Ordering number:EN996B

NPN Triple Diffused Planar Silicon Transistor

2SC3039

400V/7A Switching Regulator Applications

Features

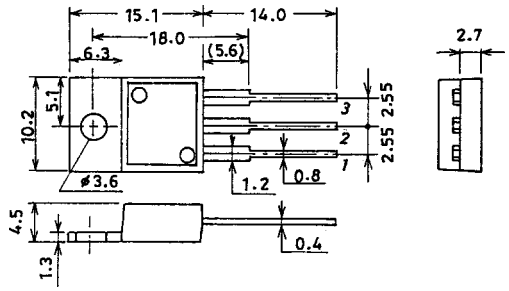
- High breakdown voltage (V_{CBO}≥500V).
- Fast switching speed.
- Wide ASO.

Package Dimensions

unit:mm

2010C

[2SC3039]



JEDEC : TO-220AB
EIAJ : SC-46

1 : Base
2 : Collector
3 : Emitter

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		500	V
Collector-to-Emitter Voltage	V_{CEO}		400	V
Emitter-to-Base Voltage	V_{EBO}		7	V
Collector Current	I_C		7	A
Collector Current (Pulse)	I_{CP}	PW≤300μs, Duty Cycle≤10%	14	A
Base Current	I_B		3	A
Collector Dissipation	P_C		1.75	W
		Tc=25˚C	50	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}=400V, 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=0.8A	15*		50*	
	$h_{FE}2$	V_{CE}=5V, I_C=4A	8			
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)}$	I_C=4A, I_B=0.8A			1.0	V
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	I_C=4A, I_B=0.8A			1.5	V

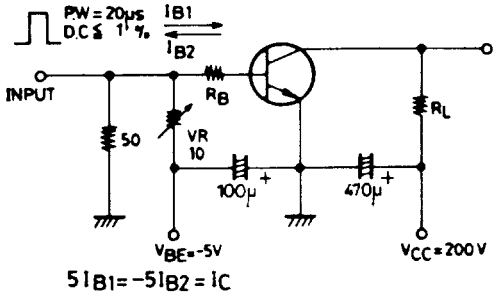
* : The $h_{FE}1$ of the 2SC3039 is classified as follows. When specifying the $h_{FE}1$ rank, specify two ranks or more in principle.

15	L	30	20	M	40	30	N	50

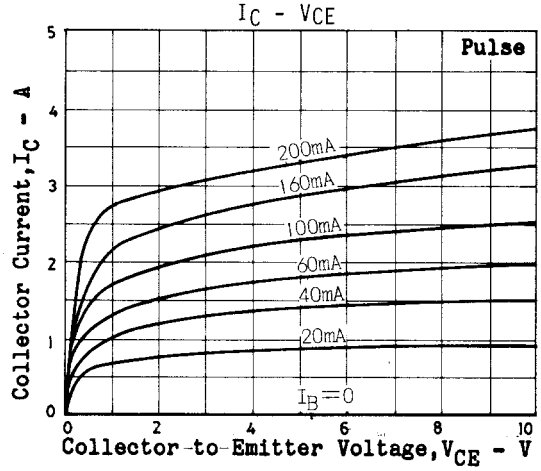
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

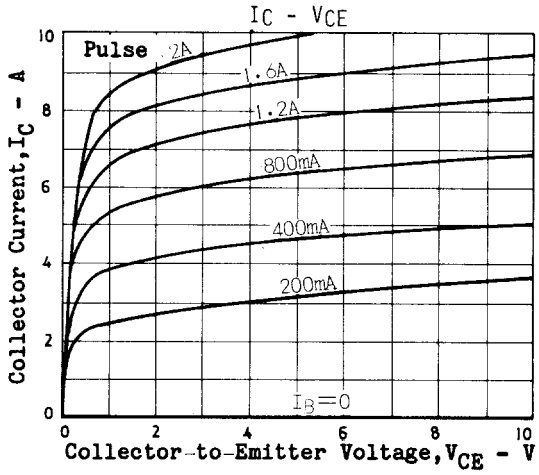
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	f_T	V_{CE}=10V, I_C=0.8A		20		MHz
Output Capacitance	C_{ob}	V_{CB}=10V, f=1MHz		80		pF
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=1mA, I_E=0	500			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=5mA, R_{BE}=∞	400			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=1mA, I_C=0	7			V
Collector-to-Emitter Sustain Voltage	$V_{CEO(sus)}$	I_C=7A, I_B=1.4A, L=50μH	400			V
Collector-to-Emitter Sustain Voltage	$V_{CEX(sus)1}$	I_C=7A, I_{B1}=1.4A, L=200μH, I_{B2}=–1.4A, clamped	400			V
	$V_{CEX(sus)2}$	I_C=1.5A, I_{B1}=0.3A, L=200μH, I_{B2}=–0.3A, clamped	450			V
Turn-ON Time	t_{on}	I_C=5A, I_{B1}=1A, I_{B2}=–1A, R_L=40Ω, V_{CC}=200V			1.0	μs
Storage Time	t_{stg}	I_C=5A, I_{B1}=1A, I_{B2}=–1A, R_L=40Ω, V_{CC}=200V			2.5	μs
Fall Time	t_f	I_C=5A, I_{B1}=1A, I_{B2}=–1A, R_L=40Ω, V_{CC}=200V			1.0	μs

