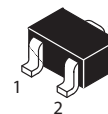
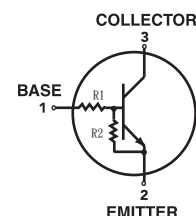


NPN Bias Resistor Transistor



SOT-323(SC-70)



Maximum Ratings (T_A=25 °C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CEO}	50	V _{dc}
Collector-Base Voltage	V _{CBO}	50	V _{dc}
Collector Current-Continuous	I _C	100	mA _{dc}

Thermal Characteristics

Characteristics	Symbol	Max	Unit
Total Device Dissipation FR-5 Board (1)T _A =25 °C Derate above 25 °C	P _D	202 1.6	mW mW/ °C
Thermal Resistance, Junction to Ambient (1)	R _{θJA}	618	°C/W
Junction and Storage, Temperature Range	T _J , T _{stg}	-55 to +150	°C

1.FR-4 @ minimum pad

2.FR-4 @ 1.0×1.0 inch Pad

Device Marking and Resistor Values

Device	Marking	R1(K)	R2(K)	Device	Marking	R1(K)	R2(K)
MUN5211	8A	10	10	MUN5231	8H	2.2	2.2
MUN5212	8B	22	22	MUN5232	8J	4.7	4.7
MUN5213	8C	47	47	MUN5233	8K/113	4.7	47
MUN5214	8D	10	47	MUN5234	8L	22	47
MUN5215	8E	10	∞	MUN5235	8M	2.2	47
MUN5216	8F	4.7	∞	MUN5236	8N	100	100
MUN5230	8G	1.0	1.0	MUN5237	8P	47	22

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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Off Characteristics

Collector-Emitter Breakdown Voltage ($I_C=2.0\text{mA}$, $I_B=0$)	V(BR)CEO	50	-	-	V
Collector-Base Breakdown Voltage ($I_C=10\text{ uA}$, $I_E=0$)	V(BR)CBO	50	-	-	V
Collector-Base Cutoff Voltage ($V_{CB}=50\text{ V}$, $I_E=0$)	ICBO	-	-	100	nA
Collector-Emitter Cutoff Current ($I_{CE}=50\text{V}$, $I_B=0$)	ICEO	-	-	500	nA
Emitter-Base Cutoff Current ($V_{EB}=6.0\text{V}$, $I_C=0$)	IEBO	-	-	0.5	mA
MUN5211		-	-	0.2	
MUN5212		-	-	0.1	
MUN5213		-	-	0.2	
MUN5214		-	-	0.9	
MUN5215		-	-	1.9	
MUN5216		-	-	4.3	
MUN5230		-	-	2.3	
MUN5231		-	-	1.5	
MUN5232		-	-	0.18	
MUN5233		-	-	0.13	
MUN5234		-	-	0.2	
MUN5235		-	-	0.05	
MUN5236		-	-	0.13	
MUN5237		-	-		

Electrical Characteristics (TA=25°C Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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On Characteristics (3)

DC Current Gain (VCE=10V, IC=5.0mA)	MUN5211 MUN5212 MUN5213 MUN5214 MUN5215 MUN5216 MUN5230 MUN5231 MUN5232 MUN5233 MUN5234 MUN5235 MUN5236 MUN5237	hFE	35 60 80 80 160 160 3.0 8.0 15 80 80 80 80 80	60 100 140 140 350 350 5.0 15 30 200 150 140 150 140	- - - - - - - - - - - - - -	
Collector-Emitter Saturation Voltage (IC=10mA, IB=0.3mA) (IC=10mA, IB=5mA) (IC=10mA, IB=1mA)	MUN5230/MUN5231 MUN5215/MUN5216 MUN5232/MUN5233/MUN5234	VCE(sat)	-	-	0.25	Vdc
Output Voltage(on) (VCC=5.0V, VB=2.5V, RL=1.0kΩ)	MUN5211 MUN5212 MUN5214 MUN5215 MUN5216 MUN5230 MUN5231 MUN5232 MUN5233 MUN5234 MUN5235 (VCC=5.0V, VB=3.5V, RL=1.0kΩ) MUN5213 (VCC=5.0V, VB=5.5V, RL=1.0kΩ) MUN5236 (VCC=5.0V, VB=4.0V, RL=1.0kΩ) MUN5237	VOL	- - - - - - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - -	0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	Vdc
Output Voltage(off) (VCC=5.0V, VB=0.5V, RL=1.0kΩ) (VCC=5.0V, VB=0.050V, RL=1.0kΩ) MUN5230 (VCC=5.0V, VB=0.25V, RL=1.0kΩ) MUN5215/MUN5216/MUN5233		VOH	4.9	-	-	Vdc

