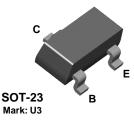
BSS64



BSS64



NPN General Purpose Amplifier

This device is designed for general purpose high voltage amplifiers and gas discharge display driving. Sourced from Process 16.

Absolute Maximum Ratings* TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V _{CEO}	Collector-Emitter Voltage	80	V
V _{CBO}	Collector-Base Voltage	120	V
V _{EBO}	Emitter-Base Voltage	5.0	V
I _C	Collector Current - Continuous	200	mA
T _J , T _{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:

1) These ratings are based on a maximum junction temperature of 150 degrees C.
 2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics TA = 25°C unless otherwise noted

Symbol	Characteristic	Мах	Units
		*BSS64	
PD	Total Device Dissipation	350	mW
	Derate above 25°C	2.8	mW/°C
$R_{ extsf{ heta}JA}$	Thermal Resistance, Junction to Ambient	357	°C/W

*Device mounted on FR-4 PCB 40 mm X 40 mm X 1.5 mm.

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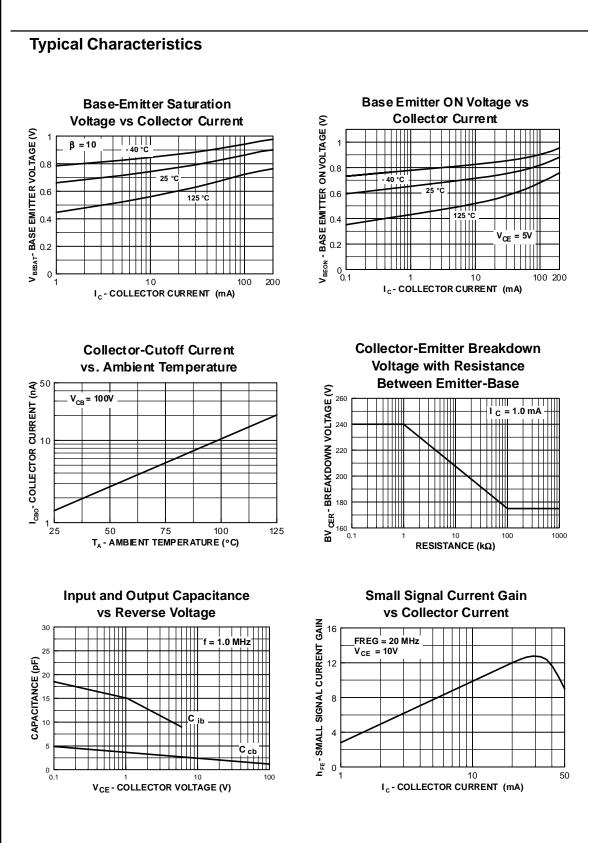
NPN General Purpose Amplifier (continued)

