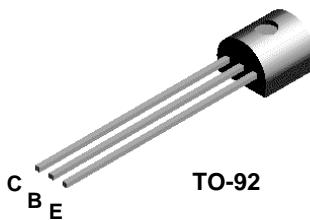
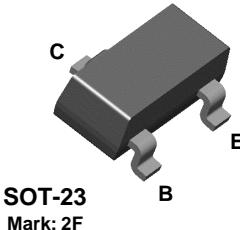
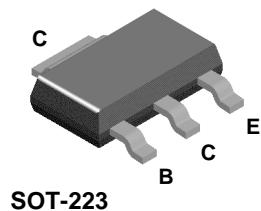


**PN2907A****MMBT2907A****PZT2907A**

### PNP General Purpose Amplifier

This device is designed for use as a general purpose amplifier and switch requiring collector currents to 500 mA. Sourced from Process 63.

#### Absolute Maximum Ratings\*

$T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Value	Units
$V_{CEO}$	Collector-Emitter Voltage	60	V
$V_{CBO}$	Collector-Base Voltage	60	V
$V_{EBO}$	Emitter-Base Voltage	5.0	V
$I_C$	Collector Current - Continuous	800	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.
- 3) All voltages (V) and currents (A) are negative polarity for PNP transistors.

### Thermal Characteristics

$T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Characteristic	Max			Units
		PN2907A	*MMBT2907A	**PZT2907A	
$P_D$	Total Device Dissipation Derate above 25°C	625 5.0	350 2.8	1,000 8.0	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	83.3			°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	200	357	125	°C/W

\* Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

\*\* Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 cm<sup>2</sup>.

## PNP General Purpose Amplifier

(continued)

### Electrical Characteristics

$T_A = 25^\circ\text{C}$  unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
<b>OFF CHARACTERISTICS</b>					
$V_{(\text{BR})\text{CEO}}$	Collector-Emitter Breakdown Voltage*	$I_C = 10 \text{ mA}, I_B = 0$	60		V
$V_{(\text{BR})\text{CBO}}$	Collector-Base Breakdown Voltage	$I_C = 10 \mu\text{A}, I_E = 0$	60		V
$V_{(\text{BR})\text{EBO}}$	Emitter-Base Breakdown Voltage	$I_E = 10 \mu\text{A}, I_C = 0$	5.0		V
$I_B$	Base Cutoff Current	$V_{CB} = 30 \text{ V}, V_{EB} = 0.5 \text{ V}$		50	nA
$I_{\text{CEX}}$	Collector Cutoff Current	$V_{CE} = 30 \text{ V}, V_{BE} = 0.5 \text{ V}$		50	nA
$I_{\text{CBO}}$	Collector Cutoff Current	$V_{CB} = 50 \text{ V}, I_E = 0$ $V_{CB} = 50 \text{ V}, I_E = 0, T_A = 150^\circ\text{C}$		0.02 20	$\mu\text{A}$

### ON CHARACTERISTICS

$h_{FE}$	DC Current Gain	$I_C = 0.1 \text{ mA}, V_{CE} = 10 \text{ V}$ $I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 10 \text{ V}$ $I_C = 150 \text{ mA}, V_{CE} = 10 \text{ V}^*$ $I_C = 500 \text{ mA}, V_{CE} = 10 \text{ V}^*$	75 100 100 100 50	300	
$V_{CE(\text{sat})}$	Collector-Emitter Saturation Voltage*	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$ $I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$		0.4 1.6	V V
$V_{BE(\text{sat})}$	Base-Emitter Saturation Voltage	$I_C = 150 \text{ mA}, I_B = 15 \text{ mA}^*$ $I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$		1.3 2.6	V V

### SMALL SIGNAL CHARACTERISTICS

$f_T$	Current Gain - Bandwidth Product	$I_C = 50 \text{ mA}, V_{CE} = 20 \text{ V},$ $f = 100 \text{ MHz}$	200		MHz
$C_{\text{obo}}$	Output Capacitance	$V_{CB} = 10 \text{ V}, I_E = 0,$ $f = 100 \text{ kHz}$		8.0	pF
$C_{\text{ibo}}$	Input Capacitance	$V_{EB} = 2.0 \text{ V}, I_C = 0,$ $f = 100 \text{ kHz}$		30	pF

