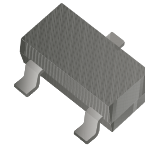


General Purpose Transistors NPN

RoHS Device

Halogen Free



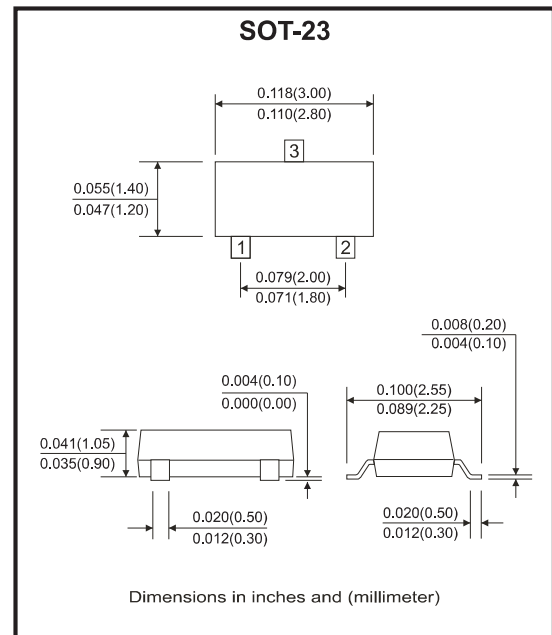
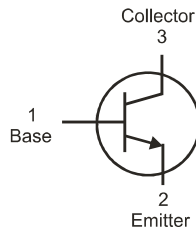
Features

- Collector current: $I_C=500\text{mA}$.
- High total power dissipation: $P_C=300\text{mW}$.
- Excellent HFE linearity.

Mechanical data

- Case: SOT-23, molded plastic.
- Mounting position: Any.

Circuit Diagram



Maximum Ratings (at $T_A=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Collector-base voltage	V_{CBO}	40	V
Collector-emitter voltage	V_{CEO}	25	V
Emitter-base voltage	V_{EBO}	5	V
Collector current-continuous	I_C	500	mA
Total device dissipation	P_D	300	mW
Thermal resistance junction to ambient	$R_{\theta JA}$	416	$^\circ\text{C/W}$
Operation junction and storage temperature range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (at $T_A=25^\circ\text{C}$ unless otherwise noted)

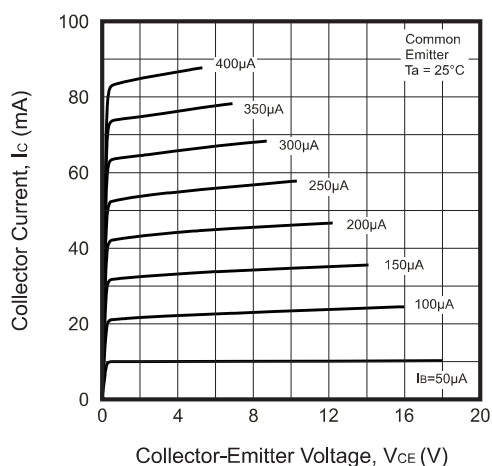
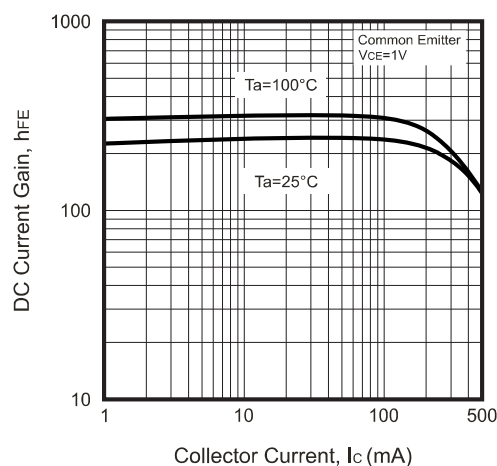
Parameter	Symbol	Conditions	Min	Max	Unit
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_C = 100\mu\text{A}$, $I_E = 0$	40		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_C = 1\text{mA}$, $I_B = 0$	25		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}$, $I_C = 0$	5		V
Collector cut-off current	I_{CBO}	$V_{CB} = 40\text{V}$, $I_E = 0$		100	nA
Collector cut-off current	I_{CEO}	$V_{CE} = 20\text{V}$, $I_B = 0$		100	nA
Emitter cut-off current	I_{EBO}	$V_{EB} = 5\text{V}$, $I_C = 0$		100	nA
DC current gain	$h_{FE(1)}$	$V_{CE} = 1\text{V}$, $I_C = 50\text{mA}$	120	400	
	$h_{FE(2)}$	$V_{CE} = 1\text{V}$, $I_C = 500\text{mA}$	40		
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 500\text{mA}$, $I_B = 50\text{mA}$		0.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = 500\text{mA}$, $I_B = 50\text{mA}$		1.2	V
Transition frequency	f_T	$V_{CE} = 6\text{Vdc}$, $I_C = 20\text{mA}$, $f = 30\text{MHz}$	150		MHz
Output Capacitance	C_{ob}	$V_{CB} = -10\text{V}$, $I_E = 0$, $f = 1.0\text{MHz}$		8	pF