BSS64

OFF CHARACTERISTICS Vignocco Collector-Emitter Breakdown Voltage Ic = 100 µA, Ic = 0 800 µA Vignocco Collector-Cutoff Current Vignocco Sol V, Ic = 0 Sol V, Ic = 0 Sol V, Ic = 0 ON CHARACTERISTICS New Collector-Cutoff Current Vignocco Collector-Emitter Saturation Voltage Ic = 10 mA, Vice = 1.0 V 200 nA ON CHARACTERISTICS New Collector-Emitter Saturation Voltage Ic = 4.0 mA, Ig = 400 µA 1.12 V Spice Model NPN (Is=2.5111 Xita: Summa Collector Current Gain Typical Pulsed Current Gain Vigno Pulsed Current Gain Spice Model NPN (Is=2.5111 Xita: Spice Model Vigno Pulsed Current Gain Vigno Pulsed Current Gain Spice Model Vigno Pulsed Current Gain Vigno Pulsed Current Gain Vigno Pulsed Current Gain <th>Symbol</th> <th>Parameter</th> <th>Test Conditions</th> <th>Min</th> <th>Max</th> <th>Units</th>	Symbol	Parameter	Test Conditions	Min	Max	Units
VIBERCED Collector-Emitter Breakdown Voltage $l_c = 4.0 \text{ mA}, l_b = 0$ 80 V VIBERCED Collector-Cases Breakdown Voltage $l_c = 100 \mu$ A, $l_c = 0$ 120 V VIBERCED Collector-Cutoff Current $V_{cb} = 90 V, l_c = 0$ 5.0 V Lead Collector-Cutoff Current $V_{cb} = 90 V, l_c = 0$ 5.0 V DN CHARACTERISTICS Free DC Current Gain $V_{cb} = 50 \text{ V}, l_c = 0$ 200 nA Negative Collector-Cutoff Current $V_{cb} = 50 \text{ V}, l_c = 0$ 20 nA Vegean Collector-Emitter Saturation Voltage $l_c = 40 \text{ mA}, l_b = 400 \mu$ A 0.15 V Vegean Collector-Emitter Saturation Voltage $l_c = 4.0 \text{ mA}, l_b = 400 \mu$ A 1.2 V State Base-Emitter Saturation Voltage $l_c = 4.0 \text{ mA}, l_b = 400 \mu$ A 1.2 V State State State State State State State Item Callestor Emitter-Saturation Voltage $l_c = 4.0 \text{ mA}, l_b = 400 \mu$ A 1.2 V State Output Capacit						
$V_{BR(ED)} = 0 + 120 +$			· · · · · · · · · · · · · · · · · · ·	n	n	n
$V_{\text{URPERD}} = \text{Emitter-Base Breakdown Voltage} I_{\text{E}} = 100 \mu\text{A}, I_{\text{C}} = 0 5.0 V V \\ V_{\text{CB}} = 90 V_{\text{L}} = 0 T_{\text{C}} = 0, T_{\text{A}} = 150^{\circ}\text{C} 5.0 \mu\text{A} \\ V_{\text{CB}} = 90 V_{\text{L}} = 0 T_{\text{C}} = 0, T_{\text{A}} = 150^{\circ}\text{C} 5.0 \mu\text{A} \\ V_{\text{EB}} = 0 V_{\text{CB}} = 5.0 V, I_{\text{C}} = 0 2.00 n\text{A} \\ \text{ONCHARACTERISTICS} \\ \hline N_{\text{E}} = D C Current Gain I_{\text{C}} = 10 \text{mA}, V_{\text{CE}} = 1.0 V 20 1 V \\ V_{\text{CB}} = 5.0 \text{mA}, I_{\text{B}} = 400 \mu\text{A} 0.15 V \\ V_{\text{C}} = 50 \text{mA}, I_{\text{B}} = 15 \text{mA} 0.2 V \\ \hline V_{\text{CB}(\text{SM})} Collector-Emitter Saturation Voltage I_{\text{C}} = 4.0 \text{mA}, I_{\text{B}} = 400 \mu\text{A} 1.2 V \\ \hline \text{SMALL SIGNAL CHARACTERISTICS} \\ \hline f_{\text{T}} Current Gain - Bandwidth Product I_{\text{C}} = 50 \text{mA}, I_{\text{B}} = 400 \mu\text{A} 1.2 V \\ \hline \text{SMALL SIGNAL