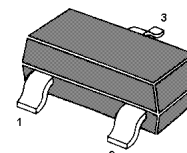


## MMUN2111...MMUN2134 PNP Silicon Epitaxial Planar Transistor

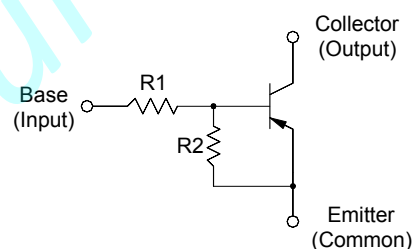
for switching and interface circuit and drive circuit applications

### 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	
	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	$-V_{OH}$	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 $\Omega$	
	MMUN2112	R1	15.4	28.6	K $\Omega$	
	MMUN2113	R1	32.9	61.1	K $\Omega$	
	MMUN2114	R1	7	13	K $\Omega$	
	MMUN2115	R1	7	13	K $\Omega$	
	MMUN2116	R1	3.3	6.1	K $\Omega$	
	MMUN2130	R1	0.7	1.3	K $\Omega$	
	MMUN2131	R1	1.5	2.9	K $\Omega$	
	MMUN2132	R1	3.3	6.1	K $\Omega$	
	MMUN2133	R1	3.3	6.1	K $\Omega$	
	MMUN2134	R1	15.4	28.6	K $\Omega$	
	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

