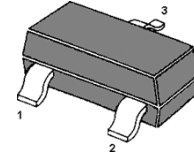


MMUN2111...MMUN2134 PNP Silicon Epitaxial Planar Transistor

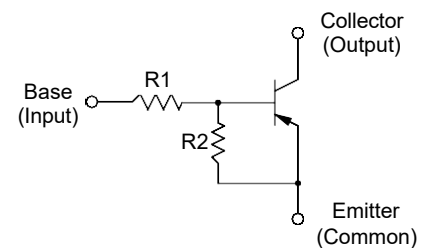
for switching and interface circuit and drive circuit applications

Resistor Values

Type	Marking	R1 (K)	R2 (K)
MMUN2111	A6A	10	10
MMUN2112	A6B	22	22
MMUN2113	A6C	47	47
MMUN2114	A6D	10	47
MMUN2115	A6E	10	∞
MMUN2116	A6F	4.7	∞
MMUN2130	A6G	1	1
MMUN2131	A6H	2.2	2.2
MMUN2132	A6J	4.7	4.7
MMUN2133	A6K	4.7	47
MMUN2134	A6L	22	47



1.Base 2.Emitter 3.Collector
SOT-23 Plastic Package



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

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	h_{FE}	60	-	-
	MMUN2113	h_{FE}	80	-	-
	MMUN2114	h_{FE}	80	-	-
	MMUN2115	h_{FE}	160	-	-
	MMUN2116	h_{FE}	160	-	-
	MMUN2130	h_{FE}	3	-	-
	MMUN2131	h_{FE}	8	-	-
	MMUN2132	h_{FE}	15	-	-
	MMUN2133	h_{FE}	80	-	-
	MMUN2134	h_{FE}	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	$-I_{EBO}$	-	0.2	mA
	MMUN2113	$-I_{EBO}$	-	0.1	mA
	MMUN2114	$-I_{EBO}$	-	0.2	mA
	MMUN2115	$-I_{EBO}$	-	0.9	mA
	MMUN2116	$-I_{EBO}$	-	1.9	mA
	MMUN2130	$-I_{EBO}$	-	4.3	mA
	MMUN2131	$-I_{EBO}$	-	2.3	mA
	MMUN2132	$-I_{EBO}$	-	1.5	mA
	MMUN2133	$-I_{EBO}$	-	0.18	mA
	MMUN2134	$-I_{EBO}$	-	0.13	mA
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 $-I_C = 10\text{ mA}$, $-I_B = 1\text{ mA}$		$-V_{CEsat}$	-	0.25	V
	MMUN2130	$-V_{CEsat}$	-	0.25	V
	MMUN2131	$-V_{CEsat}$	-	0.25	V
	MMUN2115	$-V_{CEsat}$	-	0.25	V
	MMUN2116	$-V_{CEsat}$	-	0.25	V
	MMUN2132	$-V_{CEsat}$	-	0.25	V
	MMUN2133	$-V_{CEsat}$	-	0.25	V
MMUN2134	$-V_{CEsat}$	-	0.25	V	

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

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	$-V_{OL}$	-	0.2	V	
	MMUN2114	$-V_{OL}$	-	0.2	V	
	MMUN2115	$-V_{OL}$	-	0.2	V	
	MMUN2116	$-V_{OL}$	-	0.2	V	
	MMUN2130	$-V_{OL}$	-	0.2	V	
	MMUN2131	$-V_{OL}$	-	0.2	V	
	MMUN2132	$-V_{OL}$	-	0.2	V	
	MMUN2133	$-V_{OL}$	-	0.2	V	
	MMUN2134	$-V_{OL}$	-	0.2	V	
	MMUN2113	$-V_{OL}$	-	0.2	V	
	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	$-V_{OH}$	4.9	-	V
		MMUN2116	$-V_{OH}$	4.9	-	V
MMUN2131		$-V_{OH}$	4.9	-	V	
MMUN2132		$-V_{OH}$	4.9	-	V	
Input Resistor	MMUN2111	R1	7	13	K Ω	
	MMUN2112	R1	15.4	28.6	K Ω	
	MMUN2113	R1	32.9	61.1	K Ω	
	MMUN2114	R1	7	13	K Ω	
	MMUN2115	R1	7	13	K Ω	
	MMUN2116	R1	3.3	6.1	K Ω	
	MMUN2130	R1	0.7	1.3	K Ω	
	MMUN2131	R1	1.5	2.9	K Ω	
	MMUN2132	R1	3.3	6.1	K Ω	
	MMUN2133	R1	3.3	6.1	K Ω	
	MMUN2134	R1	15.4	28.6	K Ω	
Resistor Ratio	MMUN2111/MMUN2112/MMUN2113	R1/R2	0.8	1.2	-	
	MMUN2114	R1/R2	0.17	0.25	-	
	MMUN2115/MMUN2116	R1/R2	-	-	-	
	MMUN2130/MMUN2131/MMUN2132	R1/R2	0.8	1.2	-	
	MMUN2133	R1/R2	0.055	0.185	-	