CHARACTERISTICS} \\ \hline f_{\text{T}} Current Gain - Bandwidth Product I_{\text{C}} = 3.0 \text{mA}, V_{\text{CE}} = 10, 60 \text{MHz} \\ \hline C_{\text{Ob}} Output Capacitance V_{\text{CB}} = 10 V, f = 1.0 \text{MHz} 5.0 \text{pF} \\ \hline \text{Spice Model} \\ \\ \text{NPN} (Is=2.511f Xti=3 \text{Eg}=1.11 \text{Vaf}=100 \text{Bf}=242.6 \text{Ne}=1.249 \text{Ise}=2.511f \text{Ikf}=.3458 \text{Xtb}=1.5 \text{Br}=3.197 \text{Nc}=2 \text{Isc}=0 \text{K} \\ \text{Kr}=0 \text{Rc}=11 \text{Cic}=4.8838 \text{Mic}=3.047 \text{Vic}=.75 \text{Fc}=5 \text{C} \text{ise}=18.79 \text{M} \text{g}=.3416 \text{V} \text{g}=.75 \text{Tr}=1.202n \text{Tf}=560p \text{If}=50m \text{Vit}=5 \text{Xt}=8 \text{Rb}=10 \\ \hline \text{Typical Pulsed Current Gain} \\ \text{vs Collector Current} \\ \text{vs Collector Current} \\ \hline v$		° .				
$\begin{split} \hline c_{20} & Collector-Cutoff Current & C_{CB} = 90 V, I_E = 0 & 0.1 & \muA \\ \hline V_{CB} = 90 V, I_E = 0, T_A = 150^\circ C & 50 & \muA \\ \hline V_{EB} = 5.0 V, I_E = 0, T_A = 150^\circ C & 200 & nA \\ \hline ON CHARACTERISTICS \\ \hline P_{FE} & DC Current Gain & I_C = 10 mA, V_{CE} = 1.0 V & 20 & 0.15 & V \\ \hline V_{CE(SBD} & Collector-Emitter Saturation Voltage & I_C = 4.0 mA, I_B = 400 \muA & 0.15 & V \\ \hline V_{CE(SBD} & Base-Emitter Saturation Voltage & I_C = 4.0 mA, I_B = 400 \muA & 0.15 & V \\ \hline V_{EE(SBD} & Base-Emitter Saturation Voltage & I_C = 4.0 mA, I_B = 400 \muA & 0.15 & V \\ \hline V_{EE(SBD} & Base-Emitter Saturation Voltage & I_C = 4.0 mA, I_B = 400 \muA & 0.15 & V \\ \hline V_{EE(SBD} & Current Gain - Bandwidth Product & I_C = 4.0 mA, V_{CE} = 10, f = 0.0 & MHz \\ \hline T_T & Current Gain - Bandwidth Product & I_C = 4.0 mA, V_{CE} = 10, f = 0.0 & MHz \\ \hline C_{ab} & Output Capacitance & V_{CB} = 10 V, f = 1.0 \text{ MHz} & 5.0 & pF \\ \hline Spice Model \\ NPN (Is=2.511f XiI=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Id=-3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 \\ Ikr=0 Rc=1 C_{iC=4}.883p M_{iC=.3047} V_{iC=.75} Fc=.5 C_{iE=18.79p} M_{iE=.3416} V_{iE=.75} Tr=1.202n Tf=560p Itf=50m \\ VIt=5 XIf=8 Rb=10) \\ \hline Typical Characteristics \\ \hline Typical Pulsed Current Gain \\ vs Collector Current \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 & 1.2 & 5.0 & 0.20 & 50 & 10 \\ \hline 0.1 & 0.2 & 0.5 $,				-
$V_{CB} = 90 V, I_{E} = 0, T_{A} = 150^{\circ}C$ 50 µA $V_{EB} = 5.0 V, I_{C} = 0$ 200 nA ON CHARACTERISTICS $\frac{h_{E}}{DC Current Gain} I_{C} = 10 mA, V_{CE} = 1.0 V$ 20 $\frac{h_{C}}{DC} = 4.0 mA, I_{B} = 400 \muA$ 0.2 V $\frac{h_{C}}{V_{CE(SAR)}} O_{A} = 15 mA$ 0.2 V $\frac{h_{C}}{V_{CE(SAR)}} O_{A} = 15 mA$ 0.2 V $\frac{h_{C}}{V_{CE(SAR)}} O_{A} = 10 mA, V_{CE} = 1.0 V$ 20 $\frac{h_{C}}{V_{CE(SAR)}} O_{A} = 10 mA, I_{B} = 400 \muA$ 1.2 V SMALL SIGNAL CHARACTERISTICS $\frac{h_{C}}{V_{CE(SAR)}} O_{A} = 10 mA, V_{CE} = 10, MA, I_{B} = 400 \muA$ 1.2 V SMALL SIGNAL CHARACTERISTICS $\frac{h_{C}}{V_{CE(SAR)}} O_{C} = 10 mA, V_{CE} = 10, MA, V_{CE} = 10, MHZ$ $\frac{h_{C}}{V_{CE}} O_{A} = 35 MHZ$ $C_{ab} O_{A} = 10 V, f = 1.0 MHZ$ $\frac{h_{C}}{V_{CB}} = 10 V, f = 1.0 MHZ$ $\frac{h_{C}}{V_{$		-	-	5.0		-