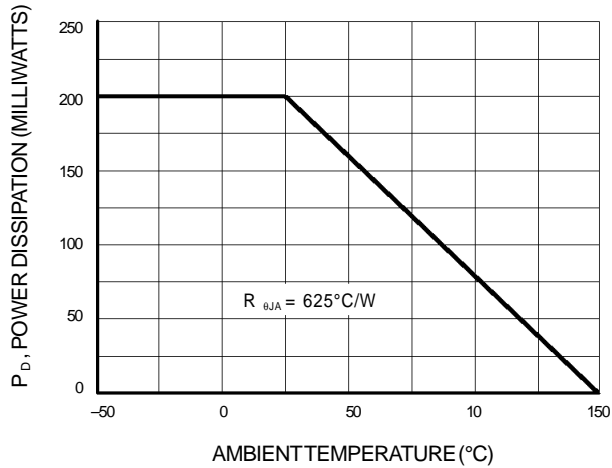


Figure 1. Derating Curve

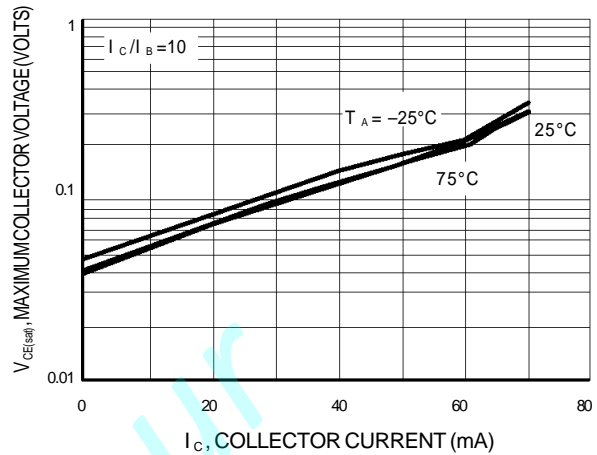


Figure 2.  $V_{CE(sat)}$  versus  $I_C$

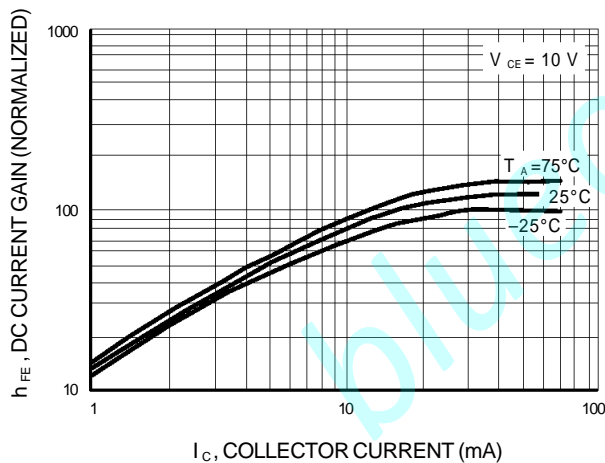


Figure 3. DC Current Gain

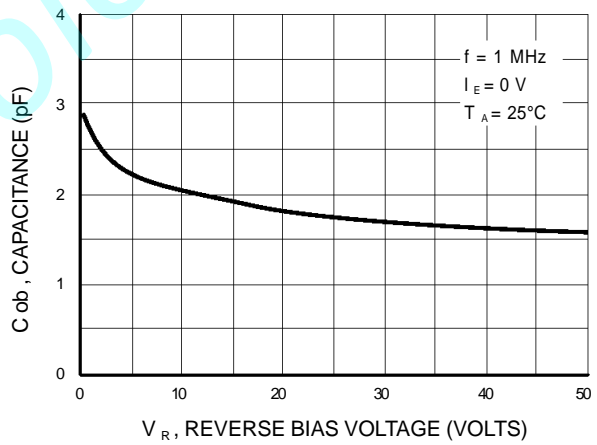


Figure 4. Output Capacitance

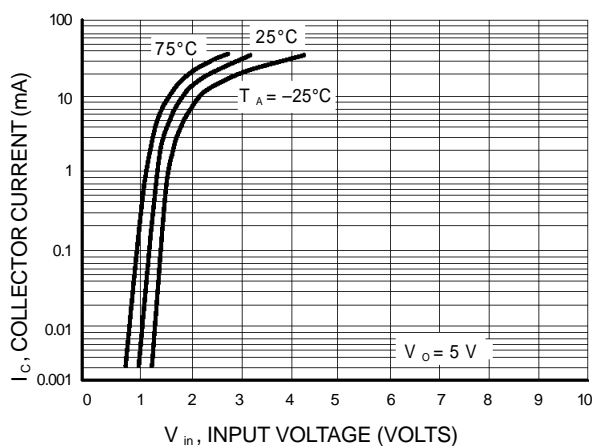


Figure 5. Output Current versus Input Voltage

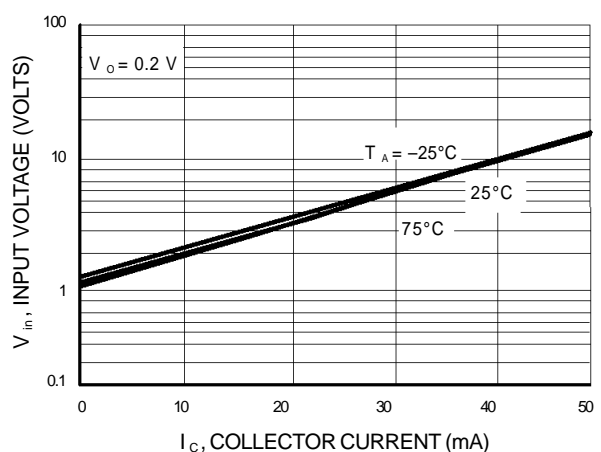


