

Die no. D-69

NPN Darlington transistor

These are epitaxial planar NPN silicon Darlington transistors.

Features

- available in the following packages:
 - SST3 (SST, SOT-23)
 - MPT3 (MPT, SOT-89), see page 300
- collector-to-emitter breakdown voltage, $BV_{CES} = 60 \text{ V}$ (min) at $I_C = 100 \mu\text{A}$
- high DC current gain, $h_{FE} = 10\,000$ (min) at $I_C = 100 \text{ mA}$
- high transition frequency, typically $f_T = 200 \text{ MHz}$ at $I_C = 10 \text{ mA}$

Device types

Package style	Part number	Part marking
SST3 (SOT-23)	SSTA28	RAT
MPT3 (SOT-89)	RXT-A28	DH

Applications

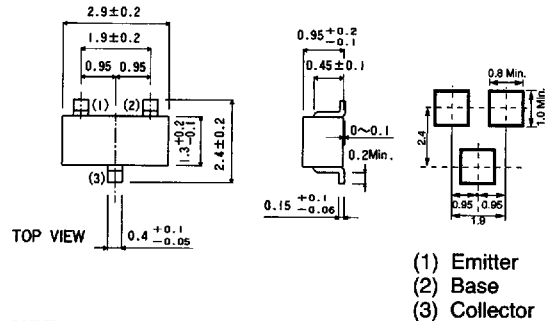
- extremely high current gain applications

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

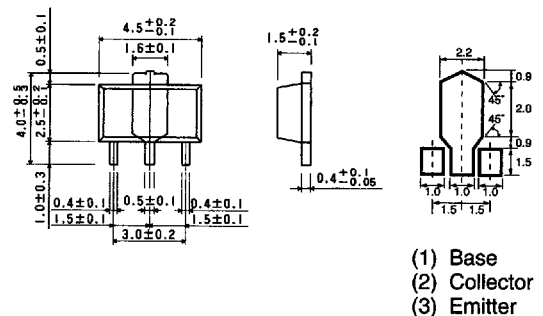
Parameter	Symbol	Limits	Unit	Conditions
Collector-to-base voltage	V_{CBO}	60	V	
Collector-to-emitter voltage	V_{CEO}	60	V	
Emitter-to-base voltage	V_{EBO}	10	V	
Collector current	I_C	500	mA	Direct current (DC)
Power dissipation	SST3 (SOT-23)	200	mW	For derating, see derating curve following
	MPT3 (SOT-89)			
Junction temperature	T_j	-55 ~ +150	$^\circ\text{C}$	

Dimensions (Units : mm)

SST3



MPT3



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}	60			V	$I_C = 100 \mu\text{A}$
Collector-to-emitter breakdown voltage	BV_{CES}	60			V	$I_C = 100 \mu\text{A}$
Emitter-to-base breakdown voltage	BV_{EBO}	10			V	$I_E = 10 \mu\text{A}$
Collector cutoff current	I_{CBO}			100	nA	$V_{CB} = 50 \text{ V}$
Emitter cutoff current	I_{EBO}			100	nA	$V_{BE} = 10 \text{ V}$
Emitter cutoff current	I_{CES}			500	nA	$V_{CE} = 50 \text{ V}$
DC current gain	h_{FE}	10 000				$I_C/I_B = 10 \text{ mA}/5 \text{ V}$
		10 000				$I_C/I_B = 100 \text{ mA}/5 \text{ V}$
Collector-to-emitter saturation voltage	$V_{CE(sat)}$		0.7	1.2	V	$I_C/I_B = 10 \text{ mA}/0.01 \text{ mA}$
			0.8	1.5		$I_C/I_B = 100 \text{ mA}/10 \text{ mA}$
Base emitter voltage	$V_{BE(on)}$		1.4	2.0	V	$I_C = 100 \text{ mA}, V_{CE} = 5 \text{ V}$
AC current gain	h_{fe}	1.25	2.4			$I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$
Collector output capacitance	C_{ob}		5	8	pF	$V_{CB} = 10 \text{ V}, I_E = 0, f = 100 \text{ kHz}$
Transition frequency	f_T	125	200		MHz	$V_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}, f = 100 \text{ MHz}$

