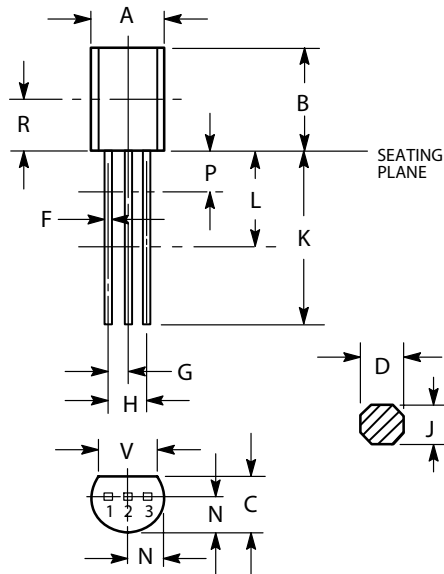


POWER TRANSISTOR E13003

SWITCHING REGULATOR APPLICATION

- High speed switching
- Suitable for switching regulator and motor control
- Case : TO-92 molded plastic body

TO-92



DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.022	0.46	0.56
F	0.016	0.019	0.41	0.48
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.135	---	3.43	---
V	0.135	---	3.43	---

NPN SILICON TRANSISTOR

FEATURES $T_c=25^\circ\text{C}$ unless otherwise specified

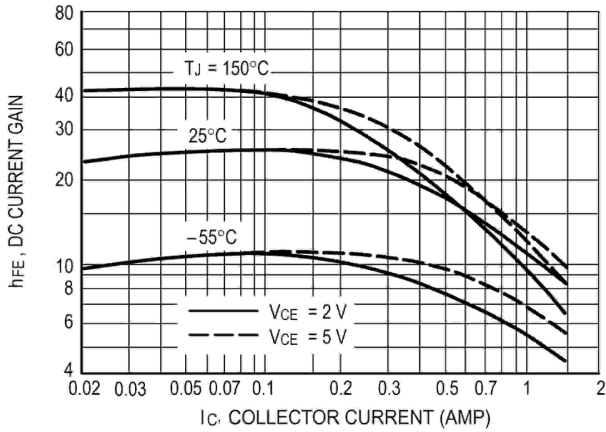
Parameter	Symbol	Value	UNIT
Collector dissipation	P_c	20	W
Collector current (DC)	I_c	1.5	A
Collector current (Pulse)	I_{cP}	3	A
Operating and storage junction temperature range	T_J, T_{STG}	-55 °C to +150 °C	°C

ELECTRICAL CHARACTERISTICS $T_c=25^\circ\text{C}$ unless otherwise specified

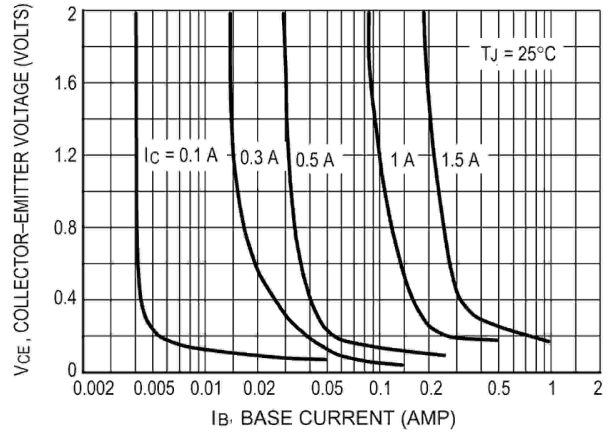
Parameter	Symbol	Test conditions	MIN	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	$I_c=1\text{mA}, I_E=0$	700		V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$	$I_c=10\text{mA}, I_B=0$	400		V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	$I_E=1\text{mA}, I_C=0$	9		V
Collector cut-off current	I_{CBO}	$V_{CB}=700\text{V}, I_E=0$		1	mA
Collector cut-off current	I_{CEO}	$V_{CE}=400\text{V}, I_B=0$		500	μA
Emitter cut-off current	I_{EBO}	$V_{EB}=9\text{V}, I_C=0$		1	mA
DC current gain	$h_{FE(1)}$	$V_{CE}=2\text{V}, I_c=0.5\text{mA}$	8	40	
	$h_{FE(2)}$	$V_{CE}=10\text{V}, I_c=0.5\text{mA}$	5		
Collector-emitter saturation voltage	V_{CEsat}	$I_c=1\text{A}, I_B=250\text{mA}$		1	V
Base-emitter saturation voltage	V_{BEsat}	$I_c=1\text{A}, I_B=250\text{mA}$		1.2	V
Base-emitter voltage	V_{BE}	$I_E=2\text{A}$		3	V
Transition frequency	f_T	$V_{CE}=10\text{V}, I_c=100\text{mA}$ $f=1\text{MHz}$	5		MHz
Fall time	t_f	$I_c=1\text{A}, I_{B1}=-I_{B2}=0.2\text{mA},$		0.5	μs
Storage time	t_s	$V_{CC}=100\text{V}$		2.5	μs