Figure 6. Input Voltage versus Output Current

## Typical Characteristics

### MMUN2112

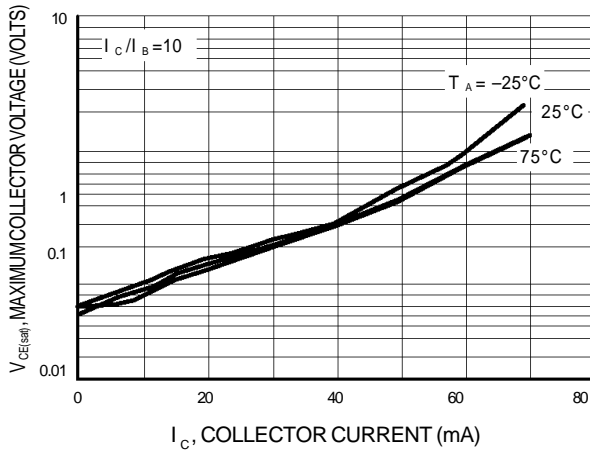


Figure 7.  $V_{CE(sat)}$  versus  $I_C$

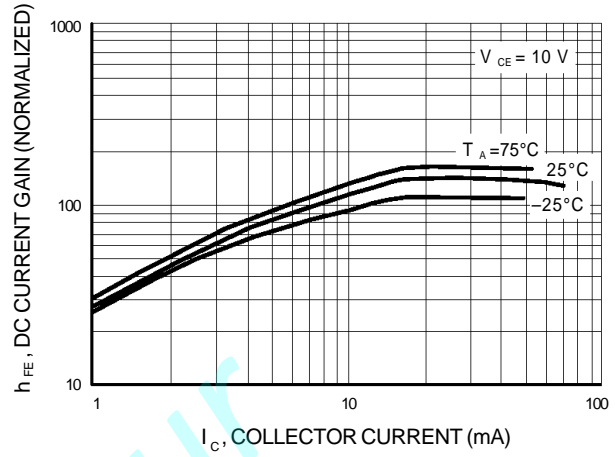


Figure 8. DC Current Gain

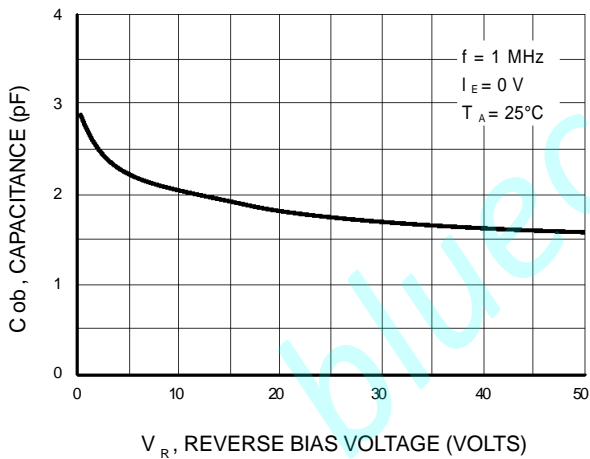


Figure 9. Output Capacitance

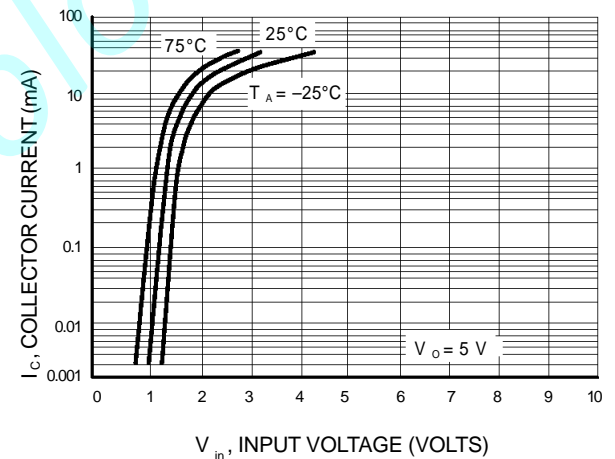


Figure 10. Output Current versus Input Voltage

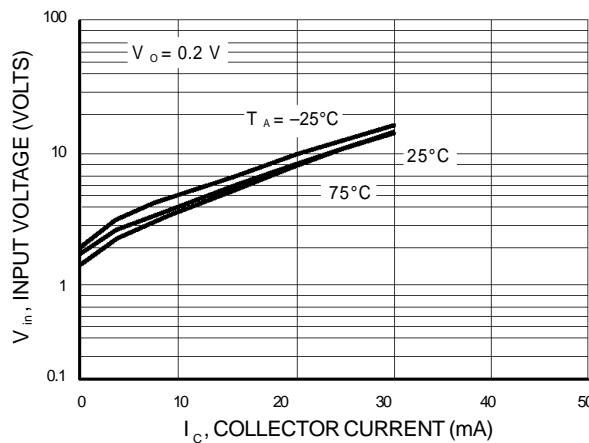


