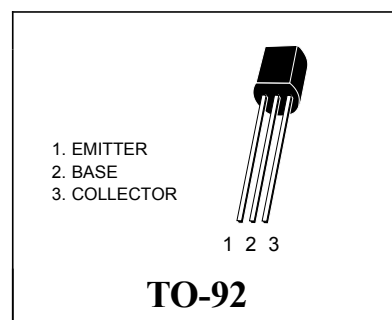


**Plastic-Encapsulate Transistors  
NPN Darlington Transistor**
 **Lead(Pb)-Free**

**Maximum Ratings**( $T_A=25^{\circ}\text{C}$  Unless Otherwise Specified)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	30	V
Collector-base Voltage	$V_{CBO}$	30	V
Emitter-base Voltage	$V_{EBO}$	10	V
Collector Current	$I_C$	500	mA
Total Power Dissipation( $T_A=25^{\circ}\text{C}$ )	$P_D$	0.625	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55~+150	$^{\circ}\text{C}$

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

Characteristic	Symbol	Min	Max	Unit
Collector-base breakdown voltage $I_C=100\mu\text{A}, I_E=0$	$V(BR)_{CBO}$	30	-	V
Collector-emitter breakdown voltage $I_C=1\text{mA}, I_B=0$	$V(BR)_{CEO}$	30	-	V
Emitter-base breakdown voltage $I_E=100\mu\text{A}, I_C=0$	$V(BR)_{EBO}$	10	-	V
Collector cut-off current $V_{CB}=30\text{V}, I_E=0$	$I_{CBO}$		0.1	$\mu\text{A}$
Emitter cut-off current $V_{EB}=10\text{V}, I_C=0$	$I_{EBO}$		0.1	$\mu\text{A}$
DC current gain <sup>1</sup> $V_{CE}=5\text{V}, I_C=10\text{mA}$	MPSA13	5000	-	-
	MPSA14			
$V_{CE}=5\text{V}, I_C=100\text{mA}$	MPSA13	10000	-	-
	MPSA14			
Collector-emitter saturation voltage <sup>1</sup> $I_C=100\text{mA}, I_B=0.1\text{mA}$	$V_{CE(sat)}$		1.5	V
Base-emitter voltage <sup>1</sup> $V_{CE}=5\text{V}, I_C=10\text{mA}$	$V_{BE(on)}$		2.0	V
Transition frequency $V_{CE}=5\text{V}, I_C=10\text{mA}, F=100\text{MHz}$	$f_T$	125	-	MHz

Note: 1.Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .

