

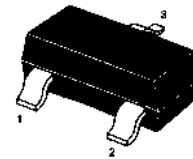
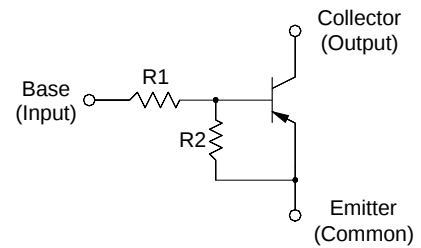


PNP Silicon Epitaxial Planar Transistor

for switching and interface circuit and drive circuit applications

Resistor Values

Type	R1 (K)	R2 (K)
MMUN2111	10	10
MMUN2112	22	22
MMUN2113	47	47
MMUN2114	10	47
MMUN2115	10	∞
MMUN2116	4.7	∞
MMUN2130	1	1
MMUN2131	2.2	2.2
MMUN2132	4.7	4.7
MMUN2133	4.7	47
MMUN2134	22	47



1.Base 2.Emitter 3.Collector

SOT-23 Plastic Package

DEVICE MARKING AND RESISTOR VALUES

Device	Package	Marking	R1 (K)	R2 (K)	Shipping
MMUN2111	SOT-23	A6A	10	10	3000/Tape & Reel
MMUN2112	SOT-23	A6B	22	22	3000/Tape & Reel
MMUN2113	SOT-23	A6C	47	47	3000/Tape & Reel
MMUN2114	SOT-23	A6D	10	47	3000/Tape & Reel
MMUN2115	SOT-23	A6E	10	∞	3000/Tape & Reel
MMUN2116	SOT-23	A6F	4.7	∞	3000/Tape & Reel
MMUN2130	SOT-23	A6G	1.0	1.0	3000/Tape & Reel
MMUN2131	SOT-23	A6H	2.2	2.2	3000/Tape & Reel
MMUN2132	SOT-23	A6J	4.7	4.7	3000/Tape & Reel
MMUN2133	SOT-23	A6K	4.7	47	3000/Tape & Reel
MMUN2134	SOT-23	A6L	22	47	3000/Tape & Reel

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Value	Unit
Collector Base Voltage	$-V_{CBO}$	50	V
Collector Emitter Voltage	$-V_{CEO}$	50	V
Collector Current	$-I_C$	100	mA
Total Power Dissipation	P_{tot}	200	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_s	- 55 to + 150	$^\circ\text{C}$



Characteristics at $T_a = 25\text{ }^{\circ}\text{C}$

Parameter		Symbol	Min.	Max.	Unit
DC Current Gain at $-V_{CE} = 10\text{ V}$, $-I_C = 5\text{ mA}$	MMUN2111	h_{FE}	35	-	-
	MMUN2112		60	-	-
	MMUN2113		80	-	-
	MMUN2114		80	-	-
	MMUN2115		160	-	-
	MMUN2116		160	-	-
	MMUN2130		3	-	-
	MMUN2131		8	-	-
	MMUN2132		15	-	-
	MMUN2133		80	-	-
	MMUN2134		80	-	-
Collector Base Cutoff Current at $-V_{CB} = 50\text{ V}$		$-I_{CBO}$	-	100	nA
Collector Emitter Cutoff Current at $-V_{CE} = 50\text{ V}$		$-I_{CEO}$	-	500	nA
Emitter Base Cutoff Current at $-V_{EB} = 6\text{ V}$	MMUN2111	$-I_{EBO}$	-	0.5	mA
	MMUN2112		-	0.2	
	MMUN2113		-	0.1	
	MMUN2114		-	0.2	
	MMUN2115		-	0.9	
	MMUN2116		-	1.9	
	MMUN2130		-	4.3	
	MMUN2131		-	2.3	
	MMUN2132		-	1.5	
	MMUN2133		-	0.18	
	MMUN2134		-	0.13	
Collector Base Breakdown Voltage at $-I_C = 10\text{ }\mu\text{A}$		$-V_{(BR)CBO}$	50	-	V
Collector Emitter Breakdown Voltage at $-I_C = 2\text{ mA}$		$-V_{(BR)CEO}$	50	-	V
Collector Emitter Saturation Voltage at $-I_C = 10\text{ mA}$, $-I_B = 0.3\text{ mA}$ at $-I_C = 10\text{ mA}$, $-I_B = 5\text{ mA}$ at $-I_C = 10\text{ mA}$, $-I_B = 1\text{ mA}$	MMUN2130	$-V_{CESat}$	-	0.25	V
	MMUN2131		-	0.25	
	MMUN2115		-	0.25	
	MMUN2116		-	0.25	
	MMUN2132		-	0.25	
	MMUN2133		-	0.25	
	MMUN2134		-	0.25	
			-	0.25	



