Ordering number:EN2236D

NPN Triple Diffused Planar Silicon Transistor

2SC3993

800V/16A Switching Regulator Applications

Features

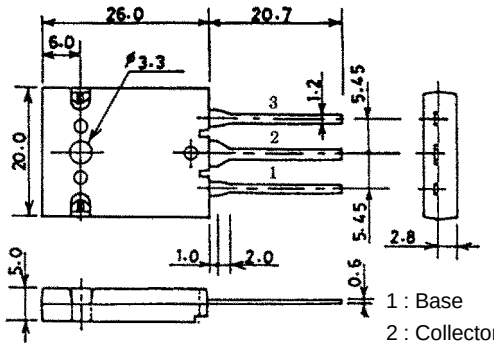
- High breakdown voltage, high reliability.
- Fast switching speed.
- Wide ASO.
- Adoption of MBIT process.

Package Dimensions

unit:mm

2048B

[2SC3993]



1 : Base
2 : Collector
3 : Emitter
SANYO : TO-3PBL

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		1100	V
Collector-to-Emitter Voltage	V_{CEO}		800	V
Emitter-to-Base Voltage	V_{EBO}		7	V
Collector Current	I_C		16	A
Collector Current (Pulse)	I_{CP}	PW≤300μs, Duty cycle≤10%	40	A
Base Current	I_B		8	A
Collector Dissipation	P_C	Tc=25˚C	250	W
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=800V, I_E=0			10	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=5V, I_C=0			10	μA
DC Current Gain	$h_{FE}1$	V_{CE}=5V, I_C=1.2A	10*		40*	
	$h_{FE}2$	V_{CE}=5V, I_C=6A	8			
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=1.2A		15		MHz
Output Capacitance	C_{ob}	V_{CB}=10V, f=1MHz		320		pF

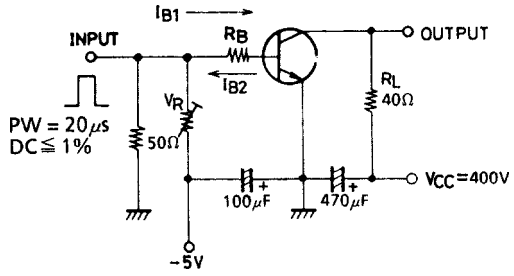
* : The 2SC3993 are classified by 1.2A h_{FE} as follows :

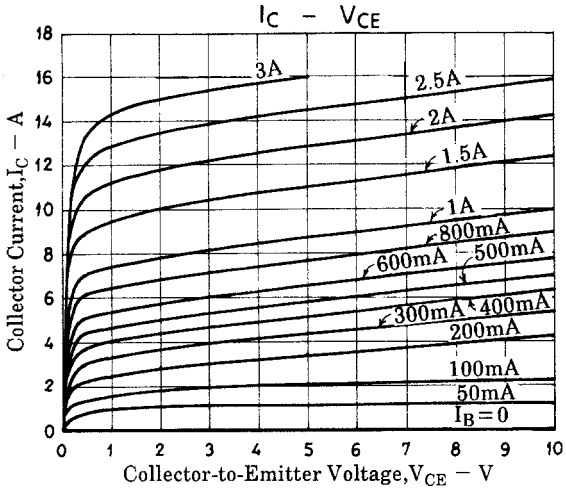
10	K	20	15	L	30	20	M	40

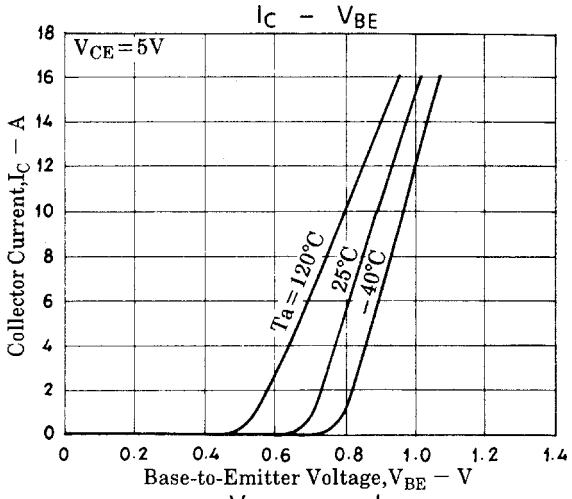
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

