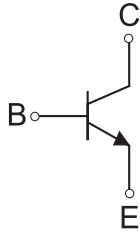


Features

- Darlington Transistors



Schematic Diagram



- 1. Base
- 2. Emitter
- 3. Collector

TO-92

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

Parameter	Symbol	Max.	Unit
Collector-Base Voltage	V_{CBO}	30	V
Collector-Emitter Voltage	V_{CEO}	30	V
Emitter-Base Voltage	V_{EBO}	10	V
Collector Current-Continuous	I_C	0.5	A
Collector Power Dissipation	P_D	625	mW
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	200	$^{\circ}\text{C/W}$
Operation Junction Temperature Range	T_J	-55 To +150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-55 To +150	$^{\circ}\text{C}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=0.1\text{mA}, I_E=0$	30	-	-	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=1\text{mA}, I_B=0$	30	-	-	V
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=0.1\text{mA}, I_C=0$	10	-	-	V
Collector Cut-Off Current	I_{CBO}	$V_{CB}=30\text{V}, I_E=0$	-	-	0.1	μA
Emitter Cut-Off Current	I_{EBO}	$V_{EB}=30\text{V}, I_C=0$	-	-	0.1	μA
DC Current Gain ¹	$h_{FE(1)}$	$V_{CE}=5\text{V}, I_C=10\text{mA}$	5000	-	-	-
	$h_{FE(2)}$	$V_{CE}=5\text{V}, I_C=100\text{mA}$	10000	-	-	-
Collector-Emitter Saturation Voltage ¹	$V_{CE(sat)}$	$I_C=100\text{mA}, I_B=0.1\text{mA}$	-	-	1.5	V
Base-Emitter Voltage ¹	V_{BE}	$V_{CE}=5\text{V}, I_C=100\text{mA}$	-	-	2.0	V
Current Gain-bandwidth Product	f_T	$V_{CE}=5\text{V}, I_C=10\text{mA}, f=100\text{MHz}$	125	-	-	MHz

Note: 1. Pulse test: pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2.0\%$.