3. Pulse Test: Pulse Width< 300 us, Duty Cycle< 2.0%

Electrical Characteristics (TA=25°C Unless Otherwise noted)

Characteristics	Symbol	Min	Typ	Max	Unit
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On Characteristics

Input Resistor	MUN5211	R1	7.0	10	13	kΩ
	MUN5212		15.4	22	28.6	
	MUN5213		32.9	47	61.1	
	MUN5214		7.0	10	13	
	MUN5215		7.0	10	13	
	MUN5216		3.3	4.7	6.1	
	MUN5230		0.7	1.0	1.3	
	MUN5231		1.5	2.2	2.9	
	MUN5232		3.3	4.7	6.1	
	MUN5233		3.3	4.7	6.1	
	MUN5234		15.4	22	28.6	
	MUN5235		1.54	2.2	2.86	
	MUN5236		70	100	130	
	MUN5237		32.9	47	61.1	
Resistor Ratio MUN5211/MUN5212		R1/R2	0.8	1.0	1.2	
MUN5213/MUN5236			0.17	0.21	0.25	
MUN5214			-	-	-	
MUN5215/MUN5216			0.8	1.0	1.2	
MUN5230/MUN5231/MUN5232			0.055	0.1	0.185	
MUN5233			0.38	0.47	0.56	
MUN5234			0.038	0.047	0.056	
MUN5235			1.7	2.1	2.6	
MUN5237						

