

Die no. D-25

NPN Darlington transistor

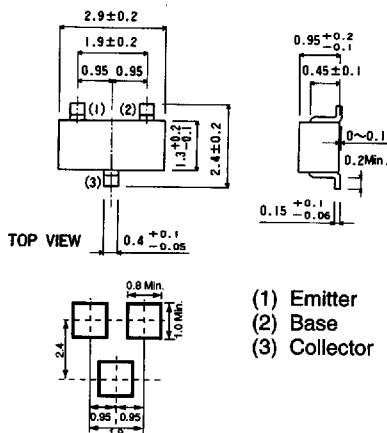
These are epitaxial planar NPN silicon Darlington transistors.

Features

- available in a SST3 (SST, SOT-23) package, see page 300
- collector-to-emitter breakdown voltage, $BV_{CES} = 30 \text{ V (min)}$ at $I_C = 100 \mu\text{A}$
- low noise, $NF = 2.0 \text{ dB}$ at $I_C = 1.0 \text{ mA}$
- high DC current gain
- high transition frequency, typically $f_T = 250 \text{ MHz (max)}$ at $I_C = 10 \text{ mA}$

Dimensions (Units : mm)

SST3



Device types

Package style	Part number	Part marking
SST3 (SOT-23)	SSTA13	R1M

Applications

- extremely high current gain applications

Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit	Conditions
Collector-to-base voltage	V_{CBO}	40	V	
Collector-to-emitter voltage	V_{CEO}	30	V	
Emitter-to-base voltage	V_{EBO}	10	V	
Collector current	I_C	500	mA	DC
Power dissipation	P_C	200	mW	For derating, see derating curve following
Junction temperature	T_j	$-55 \sim +150$	$^\circ\text{C}$	

D-25 Transistors (US/European) NPN

Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$)

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Collector-to-base breakdown voltage	BV_{CBO}	40			V	$I_C = 50 \mu\text{A}$
Collector-to-emitter breakdown voltage	BV_{CES}	30			V	$I_C = 100 \mu\text{A}$
Collector cutoff current, base & emitter shorted	I_{CES}			100	nA	$V_{CE} = 15 \text{ V}, V_{BE} = 0$
Collector cutoff current	I_{CBO}			100	nA	$V_{CB} = 30 \text{ V}$
Emitter cutoff current	I_{EBO}			100	nA	$V_{BE} = 10 \text{ V}$
DC current gain	h_{FE}	2000	8000			$I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V}$
		8000	40000			$I_C = 100 \text{ mA}, V_{CE} = 5.0 \text{ V}$
Collector-to-emitter saturation voltage	$V_{CE(sat)}$			1.0	V	$I_C/I_B = 10 \text{ mA}/0.01 \text{ mA}$
				1.5		$I_C/I_B = 100 \text{ mA}/0.1 \text{ mA}$
Base-to-emitter saturation voltage	$V_{BE(sat)}$		1.4	2.0	V	$I_C/I_B = 100 \text{ mA}/0.1 \text{ mA}$
Collector output capacitance	C_{ob}		4	7	pF	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$
Transition frequency	f_T		250		MHz	$I_C = 10 \text{ mA}, V_{CE} = 5.0 \text{ V}, f = 100 \text{ MHz}$
Noise figure	NF		2		dB	$I_C = 1.0 \text{ mA}, V_{CE} = 5 \text{ V}, R_S = 100 \text{ k}\Omega, f = 1 \text{ kHz}$