Classification of h_{FE} (1)

Rank	L	H	J
Range	120-200	200-350	300-400

Rating and Characteristic Curves

Fig.1 - Static Characteristic

Fig.2 - $h_{FE} — I_C$ 

Rating and Characteristic Curves

Fig.3 - $V_{CEsat} - I_C$

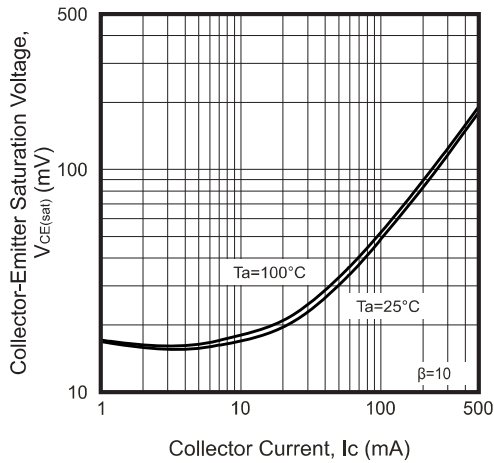


Fig.4 - $V_{BEsat} - I_C$

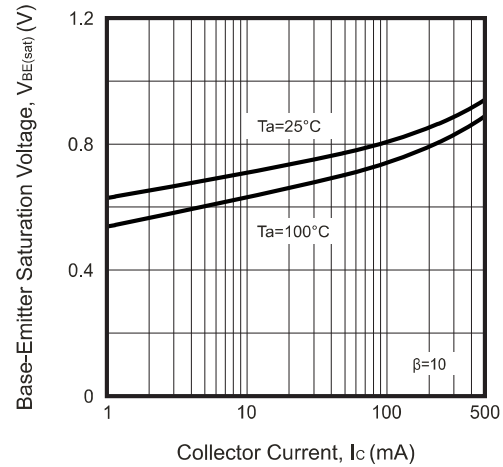


Fig.5 - $I_C - V_{BE}$

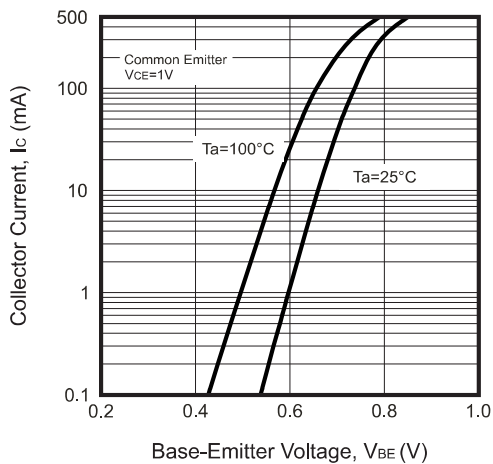


Fig.6 - $C_{ob}/C_{ib} - V_{CB}/V_{EB}$