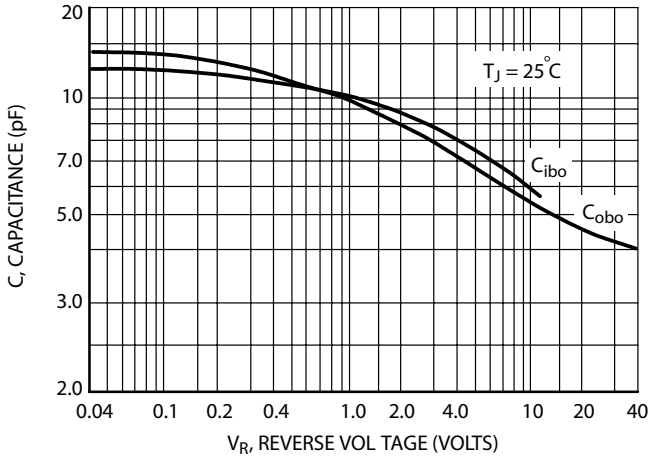


Figure 1. Capacitance

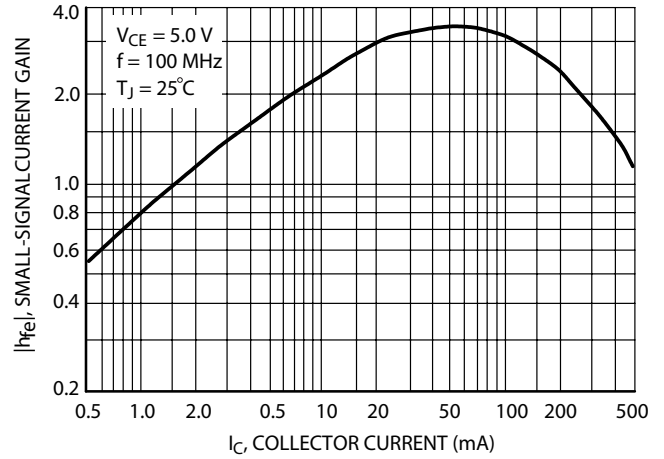


Figure 2. High Frequency Current Gain

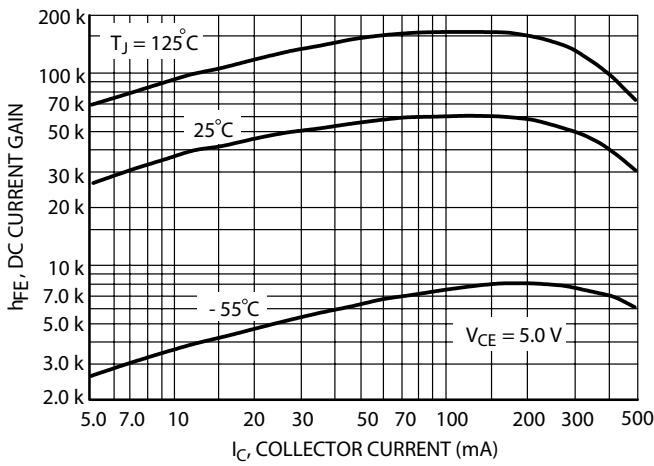


Figure 3. DC Current Gain

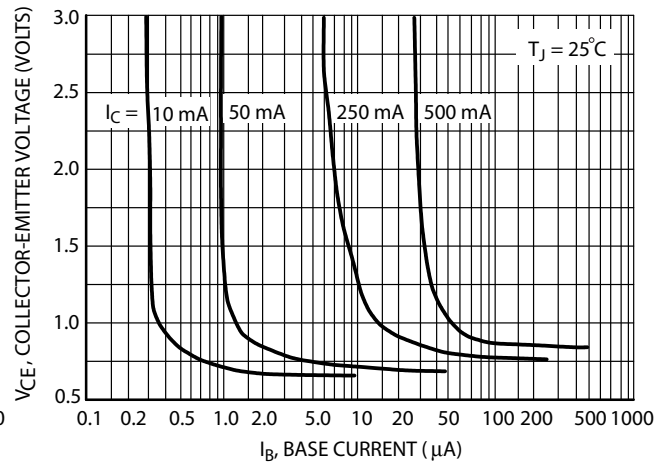


Figure 4. Collector Saturation Region

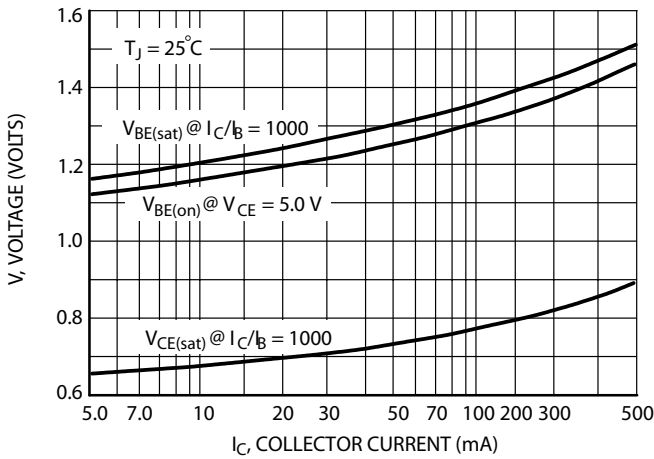


Figure 5. "On" Voltages

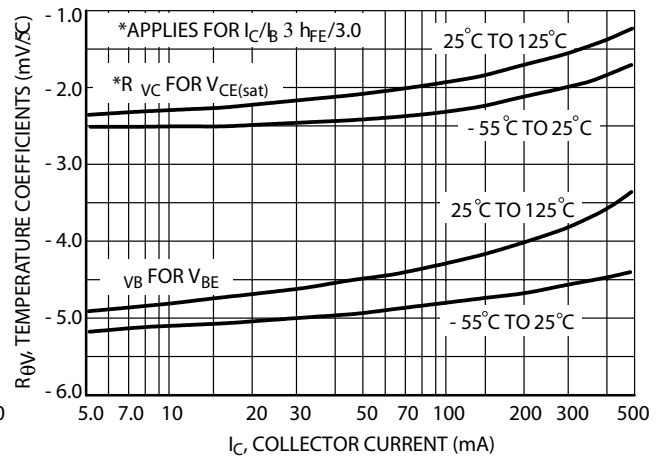


Figure 6. Temperature Coefficients