### SWITCHING CHARACTERISTICS

$t_{\text{on}}$	Turn-on Time	$V_{CC} = 30 \text{ V}, I_C = 150 \text{ mA},$ $I_{B1} = 15 \text{ mA}$		45	ns
$t_d$	Delay Time			10	ns
$t_r$	Rise Time			40	ns
$t_{\text{off}}$	Turn-off Time	$V_{CC} = 6.0 \text{ V}, I_C = 150 \text{ mA}$ $I_{B1} = I_{B2} = 15 \text{ mA}$		100	ns
$t_s$	Storage Time			80	ns
$t_f$	Fall Time			30	ns

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

NOTE: All voltages (V) and currents (A) are negative polarity for PNP transistors.

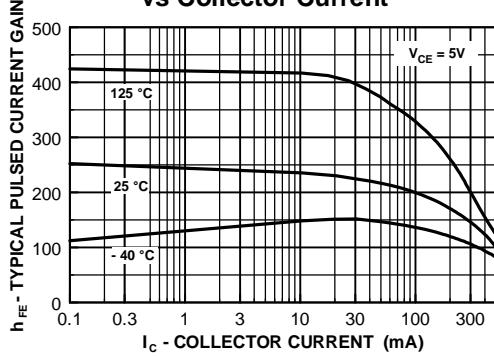
### Spice Model

PNP (Is=650.6E-18 Xti=3 Eg=1.11 Vaf=115.7 Bf=231.7 Ne=1.829 Ise=54.81f Ikf=1.079 Xtb=1.5 Br=3.563 Nc=2 Isc=0 Ikr=0 Rc=.715 Cjc=14.76p Mjc=.5383 Vjc=.75 Fc=.5 Cje=19.82p Mje=.3357 Vje=.75 Tr=111.3n Tf=603.7p Itf=.65 Vtf=5 Xtf=1.7 Rb=10)

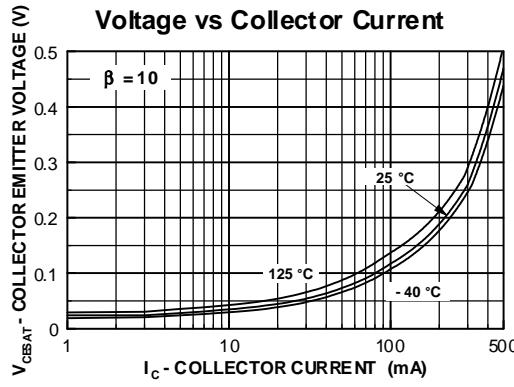
**PNP General Purpose Amplifier**  
(continued)

**Typical Characteristics**

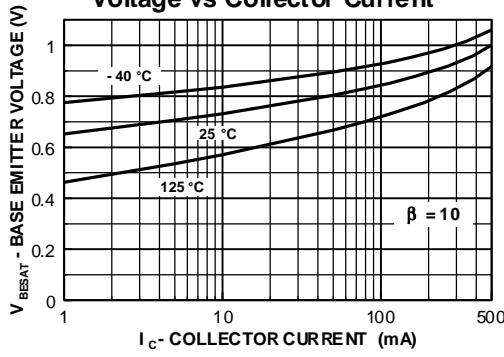
**Typical Pulsed Current Gain  
vs Collector Current**



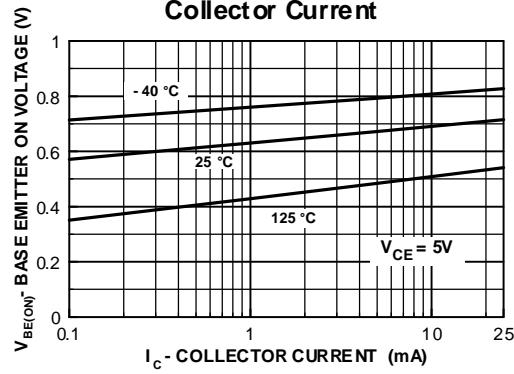
**Collector-Emitter Saturation  
Voltage vs Collector Current**