Characteristics at $T_a = 25^\circ\text{C}$

Parameter		Symbol	Min.	Max.	Unit
Output Voltage (on) at $-V_{CC} = 5\text{ V}$, $-V_B = 2.5\text{ V}$, $R_L = 1\text{ K}\Omega$	MMUN2111	$-V_{OL}$	-	0.2	V
	MMUN2112		-	0.2	
	MMUN2114		-	0.2	
	MMUN2115		-	0.2	
	MMUN2116		-	0.2	
	MMUN2130		-	0.2	
	MMUN2131		-	0.2	
	MMUN2132		-	0.2	
	MMUN2133		-	0.2	
	MMUN2134		-	0.2	
	MMUN2113		-	0.2	
at $-V_{CC} = 5\text{ V}$, $-V_B = 3.5\text{ V}$, $R_L = 1\text{ K}\Omega$					
Output Voltage (off) at $-V_{CC} = 5\text{ V}$, $-V_B = 0.5\text{ V}$, $R_L = 1\text{ K}\Omega$ at $-V_{CC} = 5\text{ V}$, $-V_B = 0.05\text{ V}$, $R_L = 1\text{ K}\Omega$ at $-V_{CC} = 5\text{ V}$, $-V_B = 0.25\text{ V}$, $R_L = 1\text{ K}\Omega$	MMUN2130	$-V_{OH}$	4.9	-	V
	MMUN2115		4.9	-	
	MMUN2116		4.9	-	
	MMUN2131		4.9	-	
	MMUN2132		4.9	-	
Input Resistor	MMUN2111	R1	7	13	$\text{K}\Omega$
	MMUN2112		15.4	28.6	
	MMUN2113		32.9	61.1	
	MMUN2114		7	13	
	MMUN2115		7	13	
	MMUN2116		3.3	6.1	
	MMUN2130		0.7	1.3	
	MMUN2131		1.5	2.9	
	MMUN2132		3.3	6.1	
	MMUN2133		3.3	6.1	
	MMUN2134		15.4	28.6	
Resistor Ratio	MMUN2111/MMUN2112/MMUN2113	R1/R2	0.8	1.2	-
	MMUN2114		0.17	0.25	-
	MMUN2115/MMUN2116		-	-	-
	MMUN2130/MMUN2131/MMUN2132		0.8	1.2	-
	MMUN2133		0.055	0.185	-



