

RoHS Compliant Product
A suffix of "-C" specifies halogen and lead free

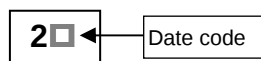
FEATURES

- Collector current capability $I_C=200\text{mA}$
- Collector-emitter voltage $V_{CEO}=40\text{V}$.

APPLICATION

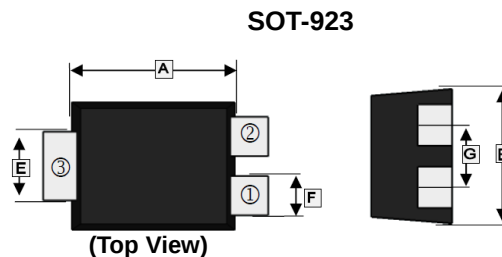
- General switching and amplification.

MARKING

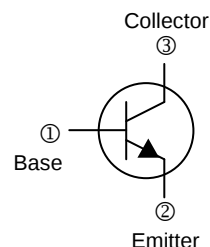


PACKAGING DIMENSION

Package	MPQ	Leader Size
SOT-923	8K	7 inch



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	0.75	0.85	E	0.15	0.25
B	0.55	0.65	F	0.1	0.2
C	0.07	0.17	G	0.35 REF.	
D	0.34	0.40	H	0.95	1.05



ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ\text{C}$ unless otherwise noted)

Parameters		Symbol	Rating	Unit
Collector - Emitter Voltage		V_{CEO}	40	Vdc
Collector - Base Voltage		V_{CBO}	60	Vdc
Emitter - Base Voltage		V_{EBO}	6	Vdc
Collector Current - Continuous		I_C	200	mA
Total Device Dissipation ¹	$T_A=25^\circ\text{C}$	P_D	290	mW
	De-rate above 25°C		2.3	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient ¹		$R_{\theta JA}$	432	$^\circ\text{C} / \text{W}$
Total Device Dissipation ²	$T_A=25^\circ\text{C}$	P_D	347	mW
	De-rate above 25°C		2.8	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient ²		$R_{\theta JA}$	360	$^\circ\text{C} / \text{W}$
Thermal Resistance, Junction to Lead ²		$R_{\theta JL}$	143	$^\circ\text{C} / \text{W}$
Junction, Storage Temperature		T_J, T_{STG}	-55 ~ +150	$^\circ\text{C}$

NOTE:

- 100 mm² 1 oz, copper traces
- 500 mm² 1 oz, copper traces.

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)(Continued)

Parameters	Symbol	MIN.	MAX.	Unit	TEST CONDITIONS
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage ¹	V _{(BR)CEO}	40	-	Vdc	I _C =1mAdc, I _B =0
Collector-Base Breakdown Voltage	V _{(BR)CBO}	60	-	Vdc	I _C =10μAdc, I _E =0
Emitter-Base Breakdown Voltage	V _{(BR)EBO}	6	-	Vdc	I _E =10μAdc, I _C =0
Collector Cut-Off Current	I _{CEX}	-	50	nAdc	V _{CE} =30Vdc, V _{EB} =3Vdc
ON CHARACTERISTICS ¹					
DC Current Gain	h _{FE(1)}	40	-		I _C =0.1mAdc, V _{CE} =1Vdc
	h _{FE(2)}	70	-		I _C =1Adc, V _{CE} =1Vdc
	h _{FE(3)}	100	300		I _C =10mAdc, V _{CE} =1Vdc
	h _{FE(4)}	60	-		I _C =50mAdc, V _{CE} =1Vdc
	h _{FE(5)}	30	-		I _C =100mAdc, V _{CE} =1Vdc
Collector-Emitter Saturation Voltage ³	V _{CE(sat)}	-	0.2	Vdc	I _C =10mAdc, I _B =1mAdc
		-	0.3		I _C =50mAdc, I _B =5mAdc
Base-Emitter Saturation Voltage ³	V _{BE(sat)}	0.65	0.85	Vdc	I _C =10mAdc, I _B =1mAdc
		-	1		I _C =50mAdc, I _B =5mAdc
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain-Bandwidth Product	f _T	200	-	MHz	I _C = 10mAdc, V _{CE} = 20Vdc, f=100MHz
Output Capacitance	C _{obo}	-	4	pF	V _{CB} =5.0Vdc, I _E =0, f=1.0MHz
Input Capacitance	C _{ibo}	-	8	pF	V _{EB} = 0.5Vdc, I _C =0, f=1.0MHz
Noise Figure	NF	-	5	dB	V _{CE} = 5Vdc, I _C =100μAdc, R _S =1KΩ, f=1.0kHz
SWITCHING CHARACTERISTICS					
Delay Time	td	-	35	nS	V _{CC} =3Vdc,V _{BE} =-0.5Vdc
Rise Time	tr	-	35	nS	I _C =10mAdc, I _{B1} =1mAdc
Storage Time	ts	-	275	nS	V _{CC} =3Vdc,I _C =10mAdc
Fall Time	tf	-	50	nS	I _{B1} =I _{B2} =1mAdc