Typical Characteristics

MMUN2111

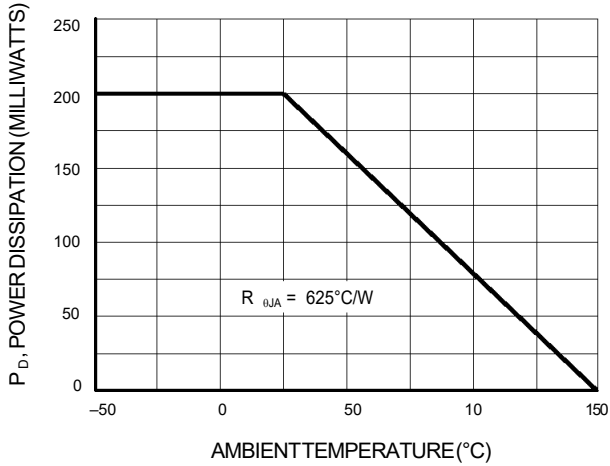


Figure 1. Derating Curve

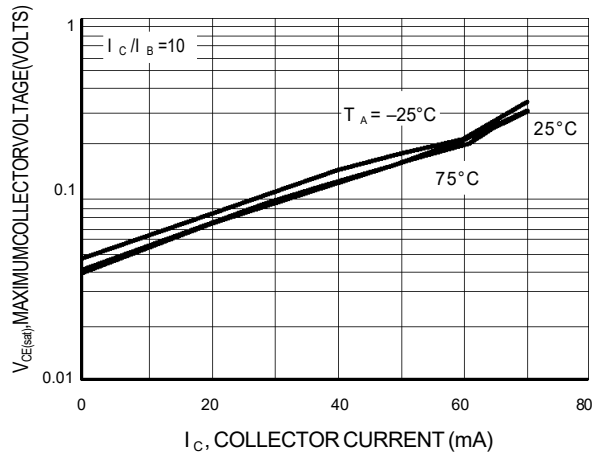


Figure 2. $V_{CE(sat)}$ versus I_C

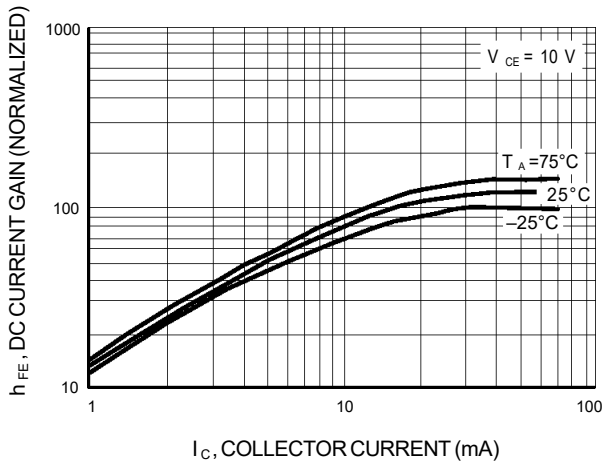


Figure 3. DC Current Gain

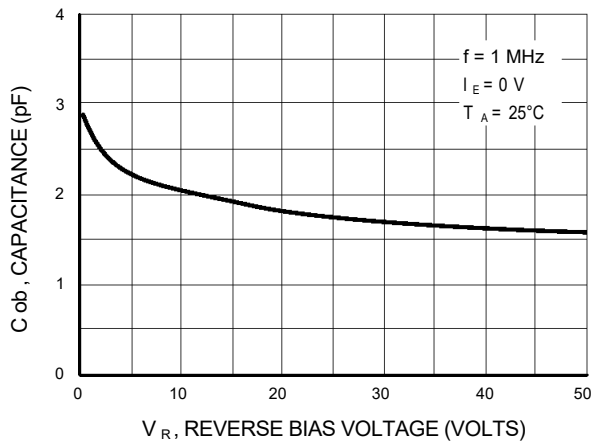


Figure 4. Output Capacitance

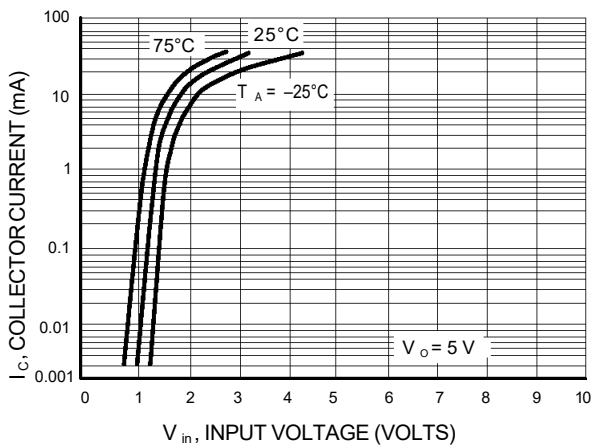