Electrical characteristic curves

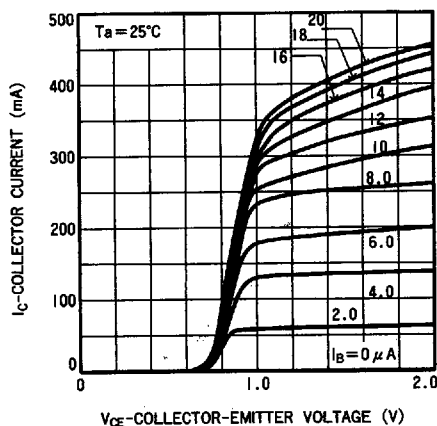


Figure 1

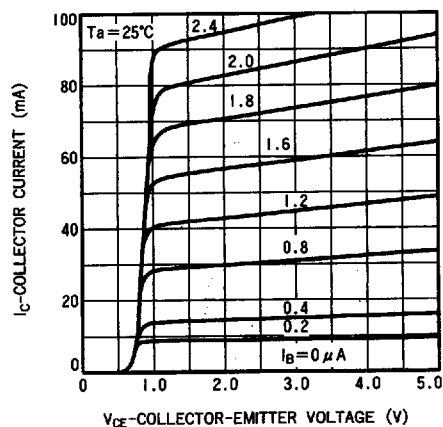


Figure 2

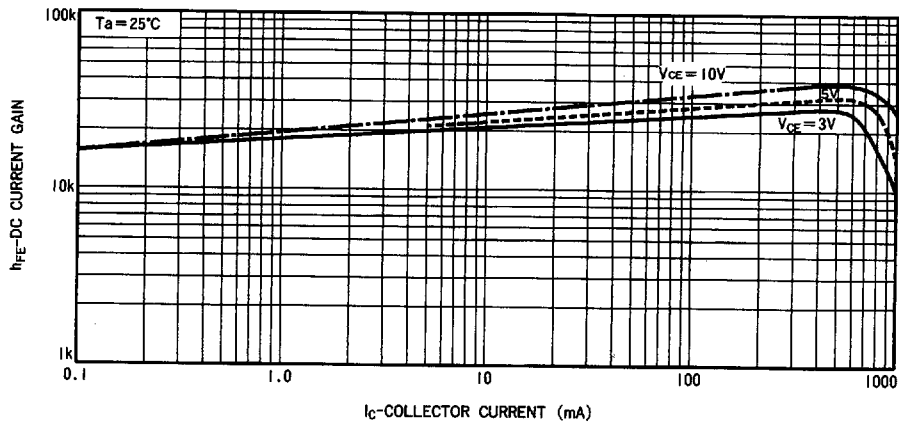


Figure 3

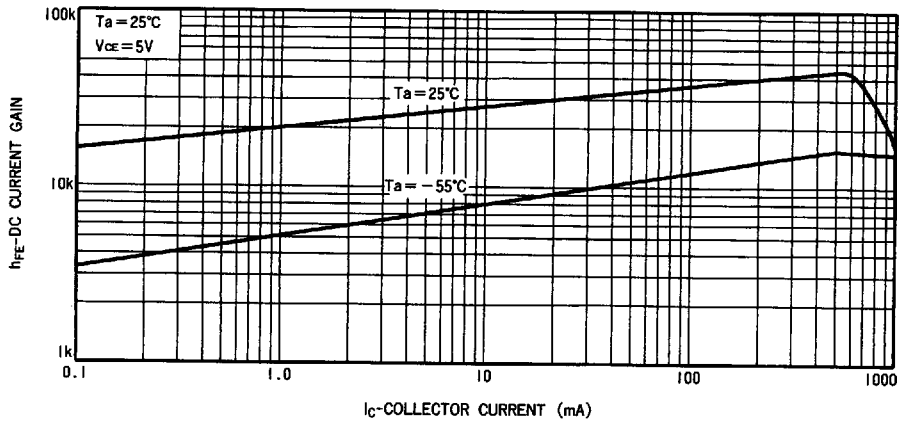


Figure 4

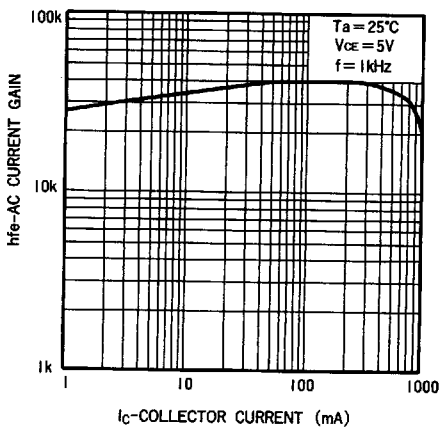


Figure 5

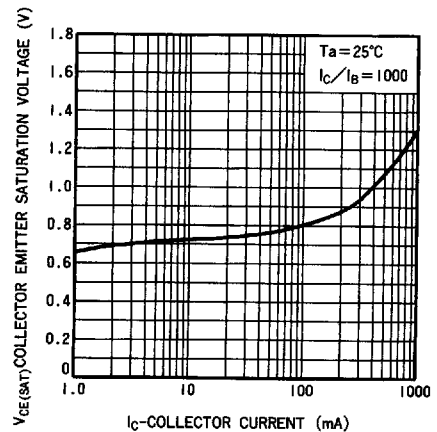