Figure 11. Input Voltage versus Output Current

## Typical Characteristics

### MMUN2113

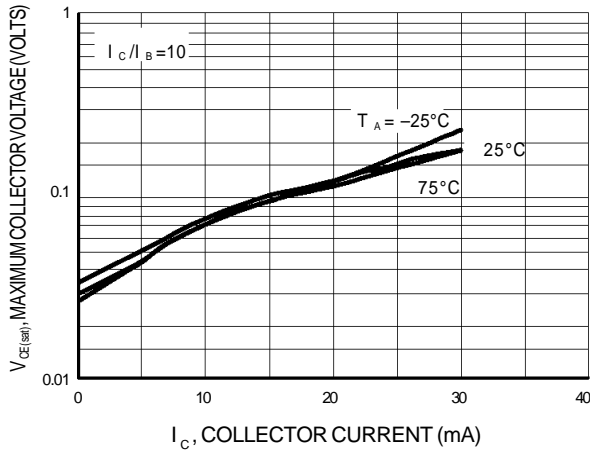


Figure 12.  $V_{CE(sat)}$  versus  $I_C$

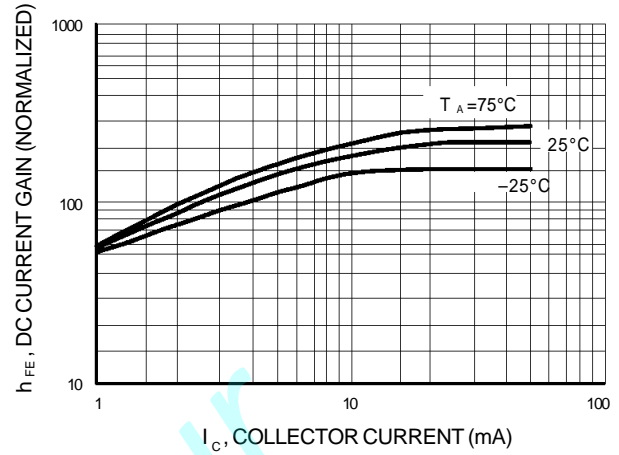


Figure 13. DC Current Gain

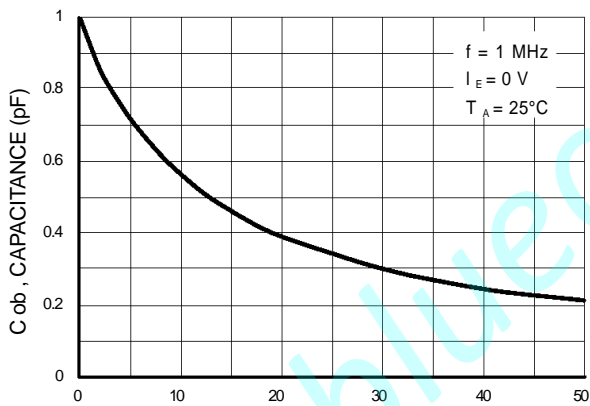


Figure 14. Output Capacitance

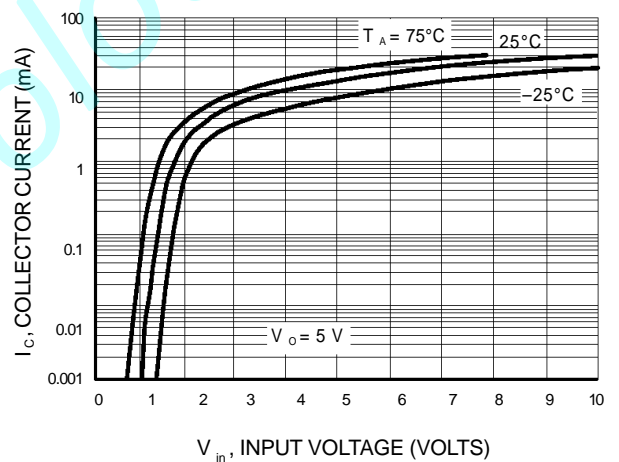


Figure 15. Output Current versus Input Voltage