Figure 5. Output Current versus Input Voltage

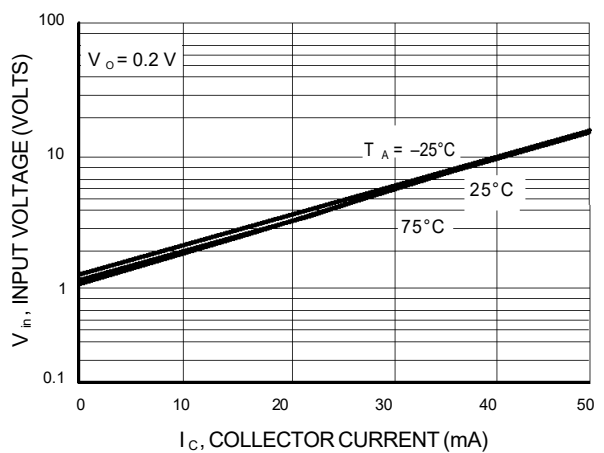


Figure 6. Input Voltage versus Output Current

MMUN2112

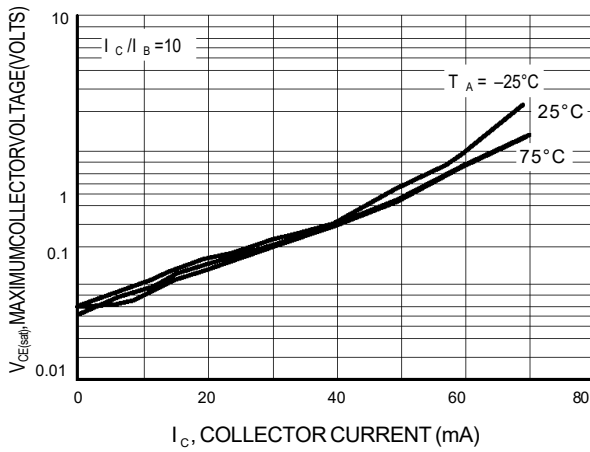


Figure 7. $V_{CE(sat)}$ versus I_C

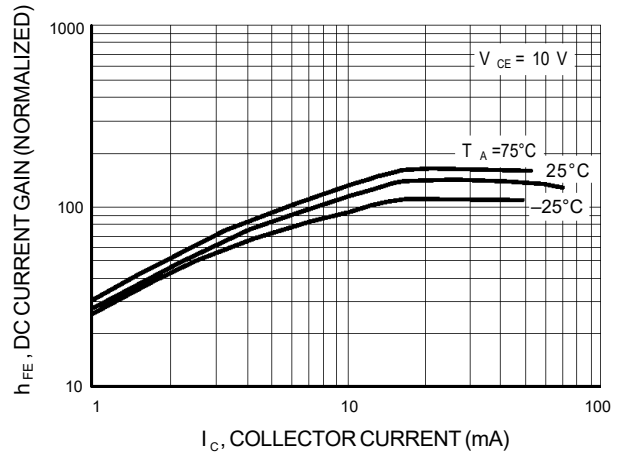


Figure 8. DC Current Gain

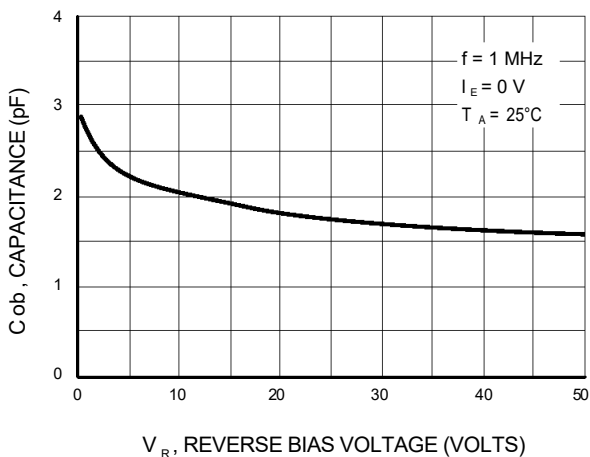