TYPICAL ELECTRICAL CHARACTERISTICS

MMUN2111

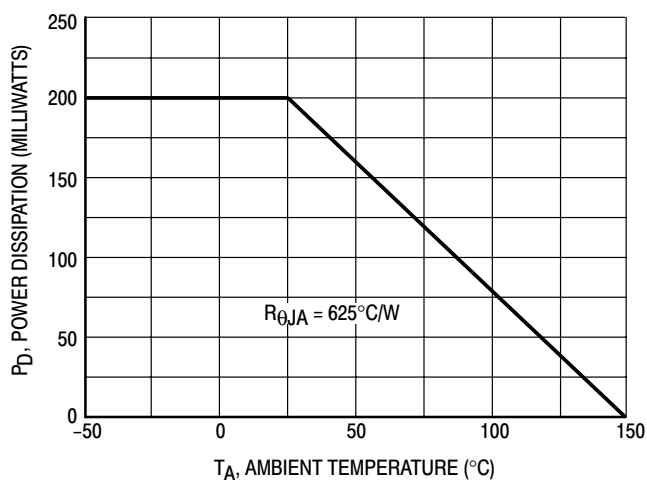


Figure 1. Derating Curve

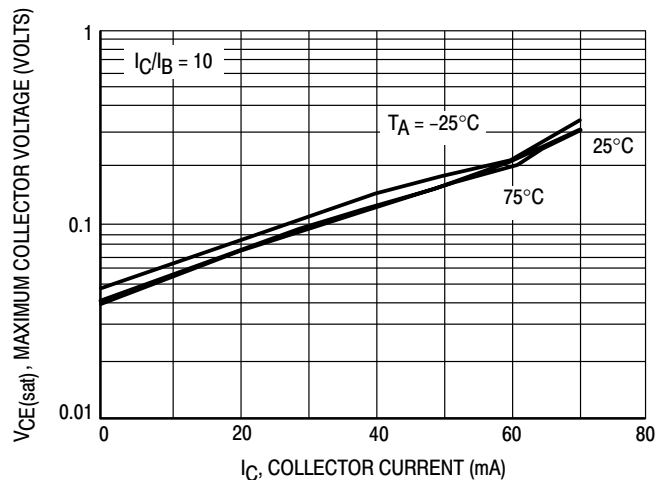


Figure 2. $V_{CE(sat)}$ versus I_C

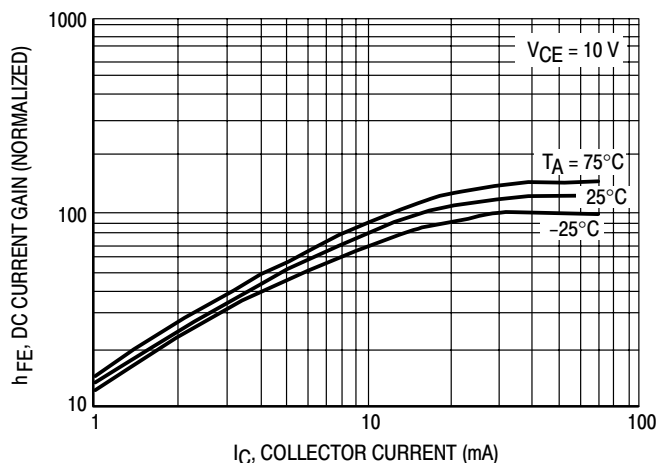


Figure 3. DC Current Gain

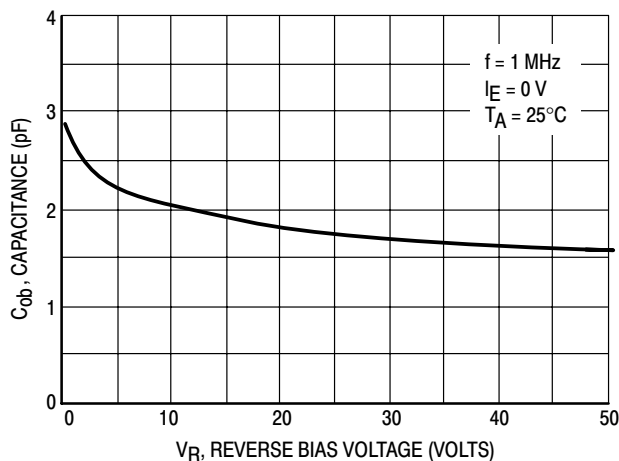


Figure 4. Output Capacitance