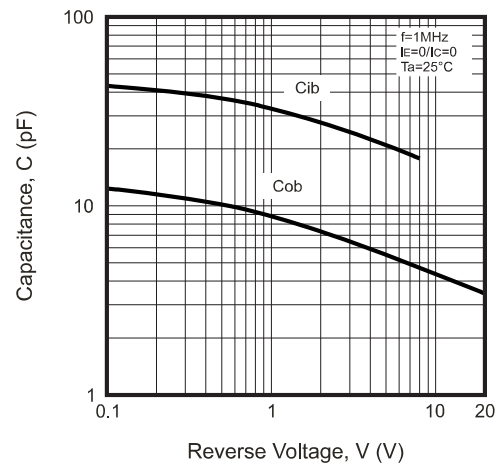


Fig.7 - $f_T - I_C$

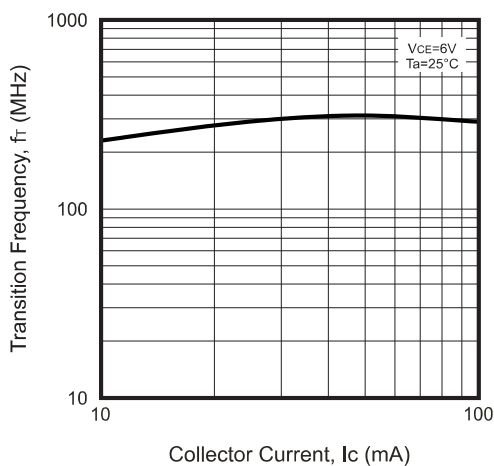
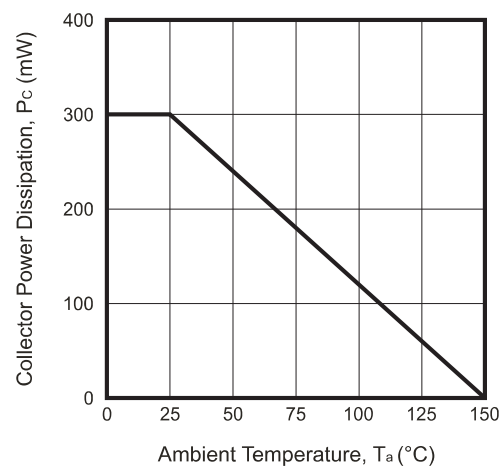
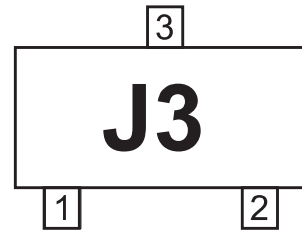


Fig.8 - $P_C - T_a$



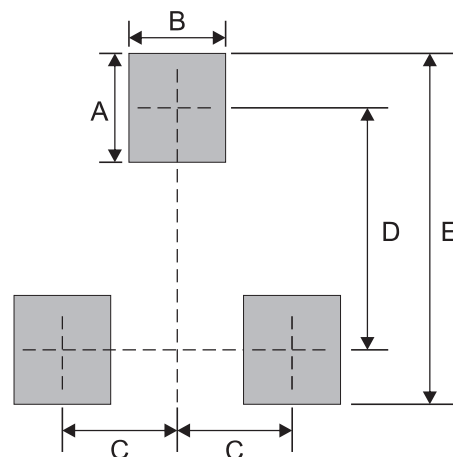
Marking Code

Part Number	Marking Code
S9013	J3



Suggested PAD Layout

SIZE	SOT-23	
	(mm)	(inch)
A	0.90	0.035
B	0.80	0.031
C	0.95	0.037
D	2.00	0.079
E	2.90	0.114