Figure 9. Output Capacitance

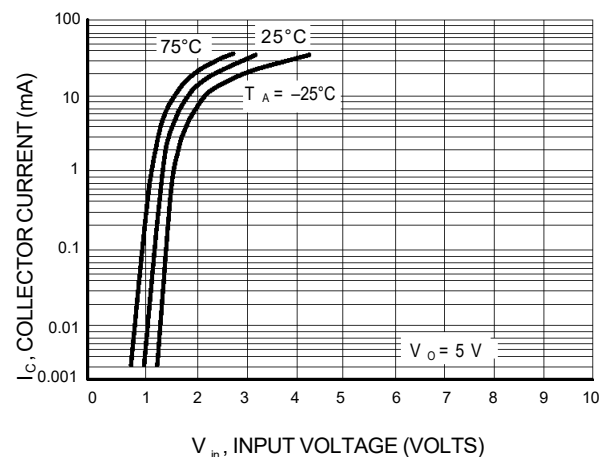


Figure 10. Output Current versus Input Voltage

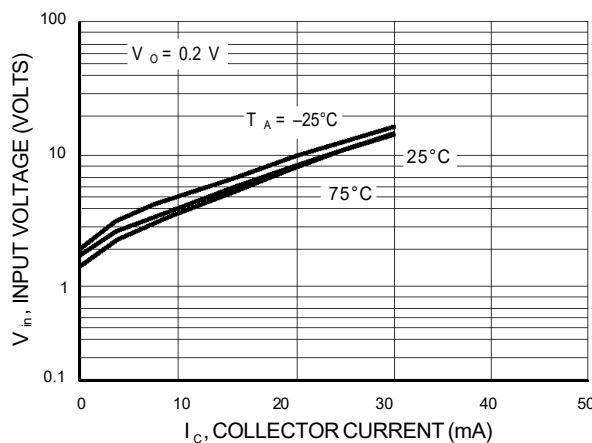


Figure 11. Input Voltage versus Output Current

MMUN2113

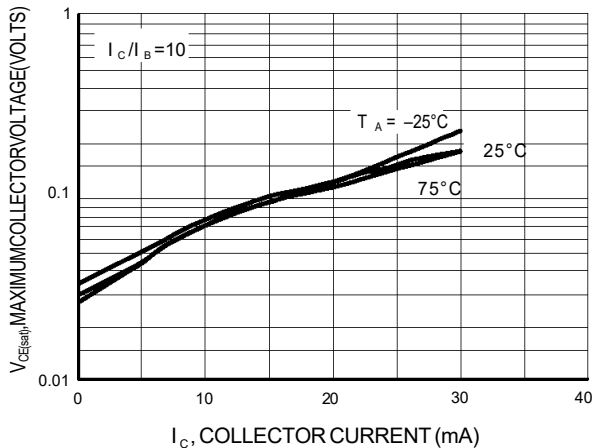


Figure 12. $V_{CE(sat)}$ versus I_C

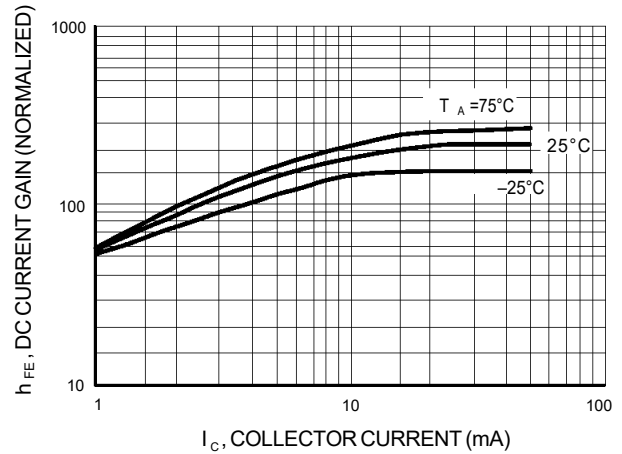


Figure 13. DC Current Gain