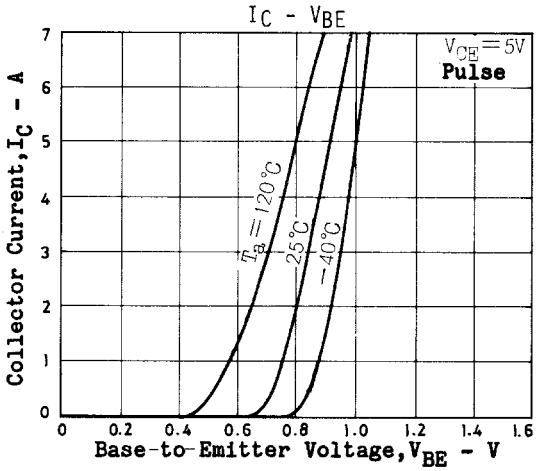
Switching Time Test Circuit

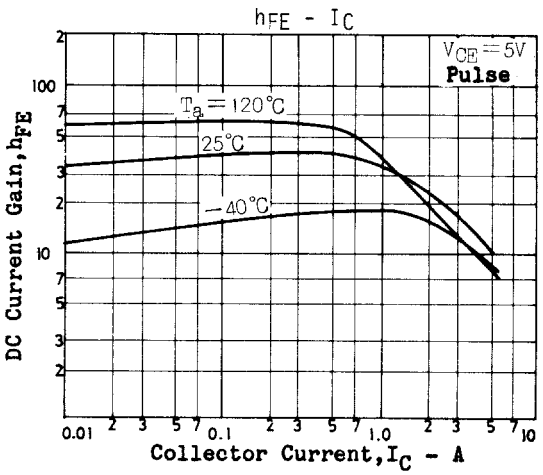


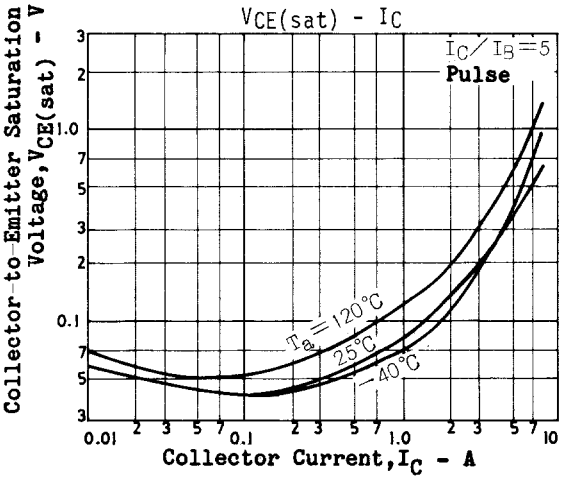
Unit (resistance : Ω, capacitance : F)