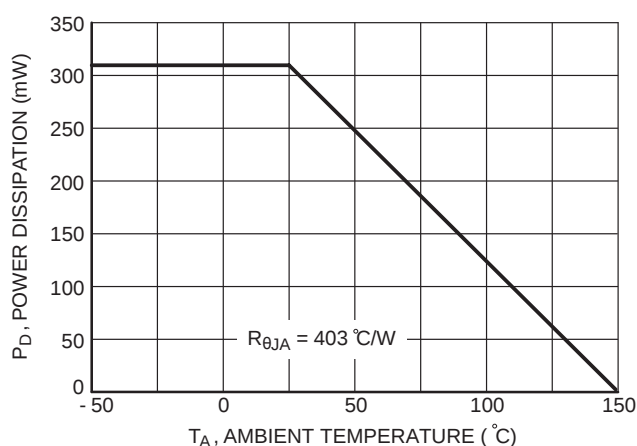


FIG 1. Derating Curve

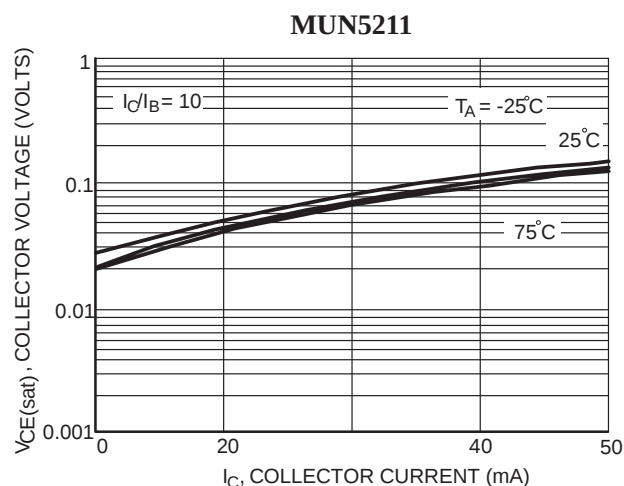


FIG.2 VCE(sat) versus IC

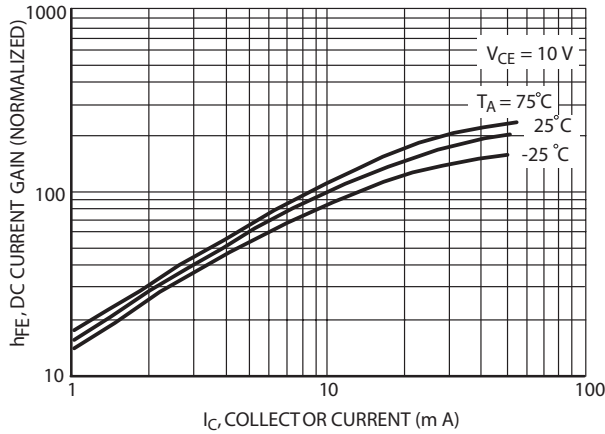


FIG.3 DC Current Gain

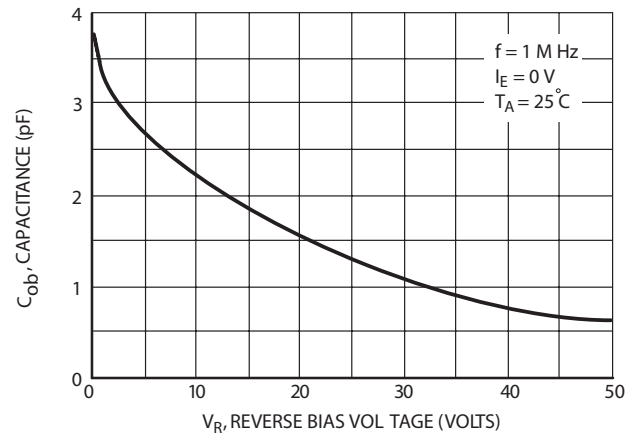


FIG.4 Output Capacitance

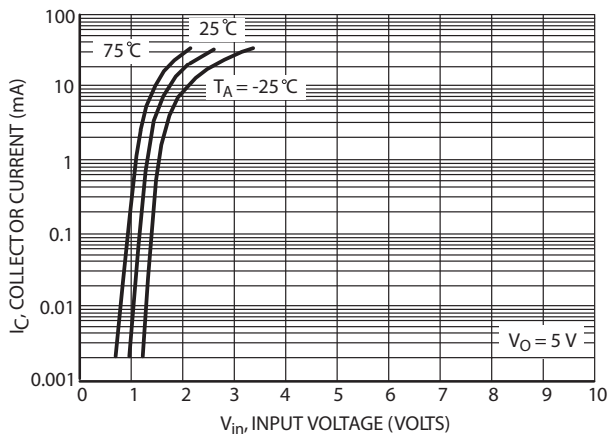


FIG.5 Output Current versus Input Voltage