Figure 6

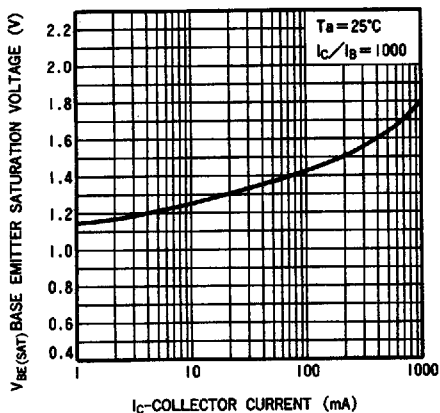


Figure 7

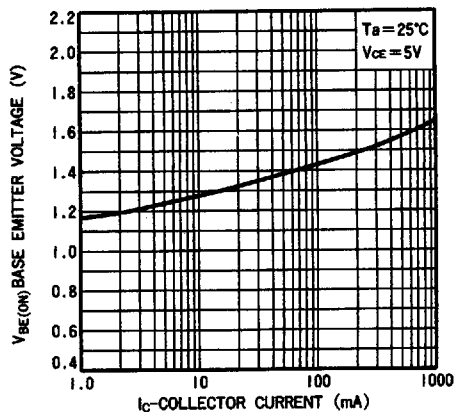


Figure 8

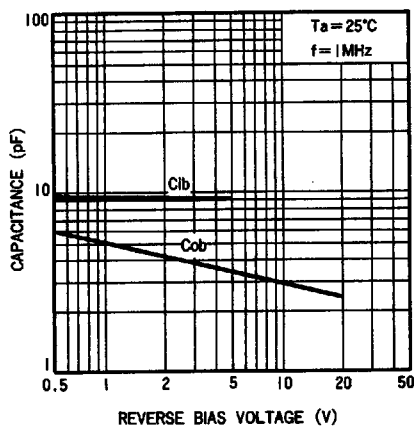


Figure 9

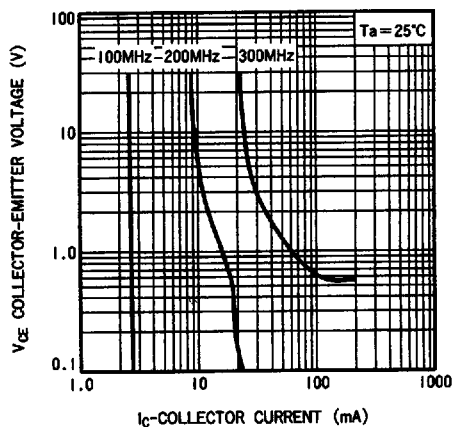


Figure 10

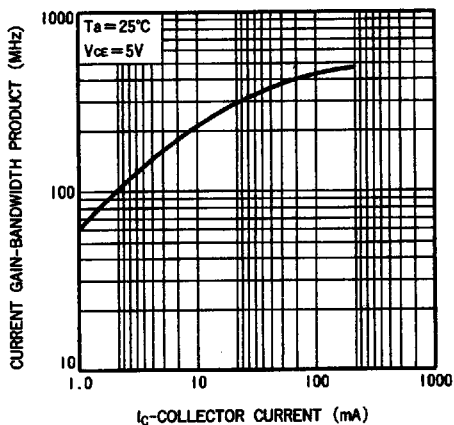


Figure 11

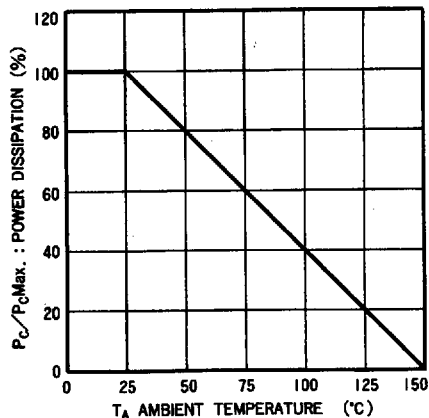


Figure 12