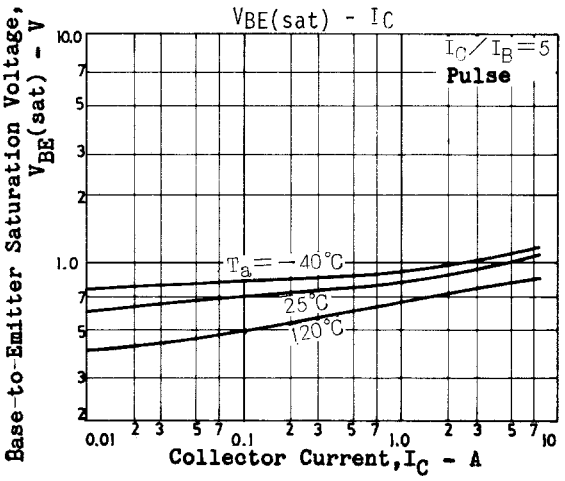


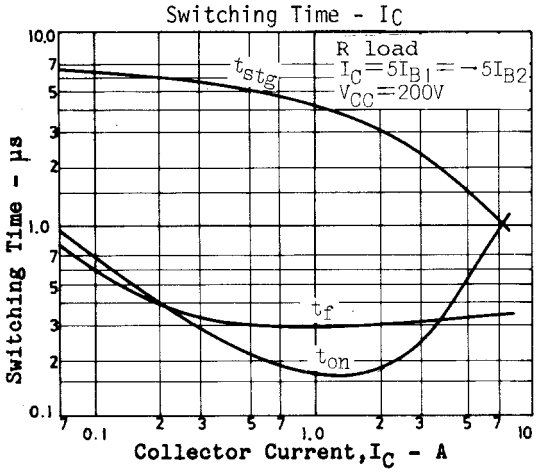


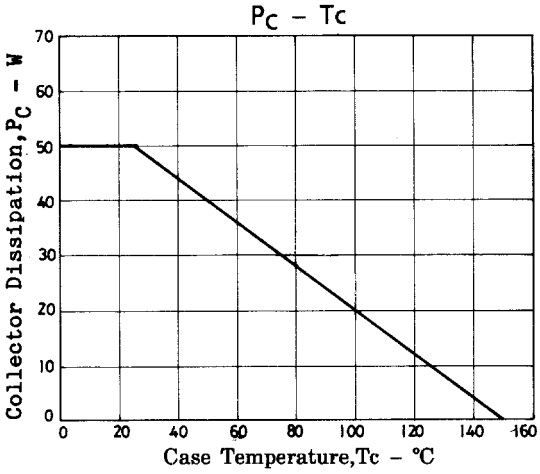


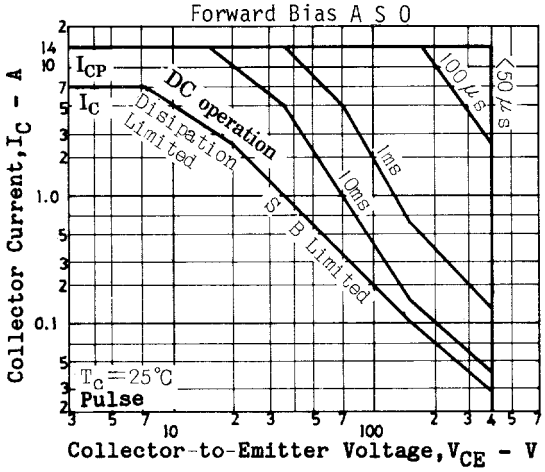


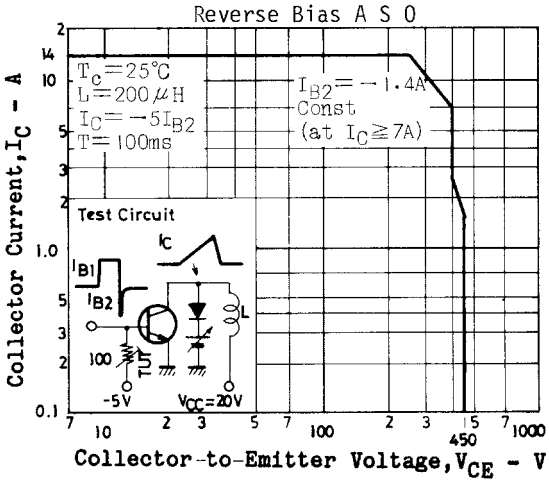

VCE(sat) - IC
IC / IB = 5
Pulse
Ta = 120°C
25°C
−40°C
Collector-to-Emitter Saturation Voltage, VCE(sat) - V
Collector Current, IC - A


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


Switching Time - IC
R load
IC = 5IB1 = −5IB2
VCC = 200V
tstg
tf
ton
Switching Time - μs
Collector Current, IC - A


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


Forward Bias A S O
ICP
IC
DC operation
Dissipation Limited
S/B Limited
100μs
50μs
1ms
10ms
Tc = 25°C
Pulse
Collector Current, IC - A
Collector-to-Emitter Voltage, VCE - V


Reverse Bias A S O
Tc = 25°C
L = 200μH
IC = −5IB2
T = 100ms
IB2 = −1.4A
Const
(at IC ≧ 7A)
Test Circuit
IC
IB1
IB2
L
100
TUT
-5V
VCC = 20V
Collector Current, IC - A
Collector-to-Emitter Voltage, VCE - V