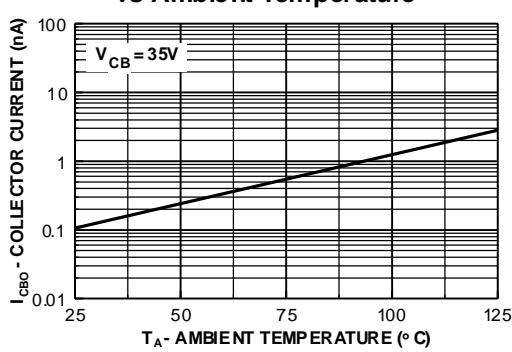
**Base-Emitter Saturation  
Voltage vs Collector Current**



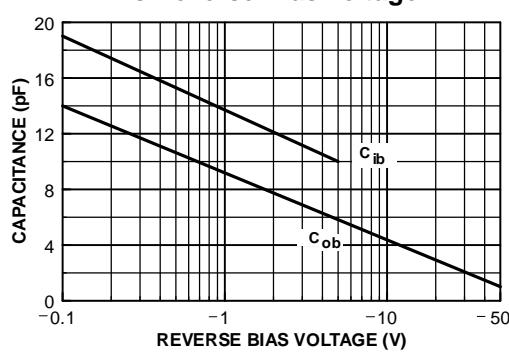
**Base Emitter ON Voltage vs  
Collector Current**



**Collector-Cutoff Current  
vs Ambient Temperature**



**Input and Output Capacitance  
vs Reverse Bias Voltage**

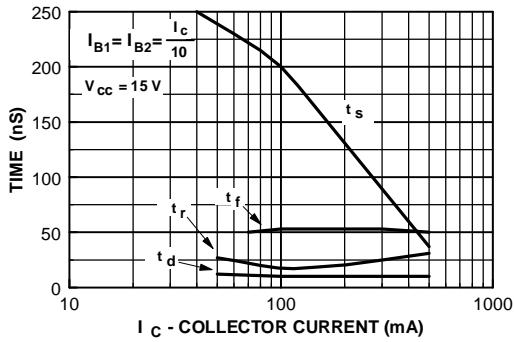


## PNP General Purpose Amplifier

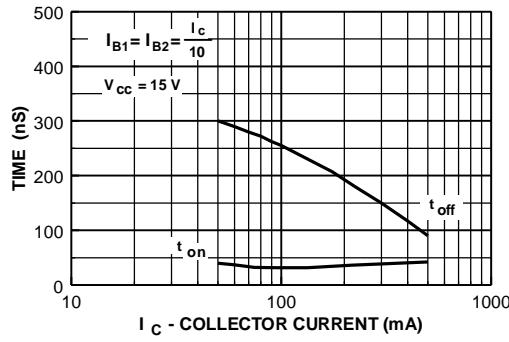
(continued)

### Typical Characteristics (continued)

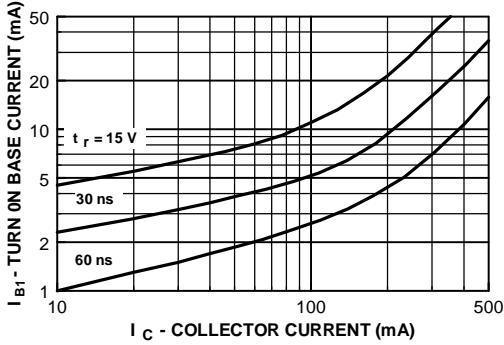
**Switching Times  
vs Collector Current**



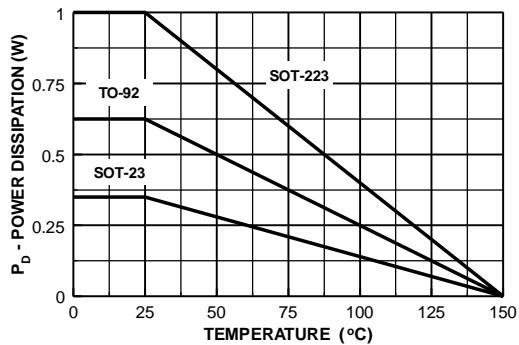
**Turn On and Turn Off Times  
vs Collector Current**