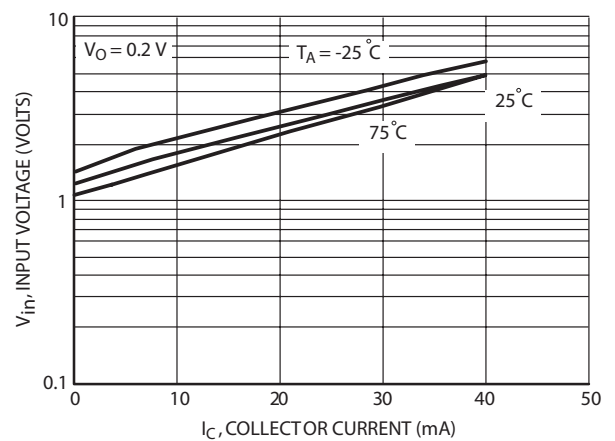


FIG.6 Input Voltage versus Output Current

MUN5212

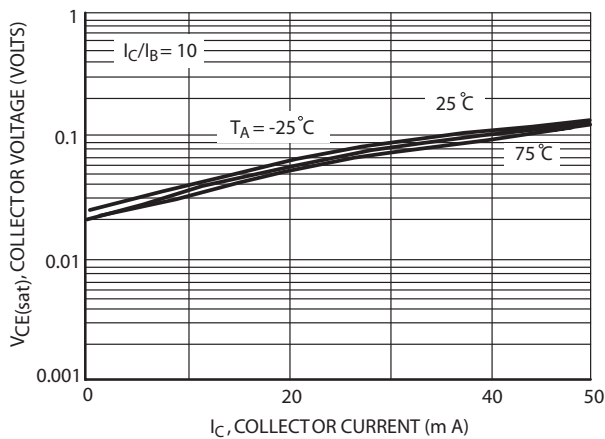


FIG.7 VCE(sat) versus IC

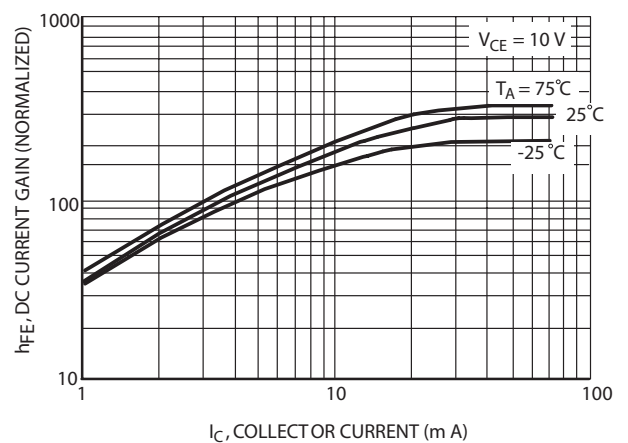


FIG.8 DC Current Gain

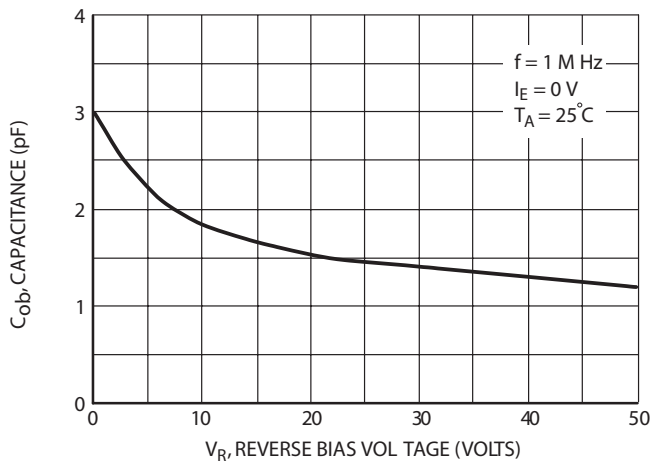


FIG.9 Output Capacitance

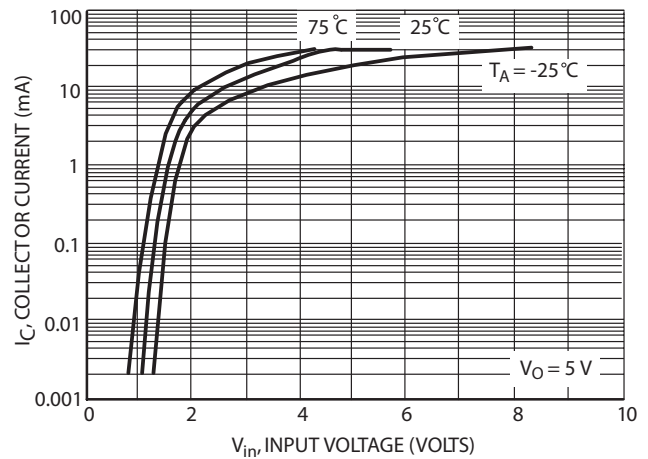


FIG.10 Output Current versus Input Voltage