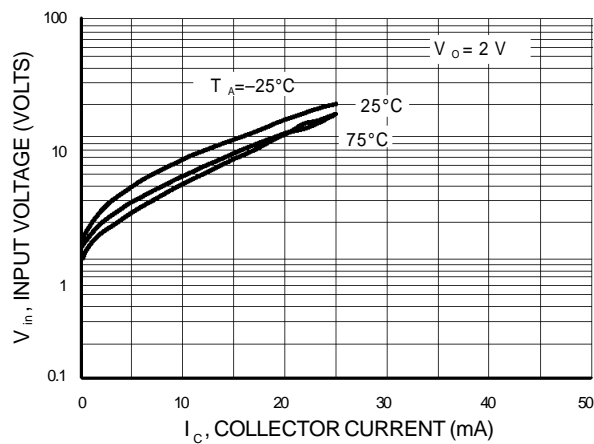


Figure 16. Input Voltage versus Output Current

## Typical Characteristics

### MMUN2114

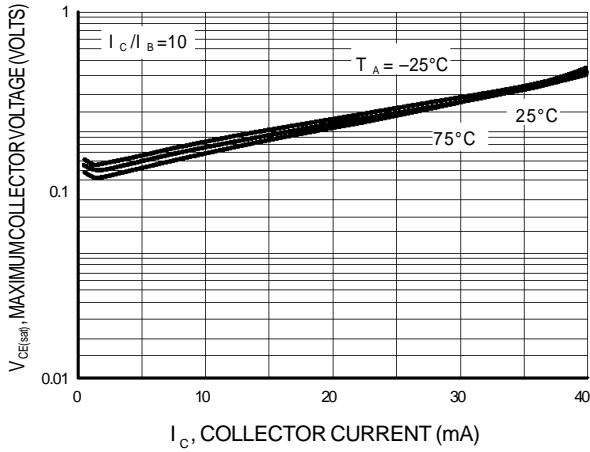


Figure 17.  $V_{CE(sat)}$  versus  $I_C$

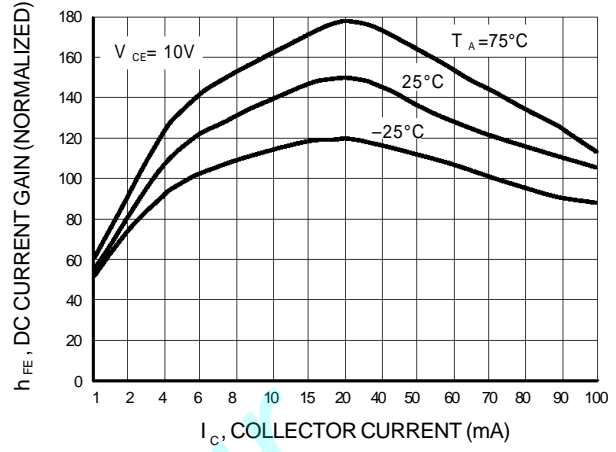


Figure 18. DC Current Gain

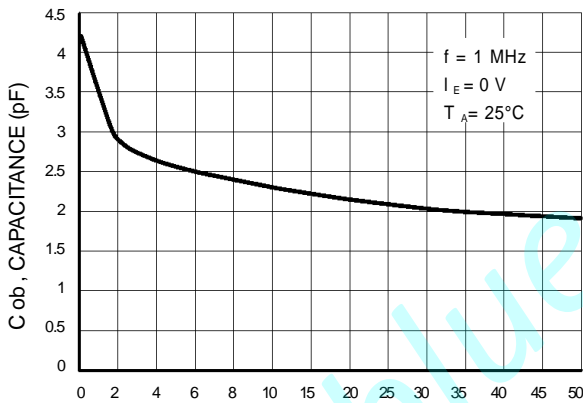


Figure 19. Output Capacitance

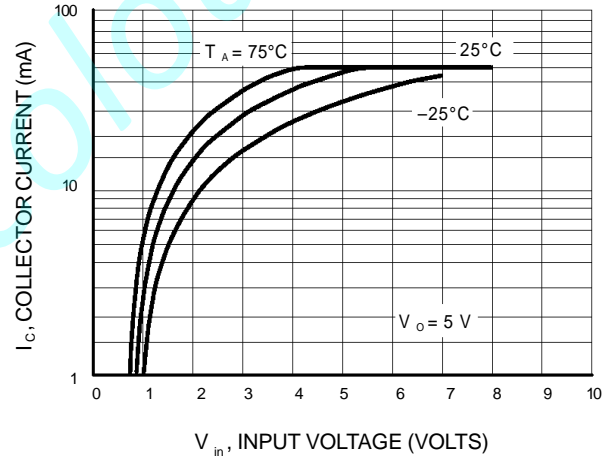


Figure 20. Output Current versus Input Voltage