Image: Second system Verse 5.0 V, I _C = 0 200 nA ON CHARACTERISTICS Image: Second system DC Current Gain Ic = 10 mA, V _{CE} = 1.0 V 20 Image: Second system Version Collector-Emitter Saturation Voltage Ic = 4.0 mA, Ig = 400 µA 0.15 V Version Collector-Emitter Saturation Voltage Ic = 4.0 mA, Ig = 400 µA 0.12 V Small Current Gain - Bandwidth Product Ic = 4.0 mA, V _{CE} = 10, f = 30 MHz 60 MHz Cob Output Capacitance V _{CB} = 10 V, f = 1.0 MHz 5.0 pF Spice Model NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.832 Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vt=5 XtH=8 Rb=10) Typical Pulsed Current Gain vs Collector Current Spice Output Collector Current Gain and and and and and and and and and an	I _{CBO}	Collector-Cutoff Current				
$h_{FE} = DC Current Gain l_{C} = 10 mA, V_{CE} = 1.0 V 20 0.15 V 0.15 V 0.2 G 0.16 V 0.2 G 0.16 V 0.2 V 0.2 V 0.2 G 0.16 V 0.2 V 0.2 V 0.2 V 0.2 G 0.16 V 0.2 $	I _{EBO}	Emitter-Cutoff Current	$V_{EB} = 5.0 \text{ V}, I_C = 0$			
$h_{FE} = DC Current Gain l_{C} = 10 mA, V_{CE} = 1.0 V 20 0.15 V 0.15 V 0.2 G 0.16 V 0.2 G 0.16 V 0.2 V 0.2 V 0.2 G 0.16 V 0.2 V 0.2 V 0.2 V 0.2 G 0.16 V 0.2 $						
$V_{CE(sat)} = Collector-Emitter Saturation Voltage l_c = 4.0 mA, l_b = 400 \muA l_c = 50 mA, l_b = 15 mA l_c = 4.0 mA, l_b = 400 \muA l_c = 4.0 mA, l_b = 400 \muA \\ l_c = 4.0 mA, l_b = 400 \muA \\ l_c = 4.0 mA, l_b = 400 \muA \\ l_c = 4.0 mA, l_b = 400 \muA \\ l_c = 4.0 mA, l_b = 400 \muA \\ l_c = 4.0 mA, l_b = 4$					1	1
$I_{0} = 50 \text{ mA}, I_{B} = 15 \text{ mA} \qquad 0.2 \text{ V}$ $I_{C} = 4.0 \text{ mA}, I_{B} = 400 \mu\text{A} \qquad 1.2 \text{ V}$ SMALL SIGNAL CHARACTERISTICS $I_{T} \qquad Current Gain - Bandwidth Product \qquad I_{C} = 4.0 \text{ mA}, I_{B} = 400 \mu\text{A} \qquad 1.2 \text{ V}$ SMALL SIGNAL CHARACTERISTICS $I_{T} \qquad Current Gain - Bandwidth Product \qquad I_{C} = 4.0 \text{ mA}, V_{CE} = 10, \qquad 60 \qquad \text{MHz}$ $C_{ob} \qquad Output Capacitance \qquad V_{CB} = 10 \text{ V}, f = 1.0 \text{ MHz} \qquad 5.0 \text{ pF}$ Spice Model NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tt=560p Itf=50m Vtf=5 Xtf=8 Rb=10 Typical Characteristics $I_{T} \qquad I_{T} \qquad I_{T$				20	0.15	.,