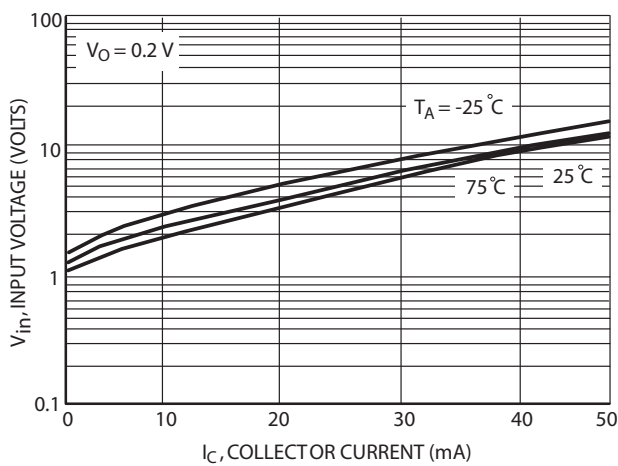


FIG.11 Input Voltage versus Output Current

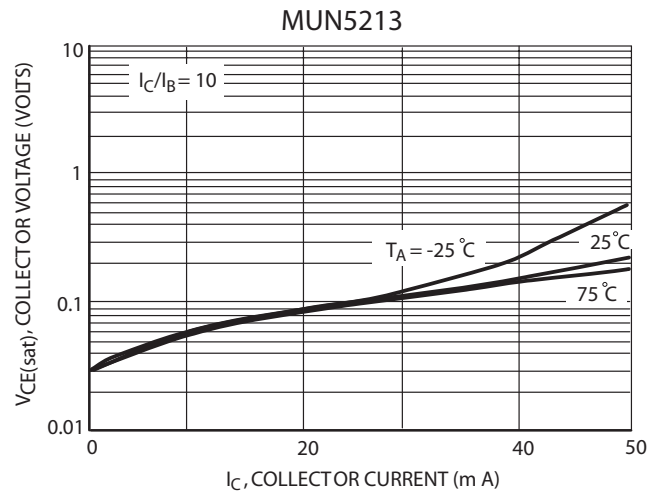


FIG.12 $V_{CE(sat)}$ versus I_C

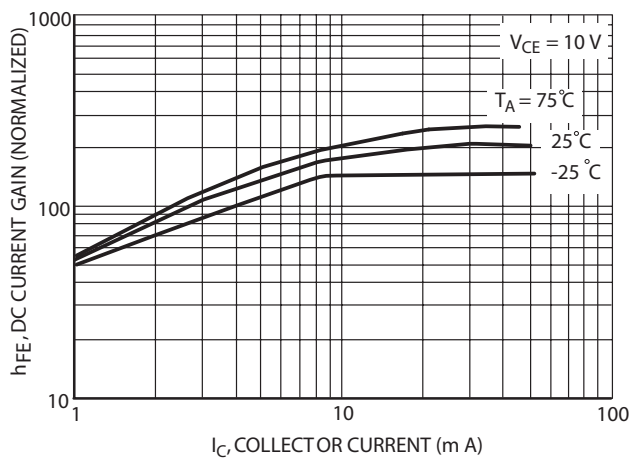


FIG.13 DC Current Gain

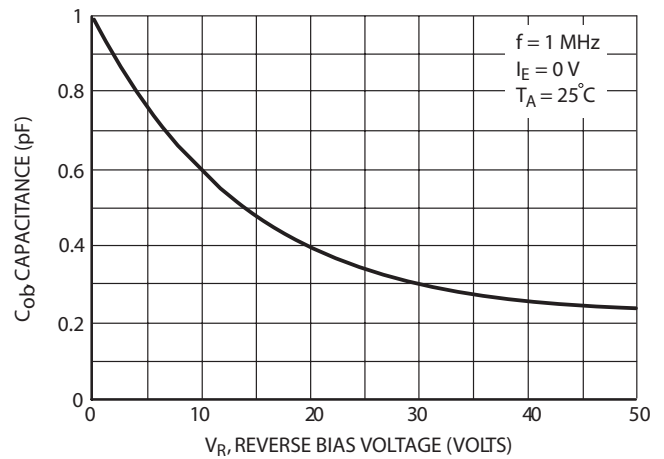


FIG.14 Output Capacitance

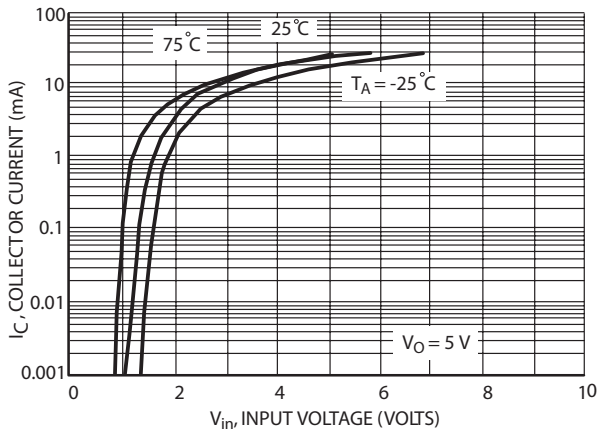


FIG.15 Output Current versus Input Voltage

