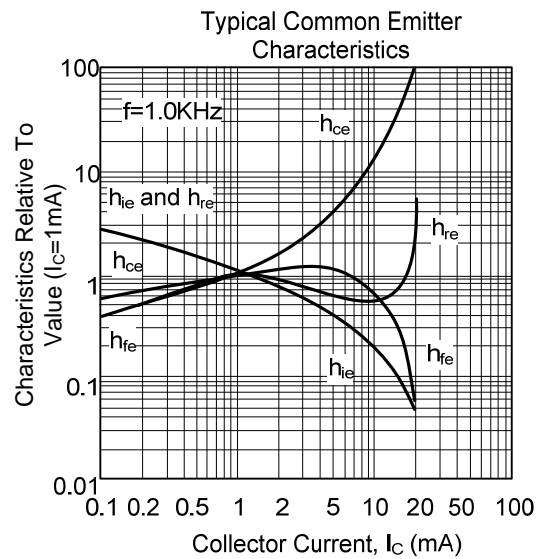
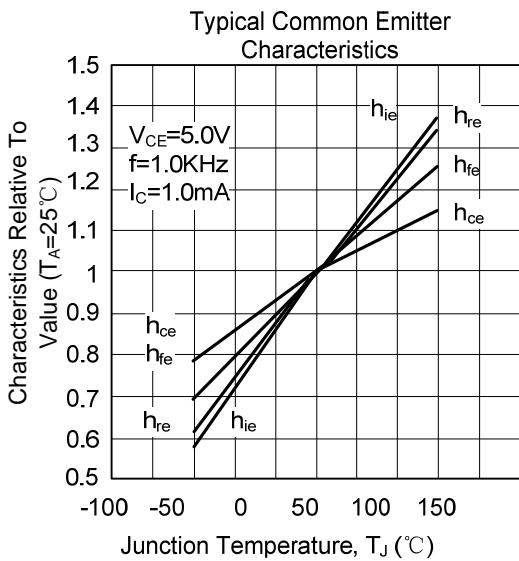
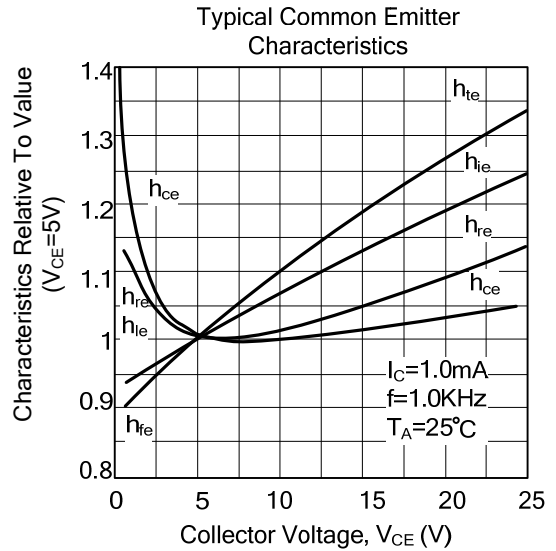
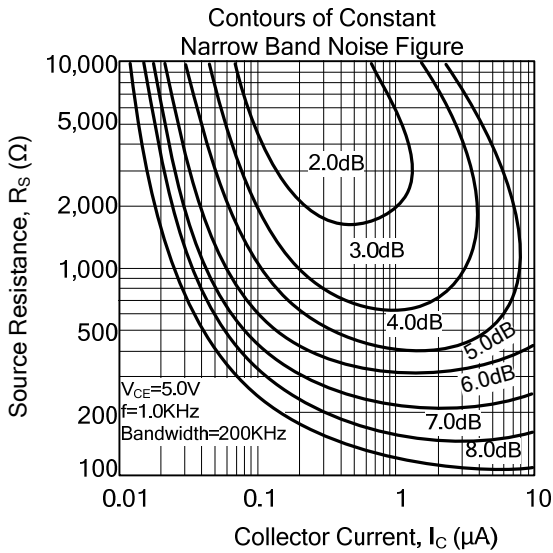
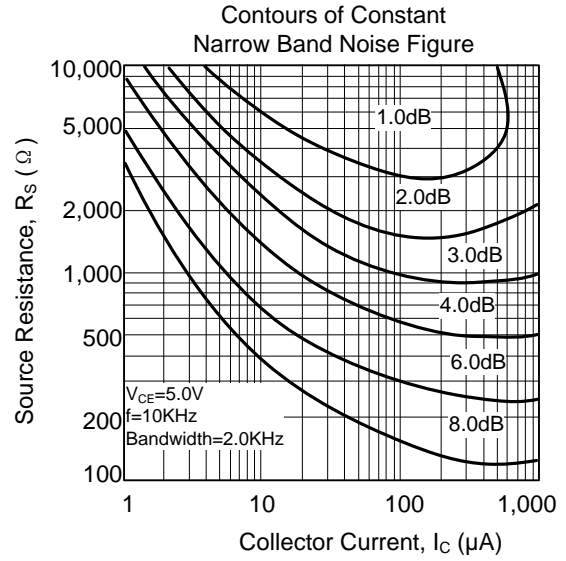
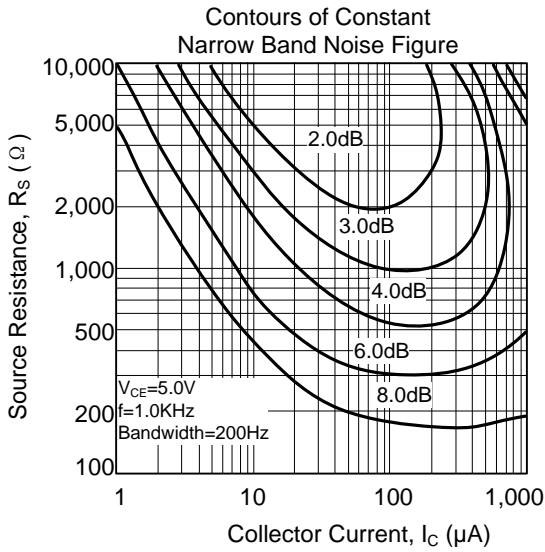
TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS(Cont.)



■ TYPICAL CHARACTERISTICS(Cont.)



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