V_{BE(GBI)} Base-Emitter Saturation Voltage I_C = 4.0 mÅ, I_B = 400 μ Å 1.2 V SMALL SIGNAL CHARACTERISTICS I_C = 4.0 mÅ, I_B = 400 μ Å 1.2 V Small Signal CHARACTERISTICS I_C = 4.0 mÅ, I_B = 400 μ Å 60 MHz Cob Output Capacitance V_{CB} = 10 V, f = 1.0 MHz 50 PF Spice Model NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.8329 Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vtf=5 Xtf=8 Rb=10) Typical Characteristics Collector Current Gain vs Collector Current Gain 100 Grad Grad Grad Grad Grad Grad Grad Grad	V _{CE(sat)}	Collector-Emitter Saturation Voltage				
SMALL SIGNAL CHARACTERISTICS $f_{T} \qquad Current Gain - Bandwidth Product \qquad l_{c} = 4.0 mA, V_{CE} = 10, 60 \qquad MHz$ $C_{ob} \qquad Output Capacitance \qquad V_{CB} = 10 V, f = 1.0 MHz \qquad 5.0 pF$ Spice Model NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vtf=5 Xtf=8 Rb=10) Typical Characteristics	V _{BE(Sat)}	Base-Emitter Saturation Voltage	$I_{\rm C} = 4.0 \text{ mA}, I_{\rm B} = 400 \mu\text{A}$			
$ \frac{f_{T}}{C_{ob}} = \frac{Current Gain - Bandwidth Product}{I_{c}} = 4.0 mA, V_{CE} = 10, 60 MHz 60 MHz C_{ob} = 0 utput Capacitance V_{OB} = 10 V, f = 1.0 MHz 5.0 pF C_{OB} = 10$			· ·	1	1	1
$ \frac{f_{T}}{C_{ob}} = \frac{Current Gain - Bandwidth Product}{I_{c}} = 4.0 mA, V_{CE} = 10, 60 MHz 60 MHz C_{ob} = 0 utput Capacitance V_{OB} = 10 V, f = 1.0 MHz 5.0 pF C_{OB} = 10$	SWALLS	IGNAL CHARACTERISTICS				
$\frac{f = 35 \text{ MHz}}{C_{ob}} \frac{1}{Output Capacitance}} \frac{f = 35 \text{ MHz}}{V_{CB} = 10 \text{ V}, f = 1.0 \text{ MHz}} \frac{1}{5.0 \text{ pF}}$ Spice Model NPN (ls=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vtf=5 Xtf=8 Rb=10)} Typical Characteristics Typical Pulsed Current Gain vs Collector Current $V_{ce} = 5V$ $V_{ce} = 5V$ $V_{$			$l_{c} = 4.0 \text{ mA}$ $V_{cr} = 10$	60		MH7
Spice Model NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Is=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vtf=5 Xtf=8 Rb=10) Typical Characteristics Typical Pulsed Current Gain vs Collector Current vs	· I		f = 35 MHz	00		
NPN (Is=2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 Ne=1.249 Ise=2.511f Ikf=.3458 Xtb=1.5 Br=3.197 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=.5 Cje=18.79p Mje=.3416 Vje=.75 Tr=1.202n Tf=560p Itf=50m Vtf=5 Xtf=8 Rb=10) Typical Characteristics Typical Pulsed Current Gain vs Collector Current $v_{cc} = 5v$ $v_{cc} = 5v$ $v_$		Output Consoltoneo	$V_{op} = 10 V f = 1.0 MHz$		5.0	pF
Figure Scale tor Current Gain s Collector Current	Spice	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6	6 Ne=1.249 Ise=2.511f Ikf=.3458			
Figure Scale tor Current Gain s Collector Current	Spice NPN (Is=2 Ikr=0 Rc=	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=	6 Ne=1.249 Ise=2.511f Ikf=.3458			
Figure Scale tor Current Gain s Collector Current	Spice NPN (Is=2 Ikr=0 Rc=	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc=	6 Ne=1.249 Ise=2.511f Ikf=.3458			