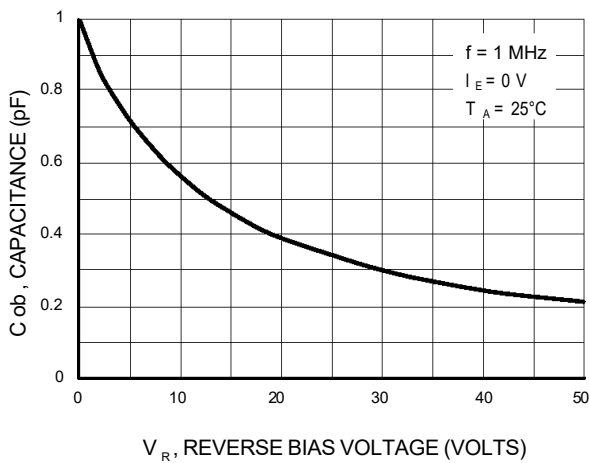


Figure 14. Output Capacitance

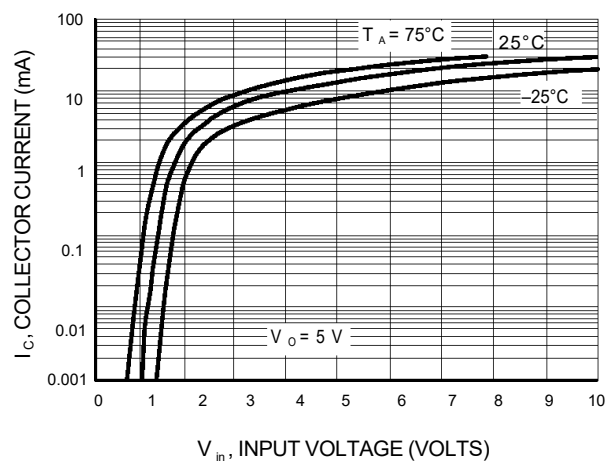


Figure 15. Output Current versus Input Voltage

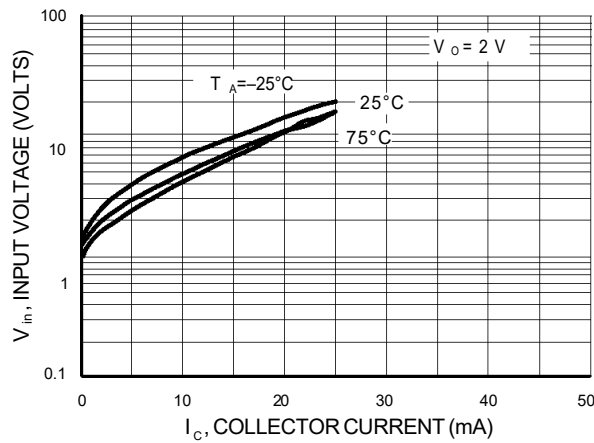


Figure 16. Input Voltage versus Output Current

MMUN2114

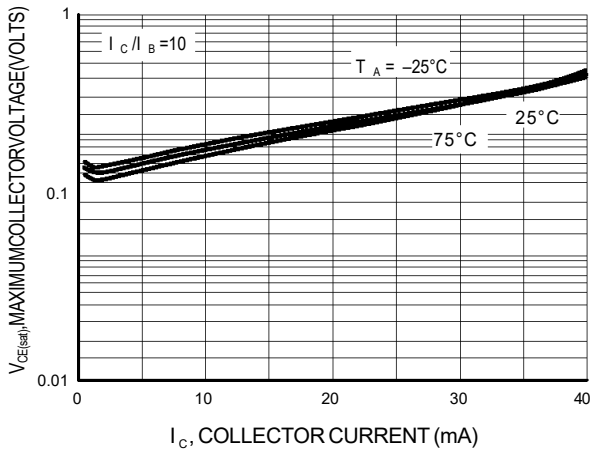


Figure 17. $V_{CE(sat)}$ versus I_C