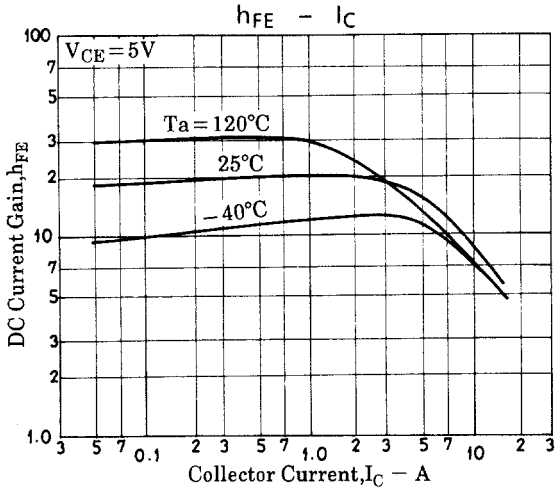
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=6A, I_B=1.2A			2.0	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=6A, I_B=1.2A			1.5	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=1mA, I_E=0	1100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=10mA, R_{BE}=∞	800			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=1mA, I_C=0	7			V
Collector-to-Emitter Sustain Voltage	$V_{CEX(sus)}$	I_C=8A, I_{B1}=–I_{B2}=–1.6A, L=500μH, clamped	800			V
Turn-ON Time	t_{on}	V_{CC}=400V, 5I_{B1}=–2.5I_{B2}=I_C=10A, R_L=40Ω			0.5	μs
Storage Time	t_{stg}	V_{CC}=400V, 5I_{B1}=–2.5I_{B2}=I_C=10A, R_L=40Ω			3.0	μs
Fall Time	t_f	V_{CC}=400V, 5I_{B1}=–2.5I_{B2}=I_C=10A, R_L=40Ω			0.3	μs