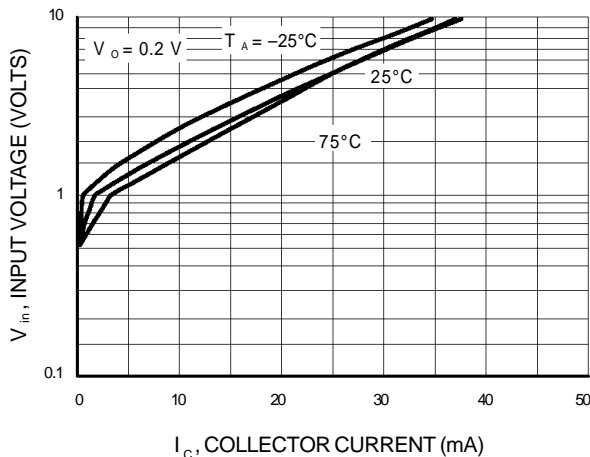


Figure 21. Input Voltage versus Output Current

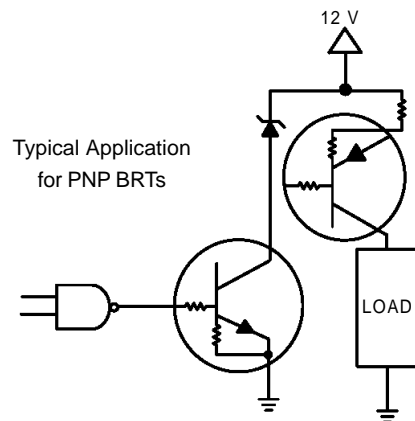
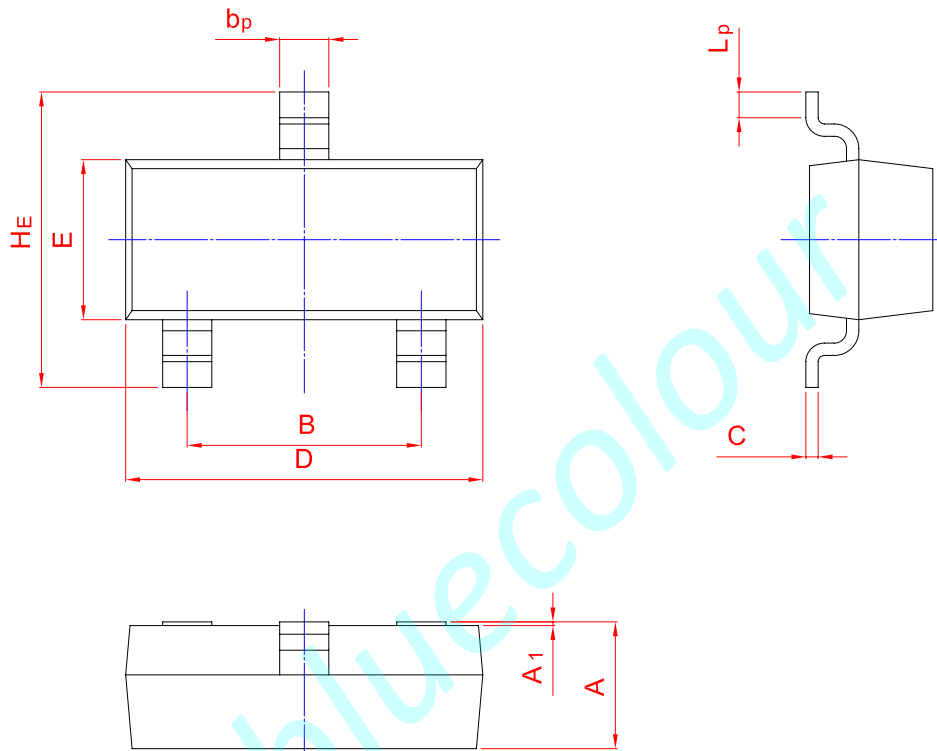
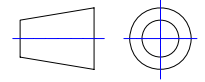


Figure 22. Inexpensive, Unregulated Current Source

## PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



UNIT	A	B	bp	C	D	E	HE	A1	Lp
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