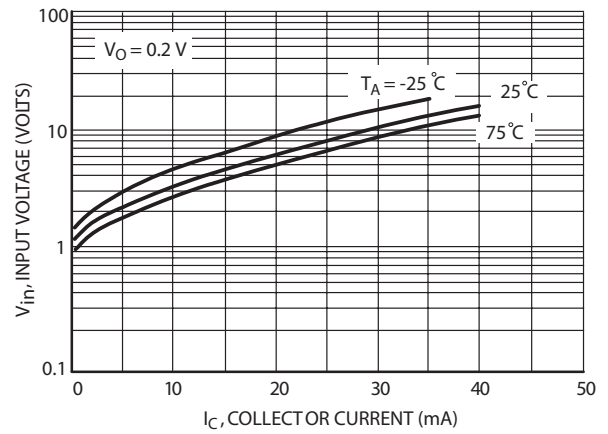


FIG.16 Input Voltage versus Output Current

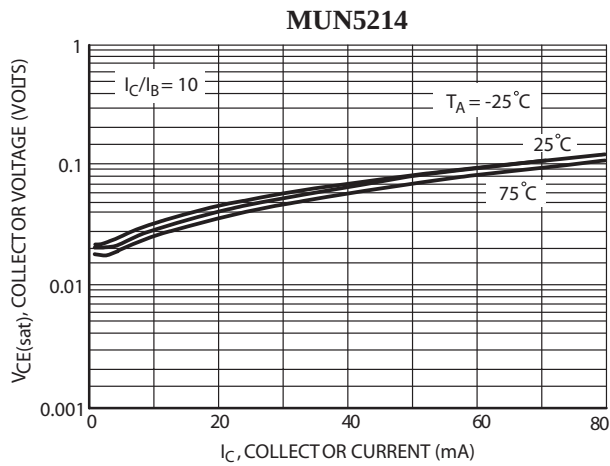


FIG.17 $V_{CE(sat)}$ versus I_C

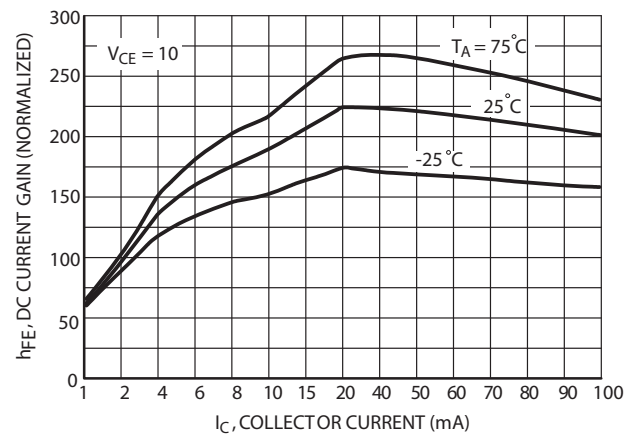


FIG.18 DC Current Gain

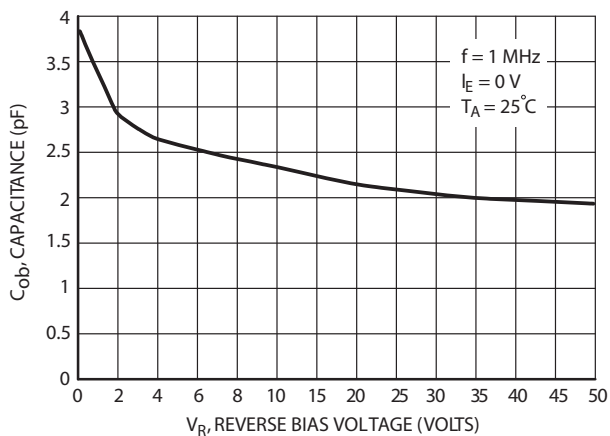


FIG.19 Output Capacitance

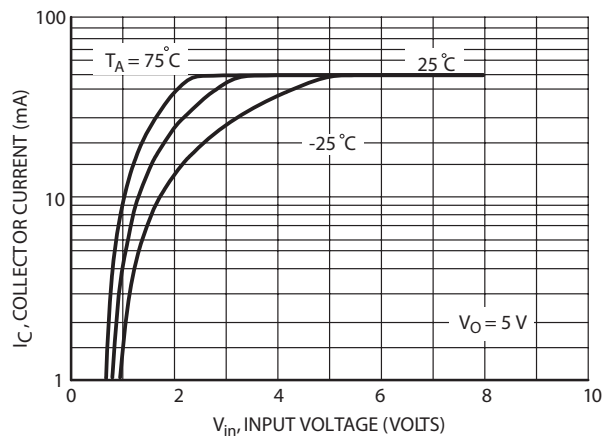