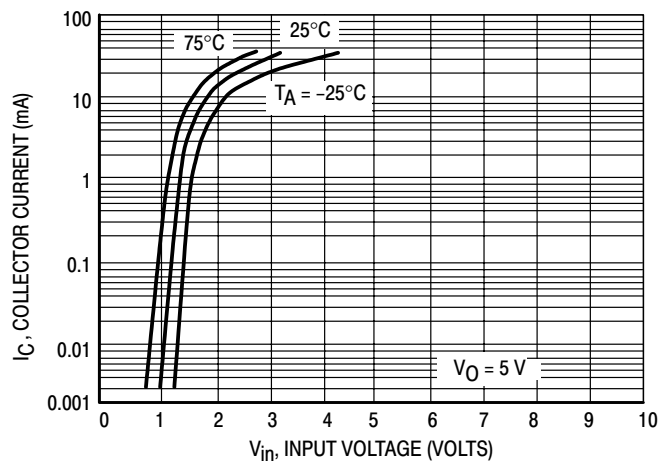


Figure 5. Output Current versus Input Voltage

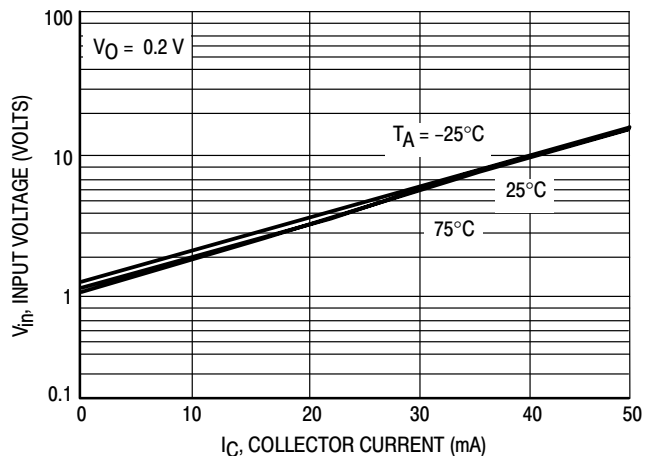


Figure 6. Input Voltage versus Output Current



MMUN2112

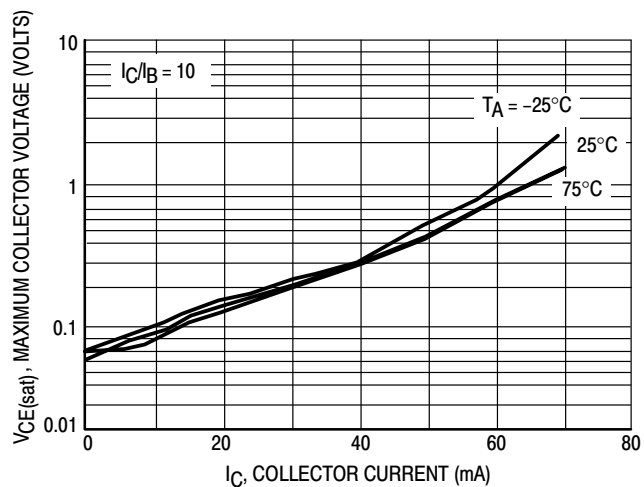


Figure 7. $V_{CE(sat)}$ versus I_C

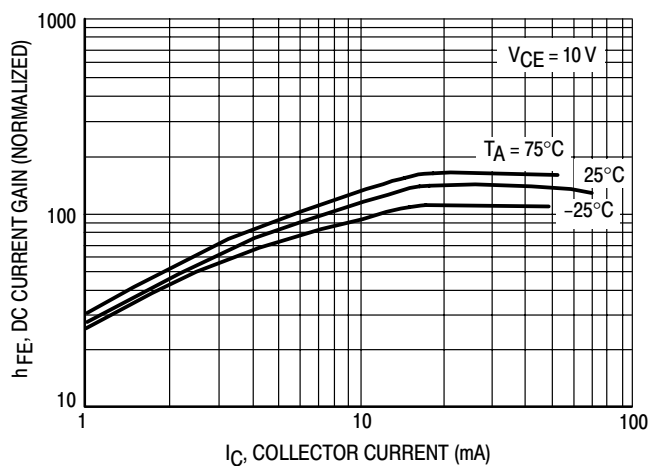


Figure 8. DC Current Gain