NOTE:

1. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2.0\%$

TYPICAL TRANSIENT CHARACTERISTIC CURVES

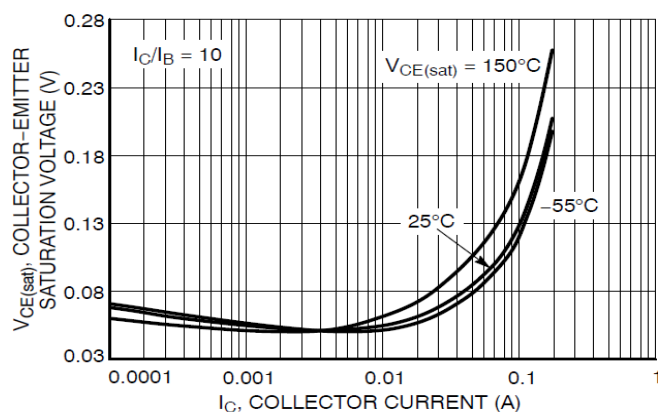


Figure 1. Collector Emitter Saturation Voltage vs. Collector Current

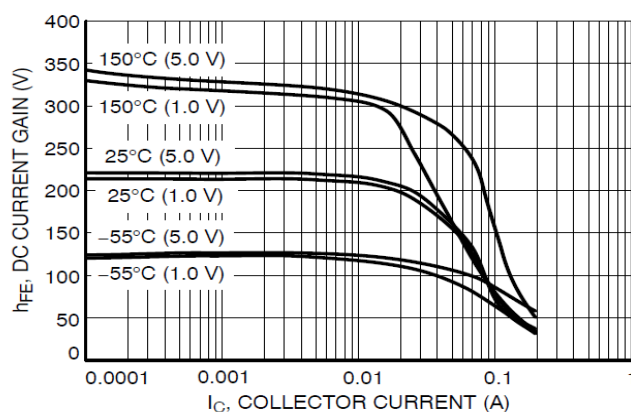


Figure 2. DC Current Gain vs. Collector Current

TYPICAL TRANSIENT CHARACTERISTIC CURVES

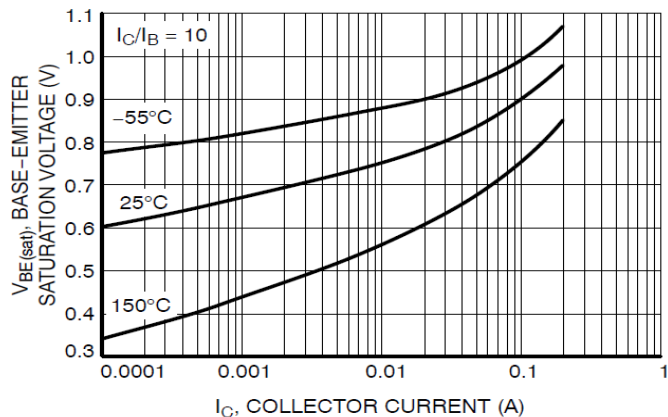