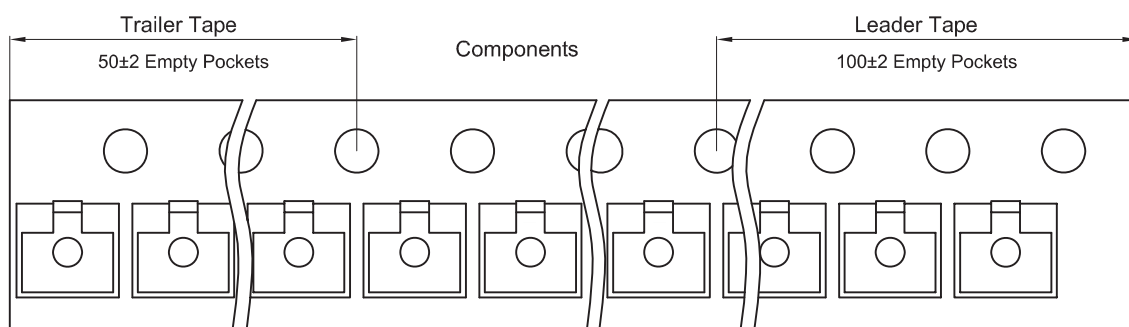
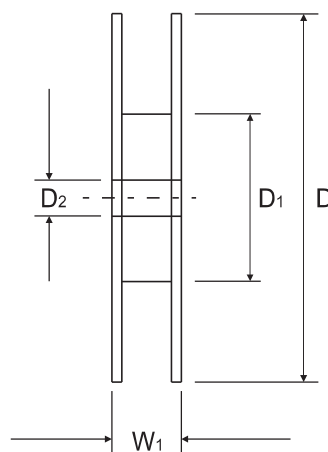
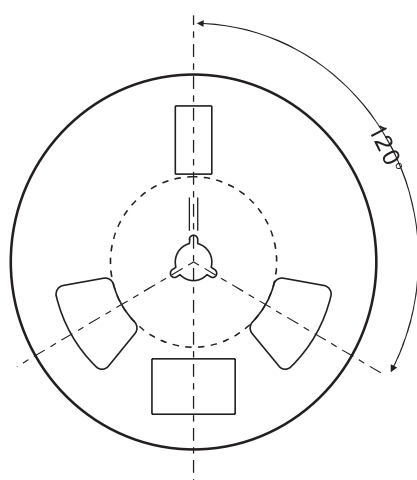
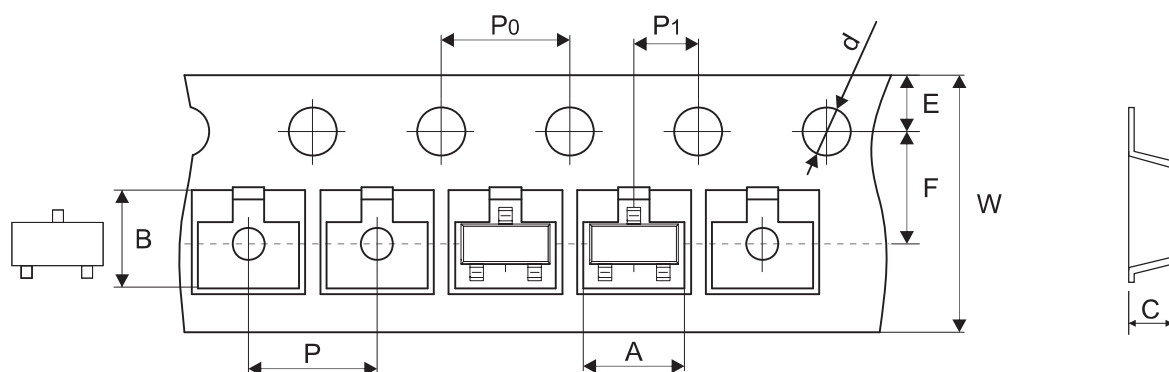


Note: 1. The pad layout is for reference purposes only.

Standard Packaging

Case Type	REEL PACK	
	REEL (pcs)	Reel Size (inch)
SOT-23	3,000	7

Reel Taping Specification



SOT-23	SYMBOL	A	B	C	d	D	D1	D2
	(mm)	3.15 ± 0.10	2.77 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	178.00 ± 2.00	54.40 ± 1.00	13.00 ± 1.00
	(inch)	0.124 ± 0.004	0.109 ± 0.004	0.048 ± 0.004	0.059 ± 0.004	7.008 ± 0.079	2.142 ± 0.039	0.512 ± 0.039

SOT-23	SYMBOL	E	F	P	P0	P1	W	W1
	(mm)	1.75 ± 0.10	3.50 ± 0.10	4.00 ± 0.10	4.00 ± 0.10	2.00 ± 0.10	8.00 ± 0.10	12.30 ± 1.00
	(inch)	0.069 ± 0.004	0.138 ± 0.004	0.157 ± 0.004	0.157 ± 0.004	0.079 ± 0.004	0.315 ± 0.004	0.484 ± 0.039

Company reserves the right to improve product design , functions and reliability without notice.

Rev:1.0