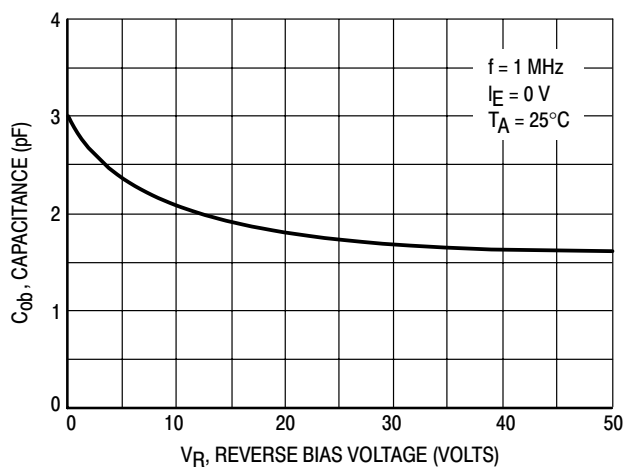


Figure 9. Output Capacitance

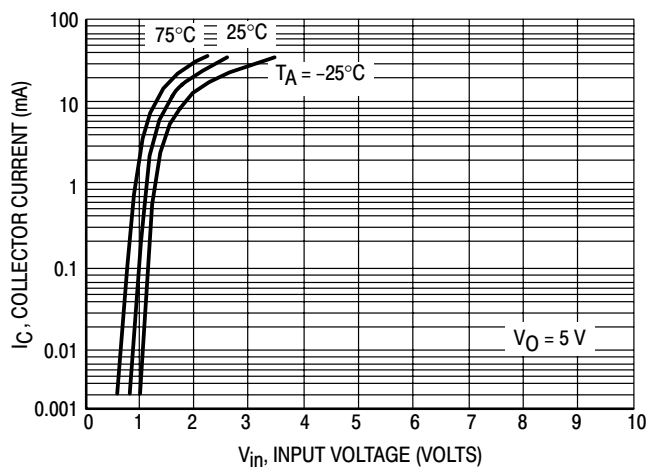


Figure 10. Output Current versus Input Voltage

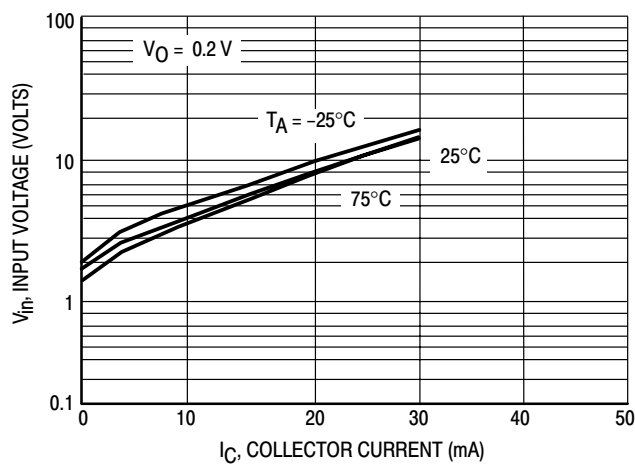


Figure 11. Input Voltage versus Output Current



MMUN2113

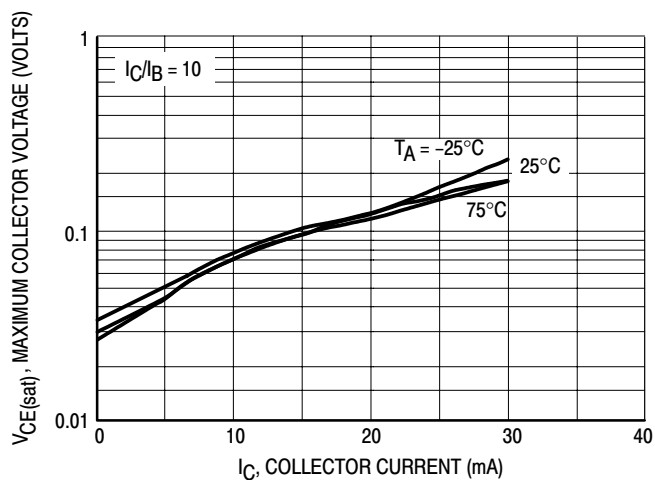


Figure 12. $V_{CE(sat)}$ versus I_C