Figure 3. Base-Emitter Saturation Voltage vs. Collector Current

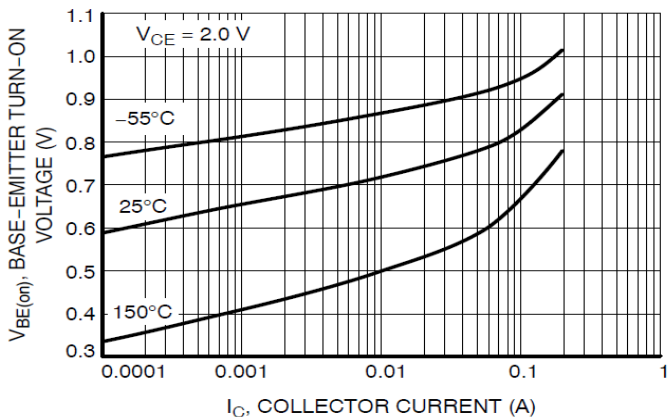


Figure 4. Base-Emitter Turn-On Voltage vs. Collector Current

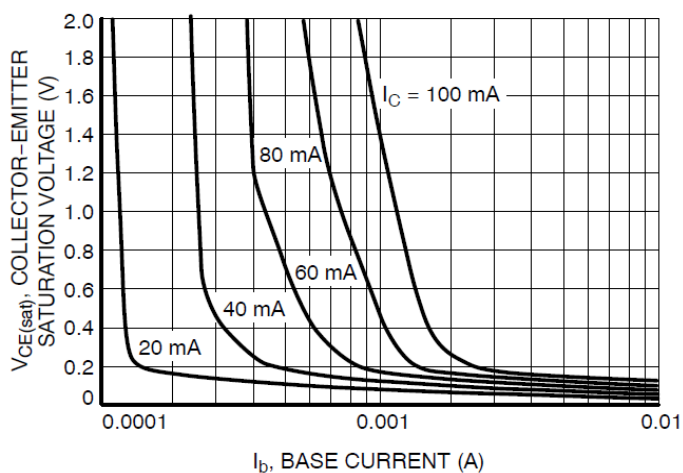


Figure 5. Saturation Region

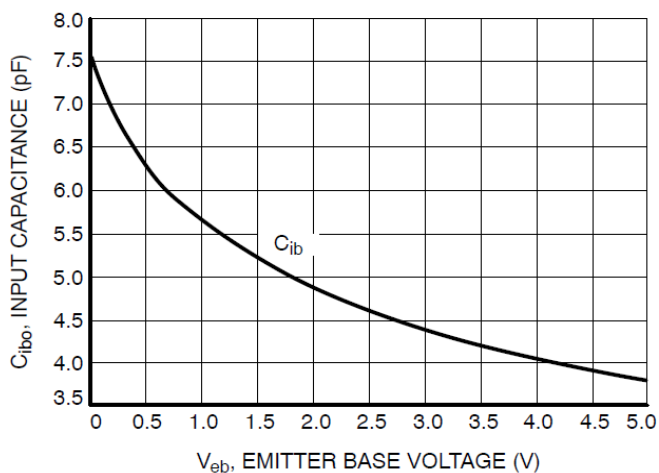


Figure 6. Input Capacitance

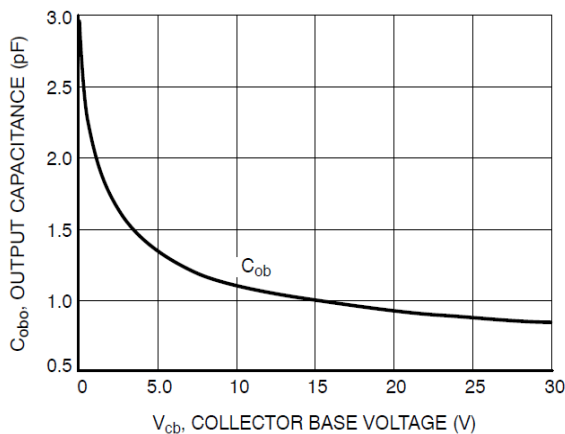


Figure 7. Output Capacitance