Typical Characteristic Curves

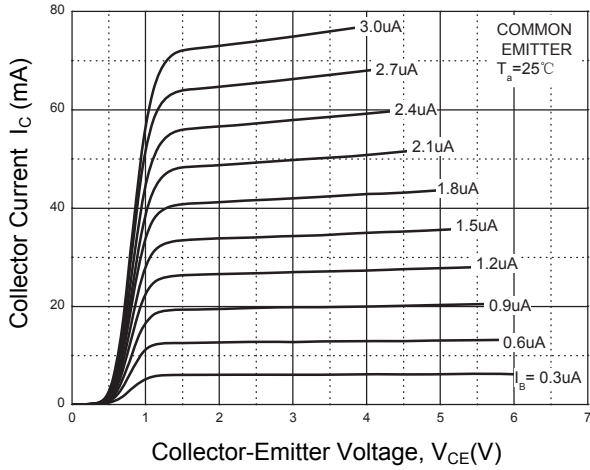


Figure 1. Static Characteristic

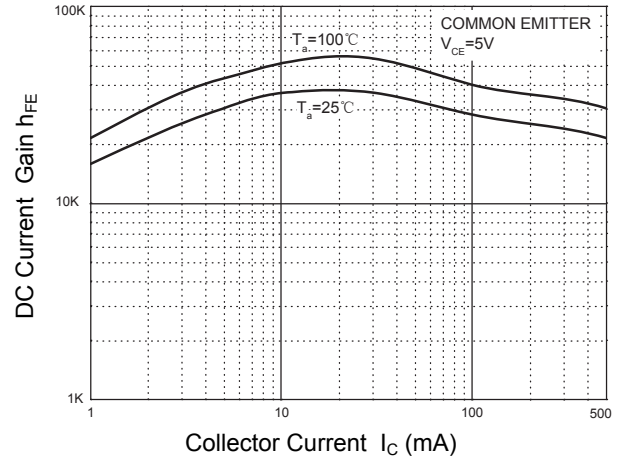


Figure 2. DC Current Gain vs Collector Current

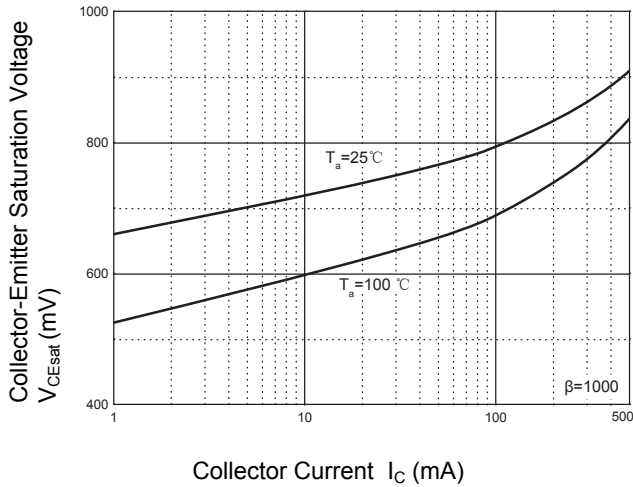


Figure 3. Collector-Emitter Saturation Voltage vs. Collector Current

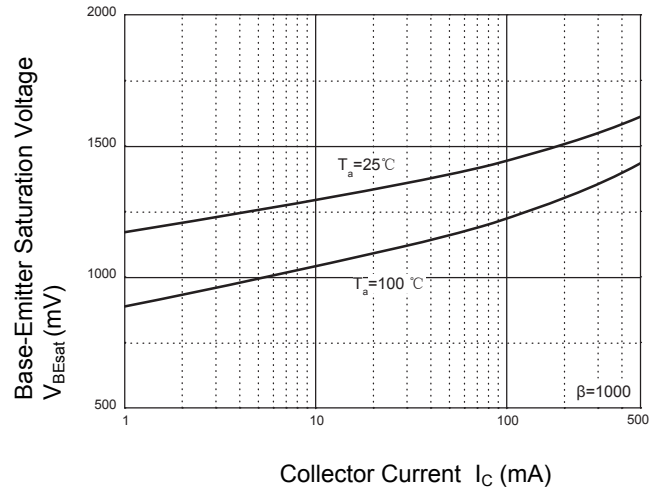


Figure 4. Base-Emitter Saturation Voltage vs. Collector Current

Typical Characteristic Curves

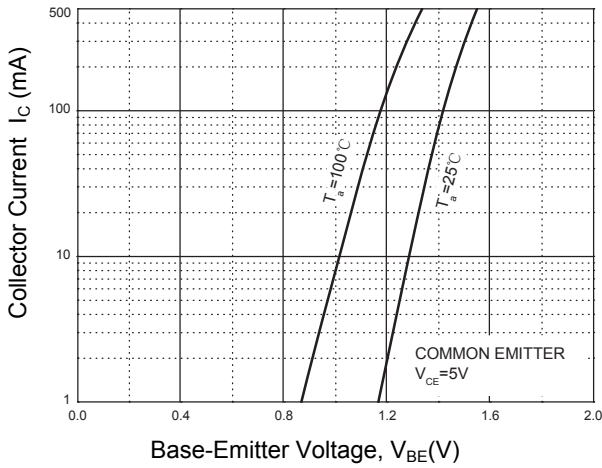


Figure 5. Collector Current vs. Base-Emitter Voltage

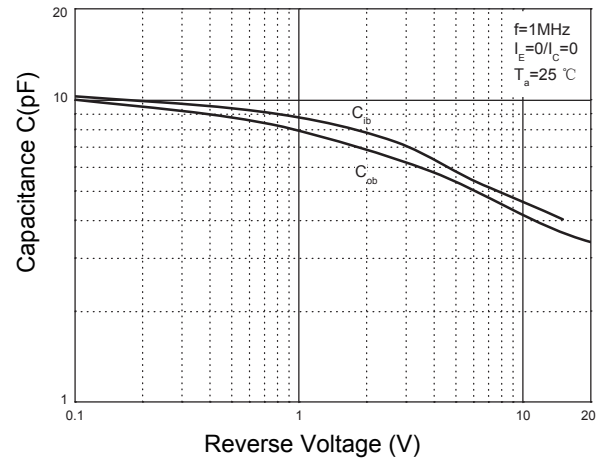


Figure 6. Capacitance Characteristics

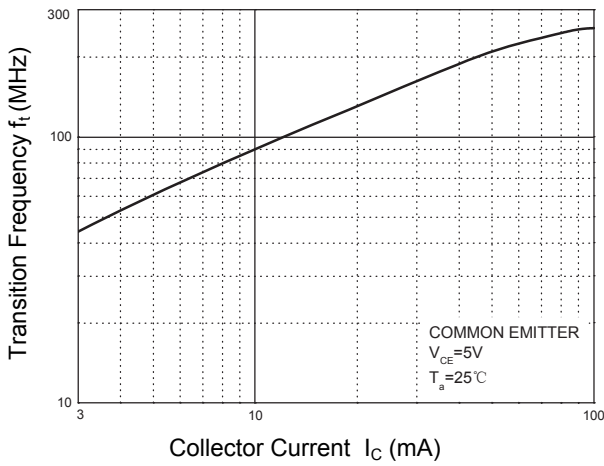


Figure 7. Transition Frequency vs. Collector Current