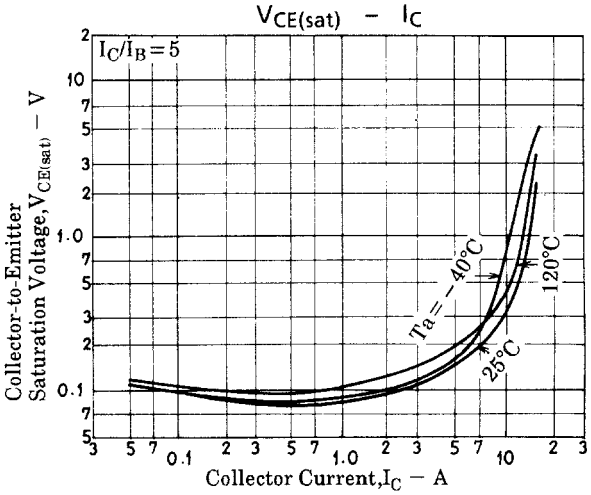
Switching Time Test Circuit

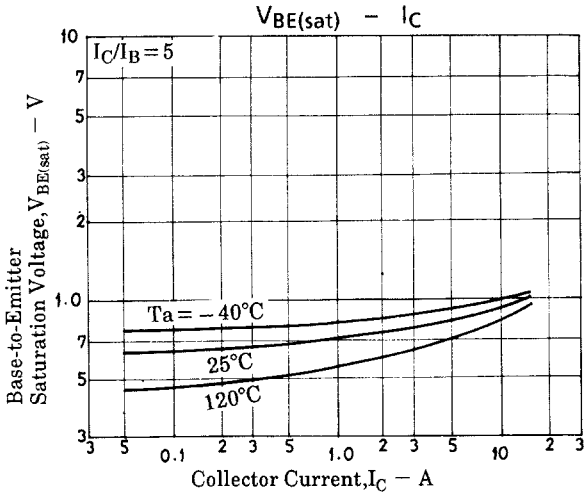


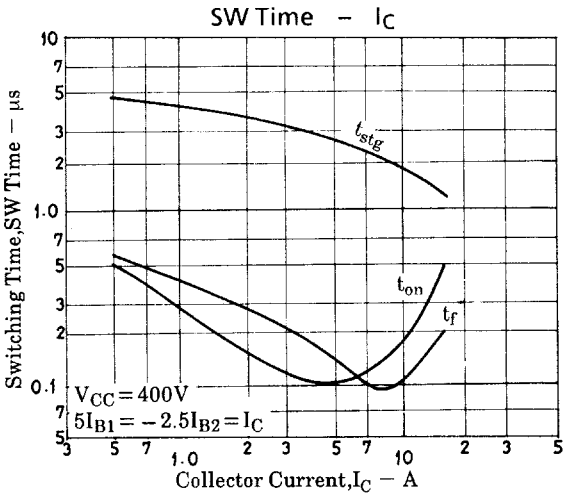


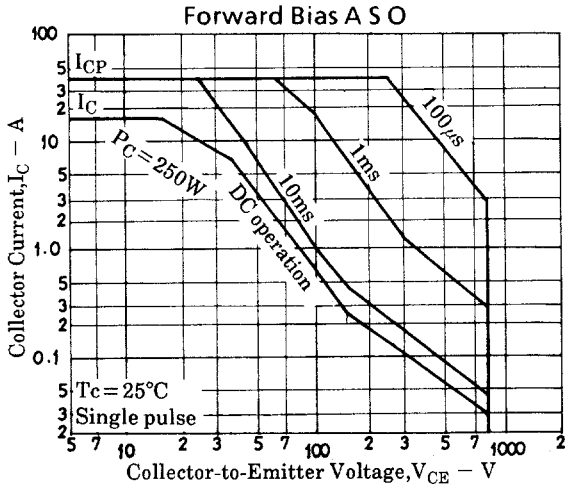


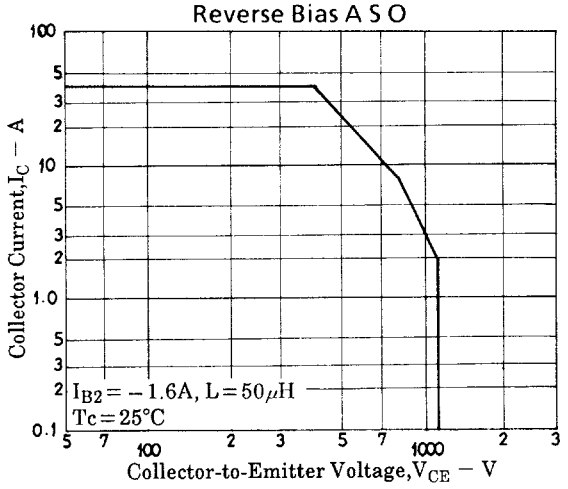


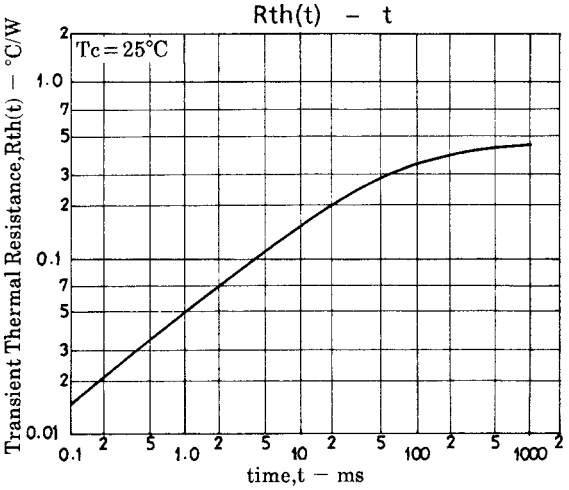


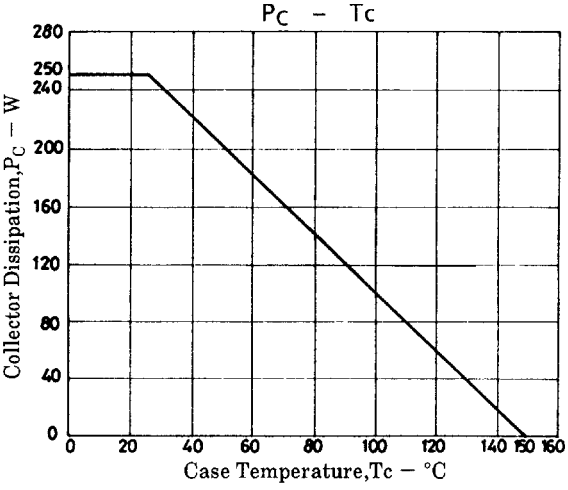

VBE(sat) – IC
IC/IB=5
Ta=–40°C
25°C
120°C
Base-to-Emitter Saturation Voltage,VBE(sat) – V
Collector Current,IC – A


SW Time – IC
tstg
ton
tf
VCC=400V
5IB1=–2.5IB2=IC
Switching Time,SW Time – µs
Collector Current,IC – A


Forward Bias A S O
ICP
IC
PC=250W
DC operation
10ms
1ms
100µs
Tc=25°C
Single pulse
Collector Current,IC – A
Collector-to-Emitter Voltage,VCE – V


Reverse Bias A S O
IB2=–1.6A, L=50µH
Tc=25°C
Collector Current,IC – A
Collector-to-Emitter Voltage,VCE – V


Rth(t) – t
Tc=25°C
Transient Thermal Resistance,Rth(t) – °C/W
time,t – ms


PC – Tc
Collector Dissipation,PC – W
Case Temperature,Tc – °C