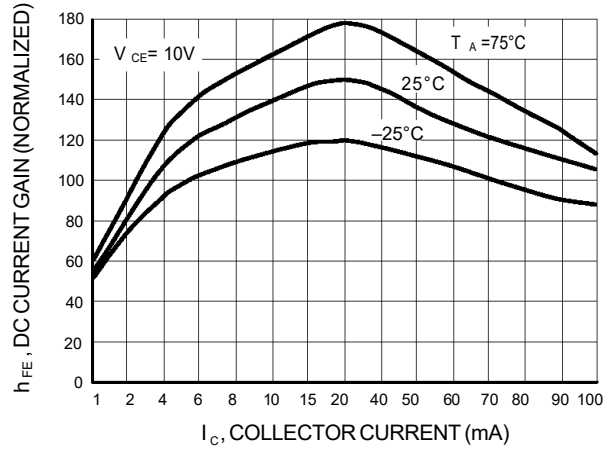


Figure 18. DC Current Gain

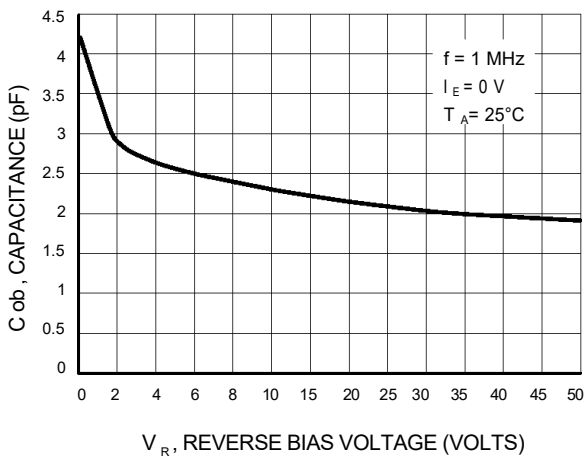


Figure 19. Output Capacitance

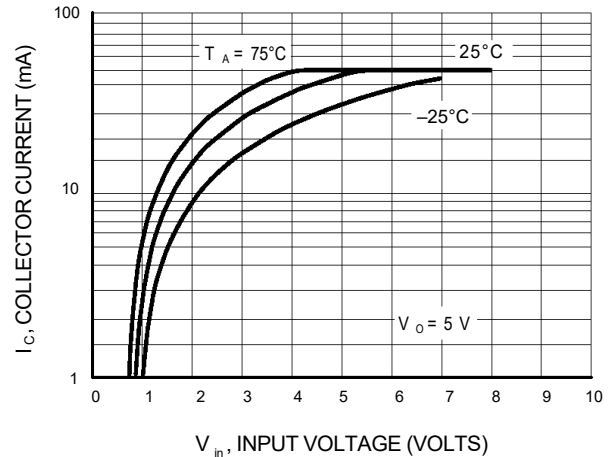


Figure 20. Output Current versus Input Voltage

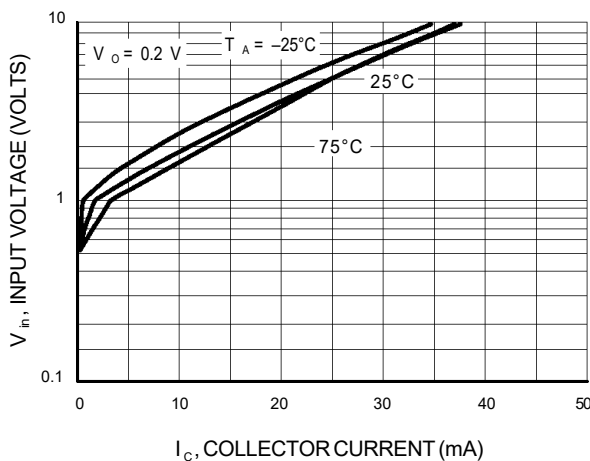


Figure 21. Input Voltage versus Output Current

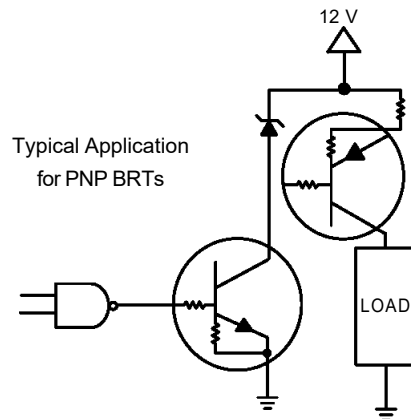