FIG.20 Output Current versus Input Voltage

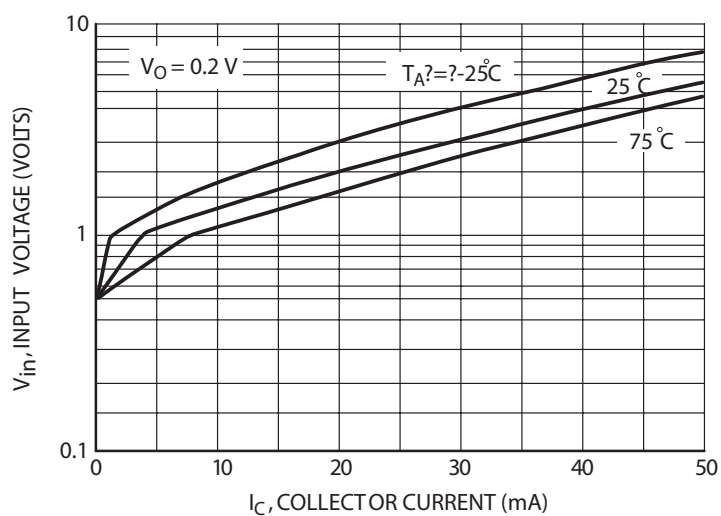
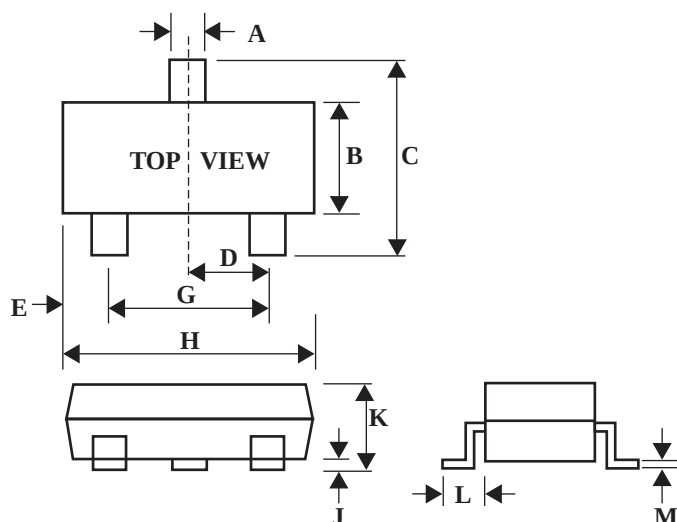


FIG.21 Input Voltage versus Output Current

SOT-323 Outline Demensions



Unit:mm

Dim	Min	Max
A	0.30	0.40
B	1.15	1.35
C	2.00	2.40
D	-	0.65
E	0.30	0.40
G	1.20	1.40
H	1.80	2.20
J	0.00	0.10
K	0.80	1.00
L	0.42	0.53
M	0.10	0.25

SOT-323 Suggested Pad Layout