**Rise Time vs Collector  
and Turn On Base Currents**

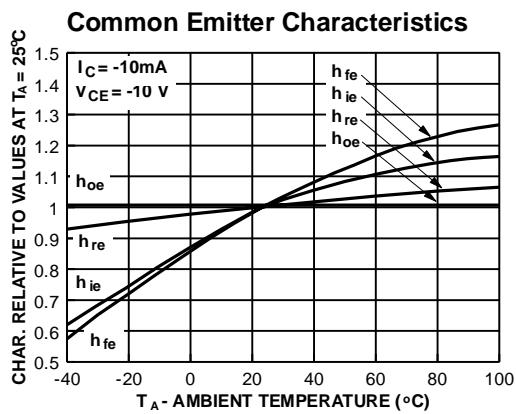
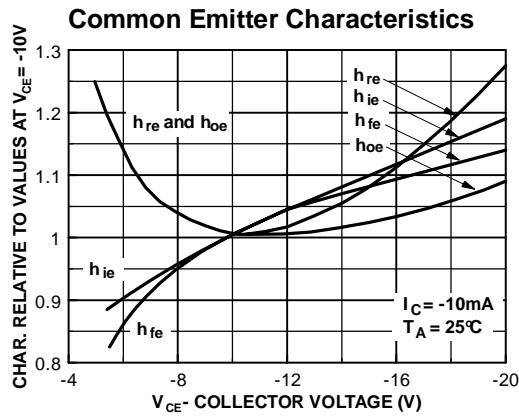
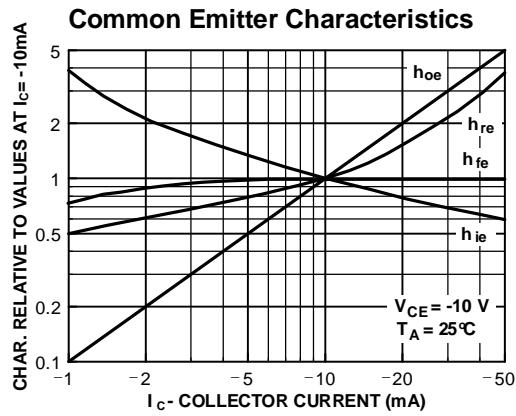


**Power Dissipation vs  
Ambient Temperature**



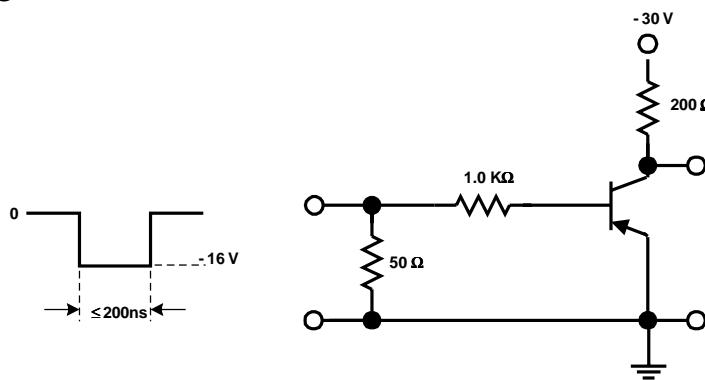
**PNP General Purpose Amplifier**  
(continued)

**Typical Common Emitter Characteristics** ( $f = 1.0\text{kHz}$ )

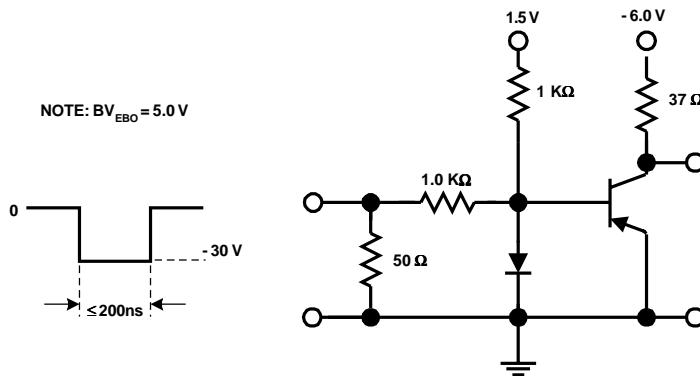


**PNP General Purpose Amplifier**  
(continued)

**Test Circuits**



**FIGURE 1: Saturated Turn-On Switching Time Test Circuit**



**FIGURE 2: Saturated Turn-Off Switching Time Test Circuit**

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#### Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: [org@eplast1.ru](mailto:org@eplast1.ru)

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.