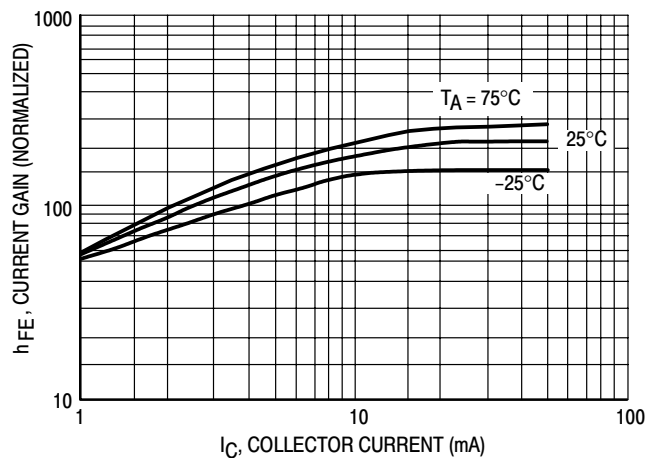


Figure 13. DC Current Gain

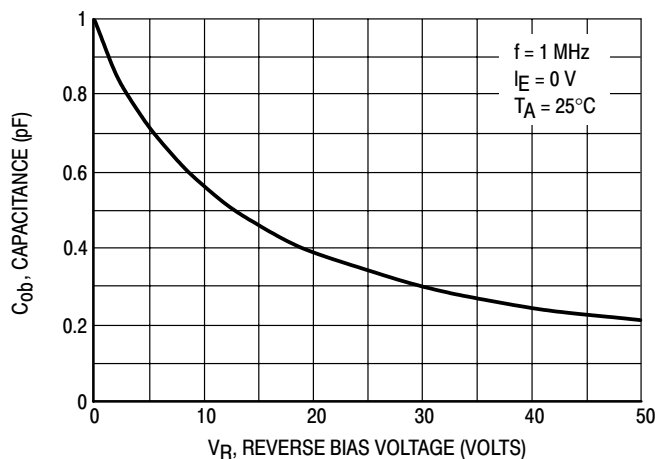


Figure 14. Output Capacitance

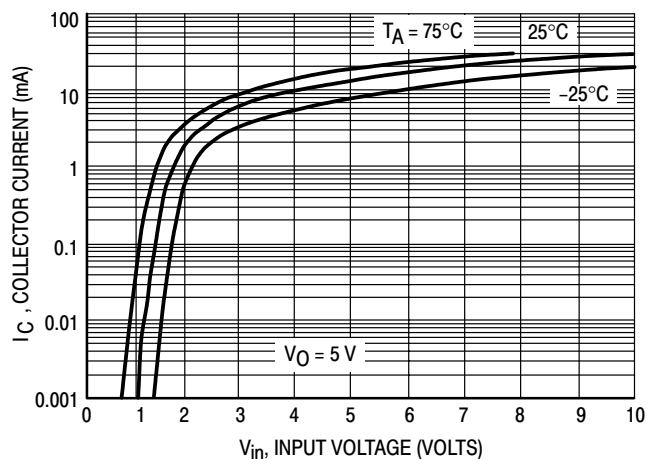


Figure 15. Output Current versus Input Voltage

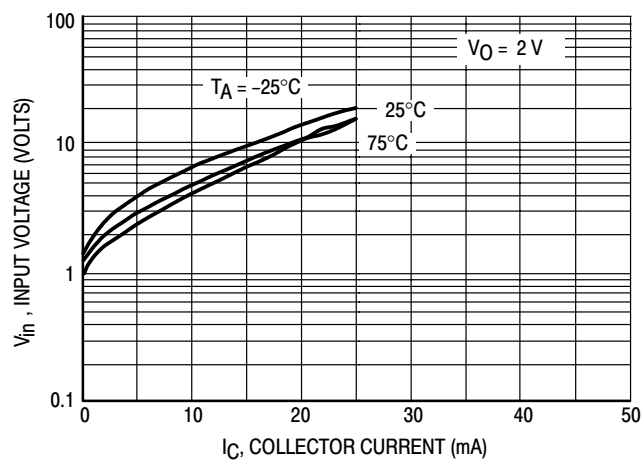


Figure 16. Input Voltage versus Output Current