$ \frac{vs \text{ Collector Current}}{vs \text{ collector Current}} \\ \frac{250}{100} \\ \frac{100}{100} \\$	Spice NPN (Is=: Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10)	6 Ne=1.249 Ise=2.511f Ikf=.3458			
$ \frac{vs \text{ Collector Current}}{vs \text{ collector Current}} \\ \frac{250}{100} \\ \frac{100}{100} \\$	Spice NPN (Is=: Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10)	6 Ne=1.249 Ise=2.511f Ikf=.3458			
$ \frac{vs \text{ Collector Current}}{vs \text{ collector Current}} \\ \frac{250}{100} \\ \frac{100}{100} \\$	Spice NPN (Is=: Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10)	6 Ne=1.249 Ise=2.511f Ikf=.3458			
$ \begin{array}{c} \mathbf{y} \\ \mathbf{y} \\ \mathbf{z} \\ \mathbf$	Spice NPN (Is=/ Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79	5 Tr=1.202	n Tf=560p	ltf=50m
$ \begin{array}{c} 1 \\ 1 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\ 2 \\$	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	n Tf=560p	ltf=50m
$ \begin{array}{c} \begin{array}{c} 2 \\ 2 \\ 3 \\ 3 \\ 3 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4$	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	n Tf=560p	ltf=50m
$ \begin{array}{c} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	n Tf=560p	ltf=50m
$ \begin{array}{c} \begin{array}{c} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\$	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	n Tf=560p	ltf=50m
$ \begin{array}{c} \mathbf{P} & 100 \\ \mathbf{V}_{CE} & = 5 \mathbf{V} \\ \mathbf{V}_{CE} & = 5 \mathbf$	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	aturation r Current	ltf=50m
$ \begin{array}{c} \mathbf{v}_{cE} = 5\mathbf{v} \\ \mathbf{v}_{cE} = $	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	aturation r Current	ltf=50m
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<u><u> </u></u>	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current 125 °C -40 °C	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	aturation r Current	ltf=50m
	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current 125 °C -40 °C	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-E	5 Tr=1.202	aturation r Current	ltf=50m
I_c - COLLECTOR CURRENT (mA) \rightarrow I_c - COLLECTOR CURRENT (mA)	Spice NPN (Is=2 Ikr=0 Rc= Vtf=5 Xtf	Model 2.511f Xti=3 Eg=1.11 Vaf=100 Bf=242.6 =1 Cjc=4.883p Mjc=.3047 Vjc=.75 Fc= =8 Rb=10) al Characteristics Typical Pulsed Current Gain vs Collector Current -125 °C -40 °C ce = 5V	5 Ne=1.249 Ise=2.511f Ikf=.3458 5 Cje=18.79p Mje=.3416 Vje=.79 Collector-F Voltage vs 0.5 0.4 $\beta = 10$ $\beta = $	Emitter Sa Collector	a turation r Current	ltf=50m

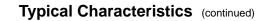
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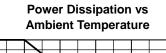


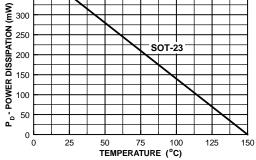






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