Electrical characteristic curves

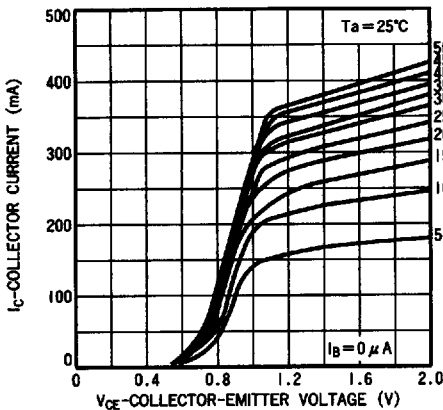


Figure 1

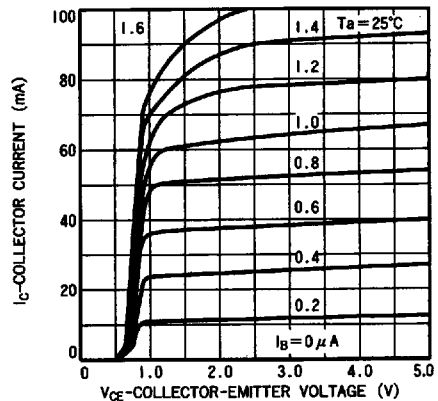


Figure 2

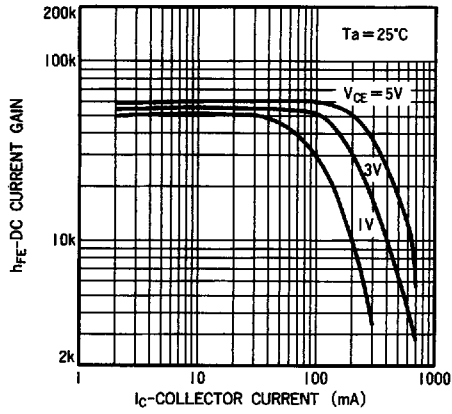


Figure 3

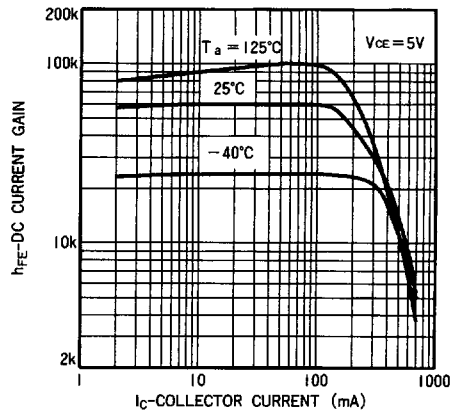


Figure 4

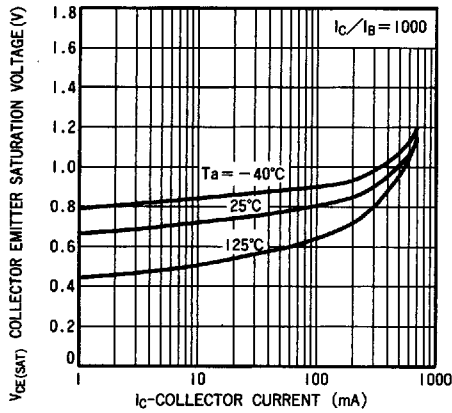


Figure 5

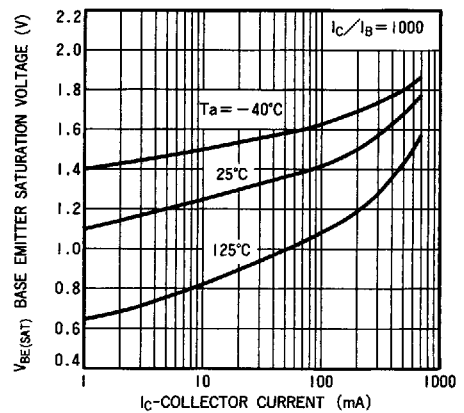


Figure 6

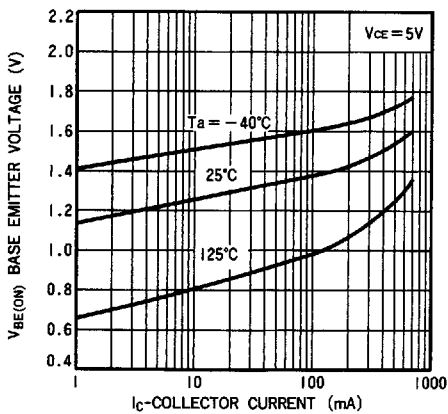


Figure 7

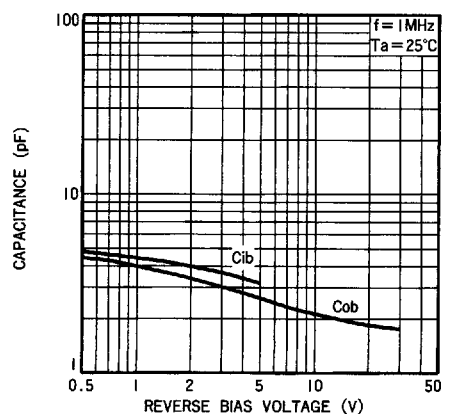


Figure 8

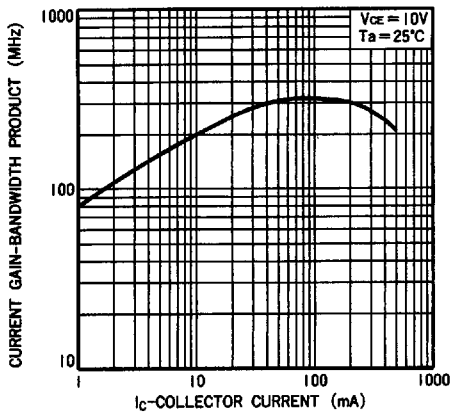


Figure 9

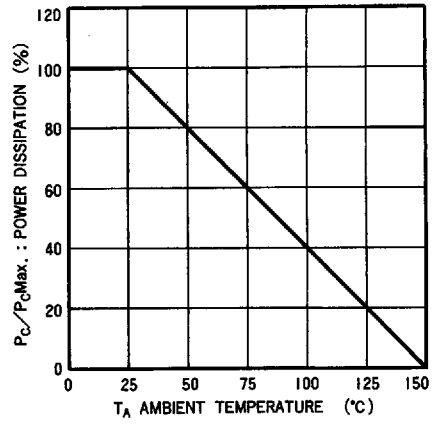


Figure 10