MMUN2114

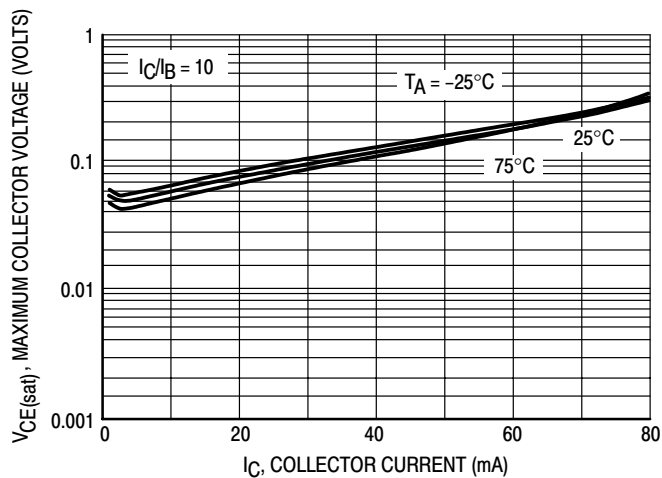


Figure 17. $V_{CE(sat)}$ versus I_C

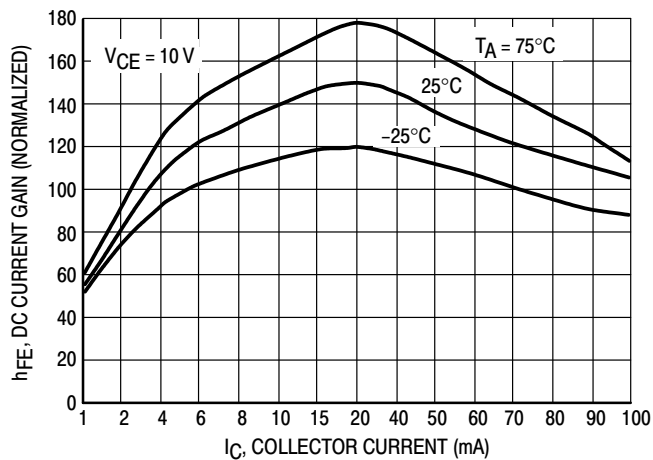


Figure 18. DC Current Gain

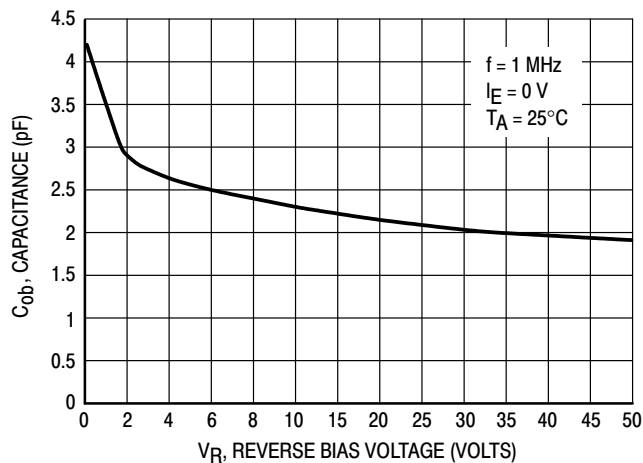


Figure 19. Output Capacitance

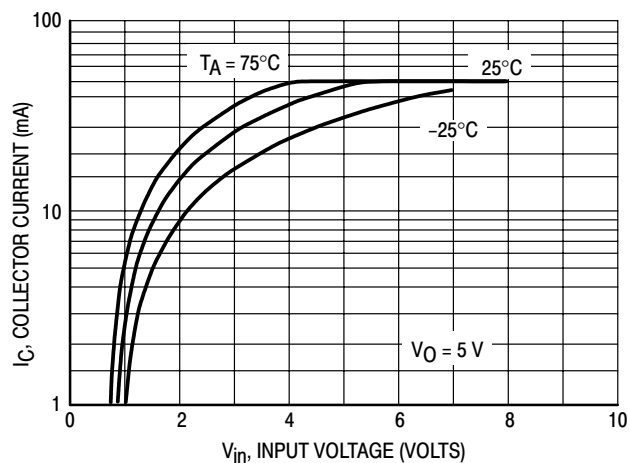


Figure 20. Output Current versus Input Voltage