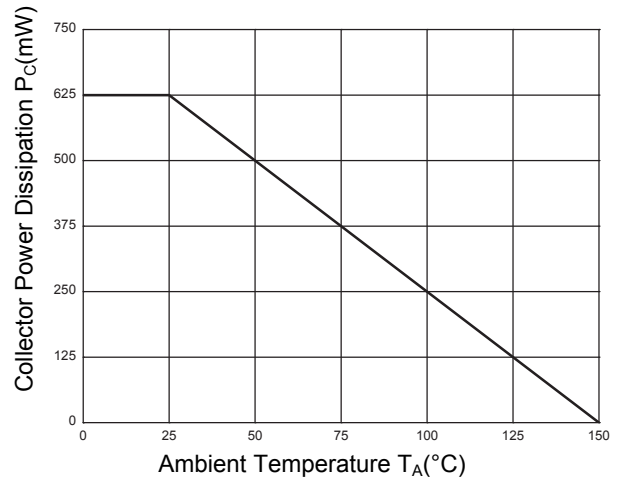
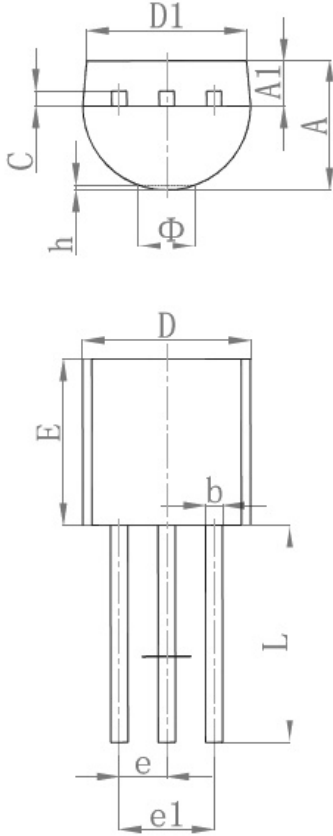


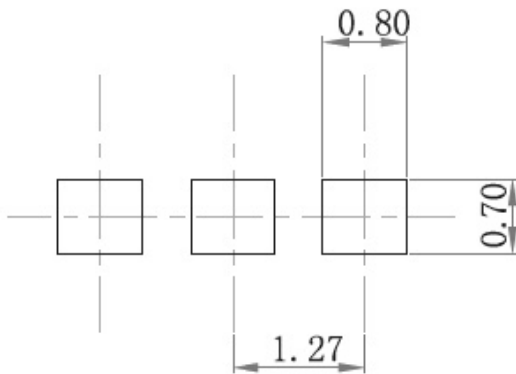
Figure 8. Power Dissipation vs. Ambient Temperature

Package Outline Dimensions (TO-92)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Ka4	Min	Ka4
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
D1	3.430		0.135	
E	4.300	4.700	0.169	0.185
e	1.270 TYP		0.050 TYP	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571
K		1.600		0.063
h	0.000	0.380	0.000	0.015

Recommended Pad Layout



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.05mm.
 3. The pad layout is for reference purposes only.

Ordering Information

Device	Package	Marking	Quantity	HSF Status
GSMPSA13	TO-92	MPSA13	2,000pcs / Box	RoHS Compliant