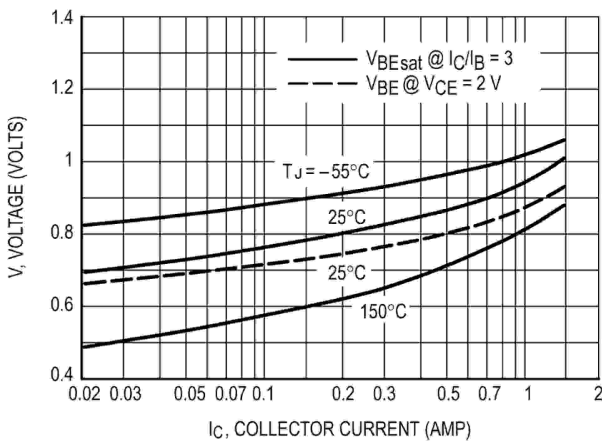
RATINGS AND CHARACTERISTIC CURVES E13003



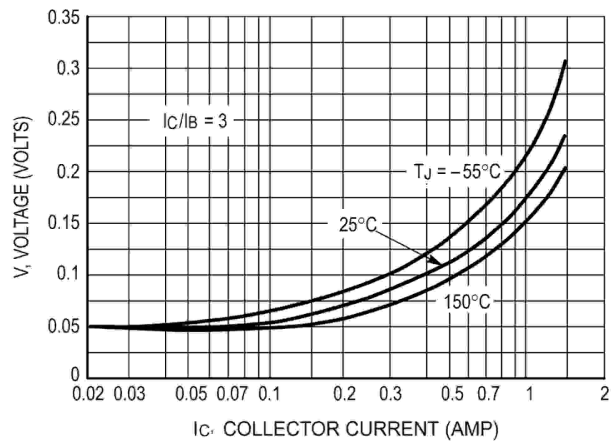
DC Current Gain



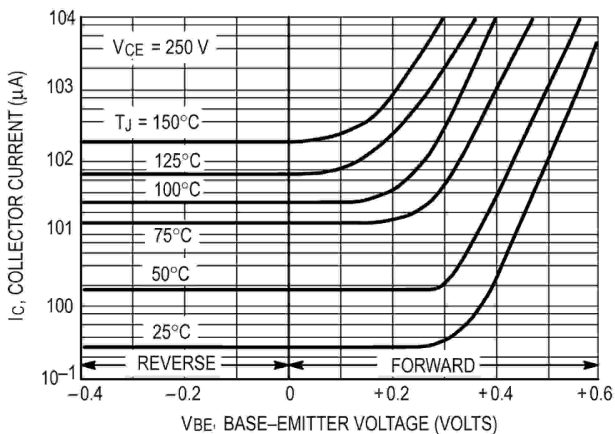
Collector Saturation Region



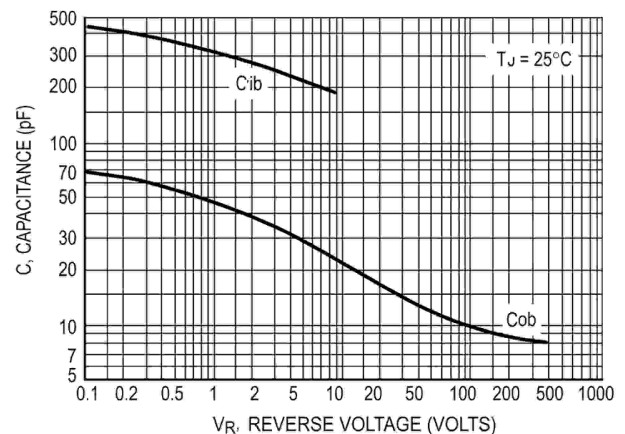
Base-Emitter Voltage



Collector-Emitter Saturation Region



Collector Cutoff Region



Capacitance