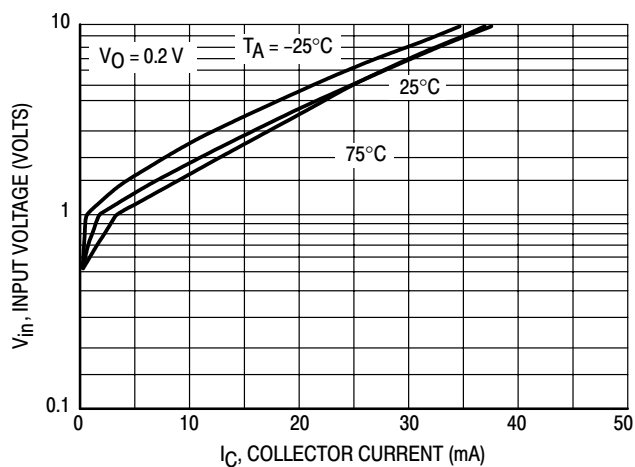


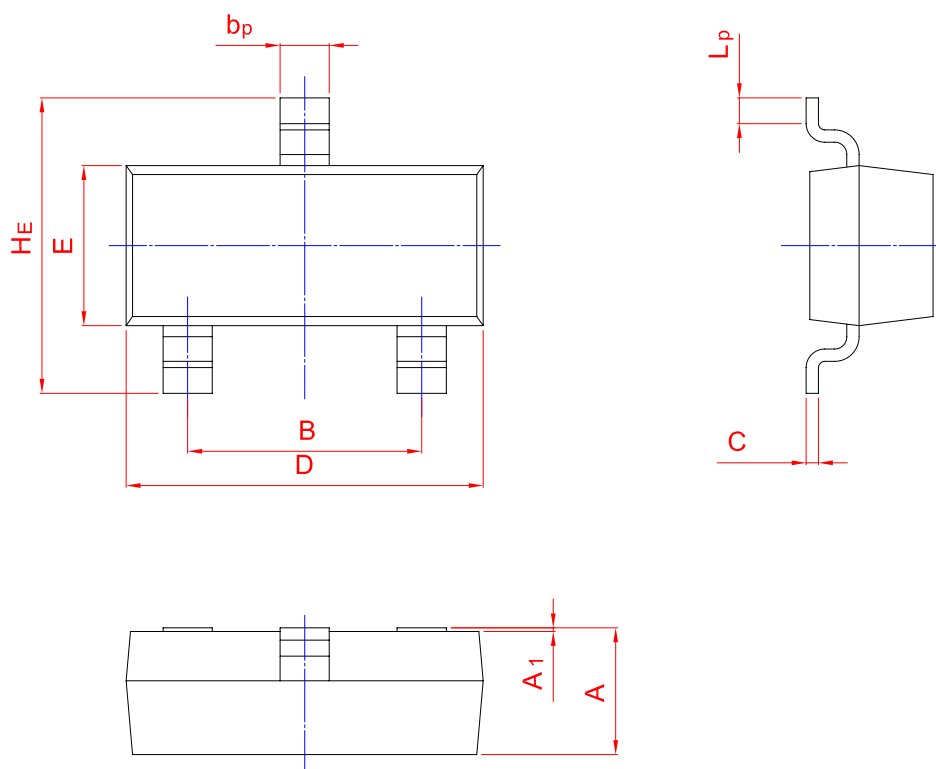
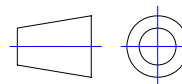
Figure 21. Input Voltage versus Output Current



PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



UNIT	A	B	bp	C	D	E	HE	A1	Lp
mm	1.40 0.95	2.04 1.78	0.50 0.35	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20