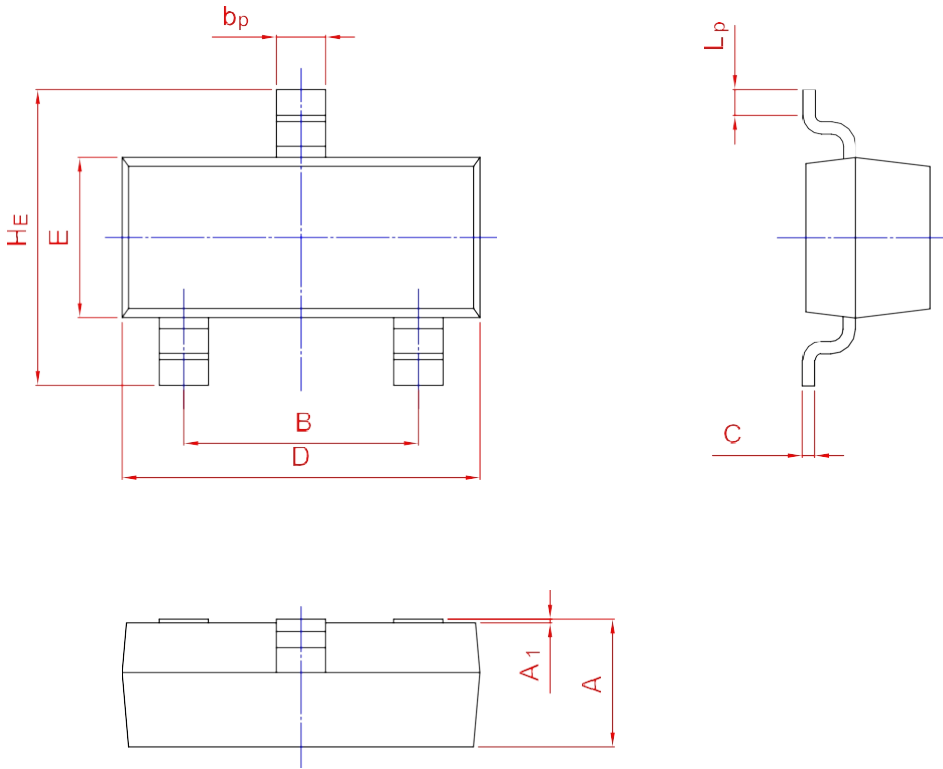
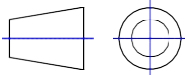


Figure 22. Inexpensive, Unregulated Current Source

PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



UNIT	A	B	b _p	C	D	E	H _E	A ₁	L _p
mm	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50
	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20