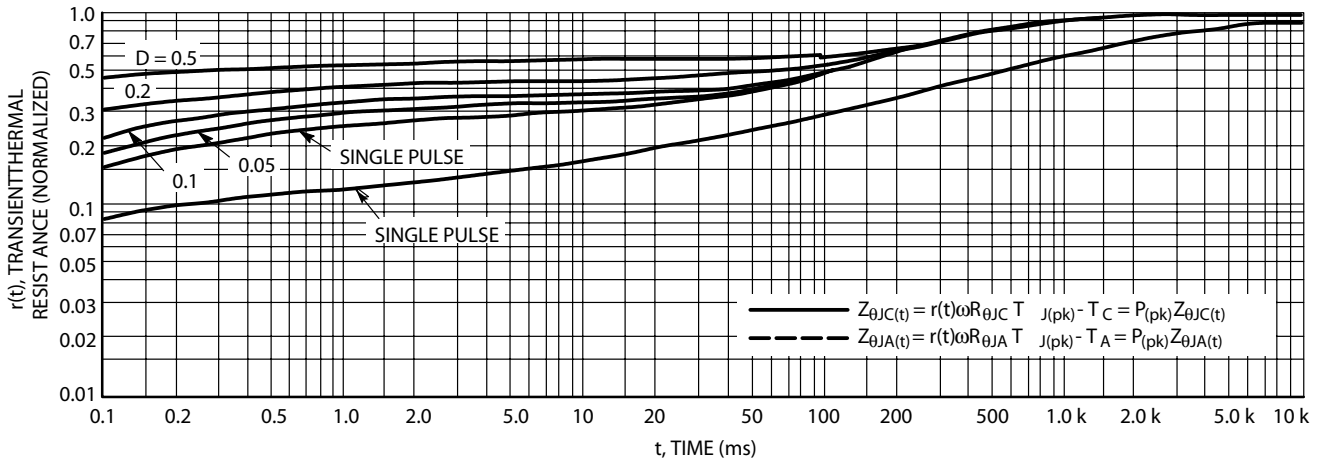


Figure 7. Thermal Response

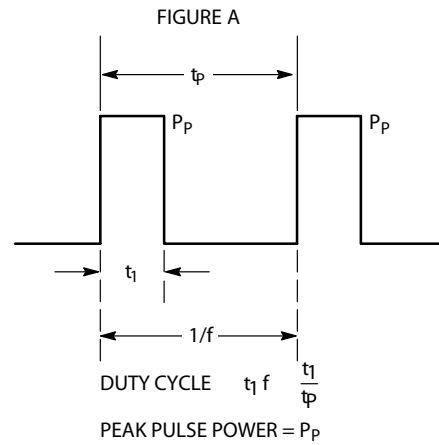
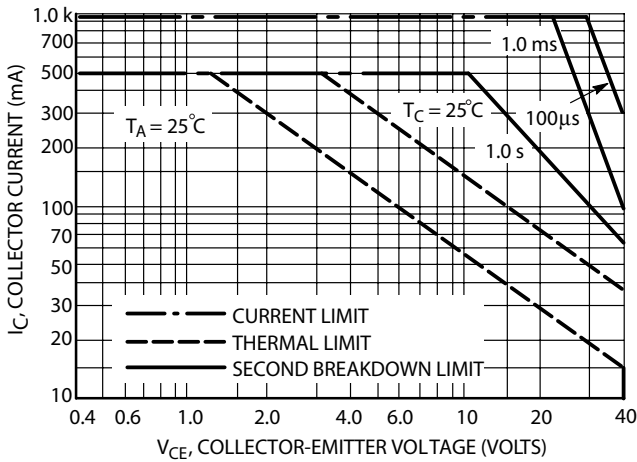
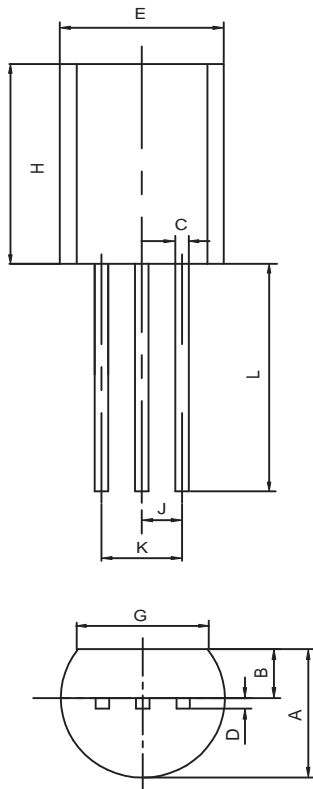


Figure 8. Active Region Safe Operating Area Design Note: Use of Transient Thermal Resistance Data

## TO-92 Outline Dimensions

unit:mm



TO-92		
Dim	Min	Max
A	3.30	3.70
B	1.10	1.40
C	0.38	0.55
D	0.36	0.51
E	4.40	4.70
G	3.43	-
H	4.30	4.70
J	1.270TYP	
K	2.44	2.64
L	14.10	14.50