NEC

NPN SILICON POWER TRANSISTOR

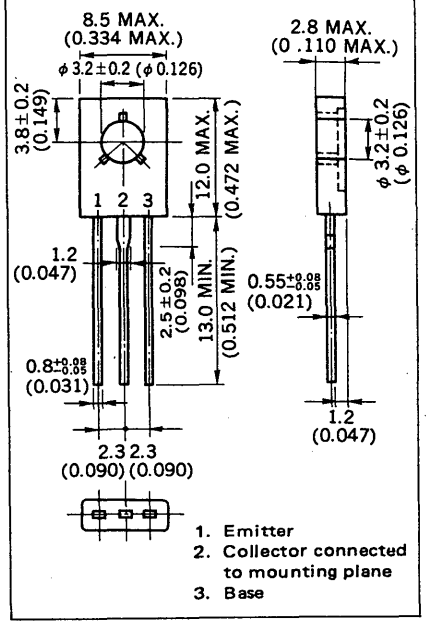
2SC2752

DESCRIPTION The 2SC2752 is suitable for Low Power Switching regulator, DC-DC converter and High Voltage Switch.

FEATURES

- High Breakdown Voltage.
- Low Collector Saturation Voltage.
- High Speed Switching.
- Complementary to the NEC 2SA1156 PNP Transistor.

PACKAGE DIMENSIONS
in millimeters (inches)



ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature	−55 to +150	°C
Junction Temperature	+150 °C Maximum	

Maximum Power Dissipations

Total Power Dissipation (T_a = 25 °C)	1.0	W
Total Power Dissipation (T_c = 25 °C)	10	W

Maximum Voltages and Currents (T_a = 25 °C)

V_{CBO}	Collector to Base Voltage	500	V
V_{CEO}	Collector to Emitter Voltage	400	V
V_{EBO}	Emitter to Base Voltage	7.0	V
$I_{C(DC)}$	Collector Current	0.5	A
$I_{C(pulse)}$*	Collector Current	1.0	A
$I_{B(DC)}$	Base Current	0.25	A

* PW ≦ 10 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE1} *	DC Current Gain	20		80	—	V_{CE} = 5.0 V, I_C = 0.05 A
h_{FE2} *	DC Current Gain	10			—	V_{CE} = 5.0 V, I_C = 0.3 A
t_{on}	Turn On Time			1.0	μs	I_C = 0.3 A, I_{B1} = $-I_{B2}$ = 0.06 A, PW ≒ 50 μs R_L = 500 Ω, V_{CC} ≒ 150 V
t_{stg}	Storage Time			2.5	μs	
t_f	Fall Time			1.0	μs	
$V_{ECO(sus)}$	Collector to Emitter Sustaining Voltage	400			V	Table 1, I_C = 0.3 A, I_{B1} = 0.06 A, L = 10 mH
$V_{CEX(sus)1}$	Collector to Emitter Sustaining Voltage	450			V	Table 1, I_C = 0.3 A, I_{B1} = $-I_{B2}$ = 0.06 A V_{clamp} = Rated V_{CEX}, T_a = 125 °C, L = 10 mH
$V_{CEX(sus)2}$	Collector to Emitter Sustaining Voltage	400			V	Table 1, I_C = 0.6 A, I_{B1} = 0.2 A, I_{B2} = −0.06 A V_{clamp} = Rated V_{CEX}, T_a = 125 °C, L = 10 mH
I_{CER}	Collector Cutoff Current			1.0	mA	V_{CE} = 400 V, R_{BE} = 51 Ω, T_a = 125 °C
I_{CEX1}	Collector Cutoff Current			10	μA	V_{CE} = 400 V, $V_{BE(OFF)}$ = −1.5 V
I_{CEX2}	Collector Cutoff Current			1.0	mA	V_{CE} = 400 V, $V_{BE(OFF)}$ = −1.5 V, T_a = 125 °C
I_{EBO}	Emitter Cutoff Current			10	μA	V_{EB} = 5.0 V, I_C = 0
$V_{CE(sat)}$*	Collector Saturation Voltage			1.0	V	I_C = 0.3 A, I_B = 0.06 A
$V_{BE(sat)}$*	Base Saturation Voltage			1.2	V	I_C = 0.3 A, I_B = 0.06 A

* Pulsed / PW ≦ 350 μs, Duty Cycle ≦ 2 %

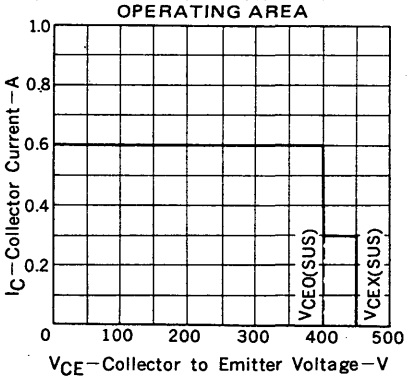
Classification of h_{FE1}

Rank	M	L	K
Range	20 to 40	30 to 60	40 to 80

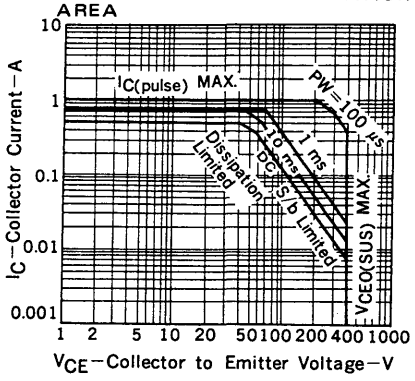
Test Conditions: V_{CE} = 5.0 V, I_C = 0.05 A

TYPICAL CHARACTERISTICS (T_a = 25 °C)

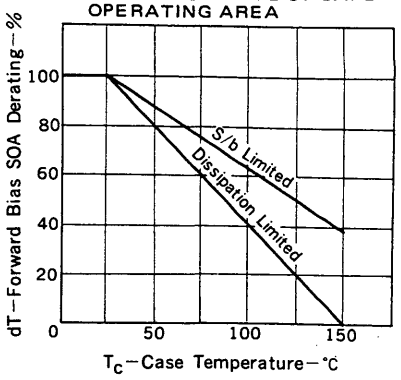
REVERSE BIAS SAFE OPERATING AREA



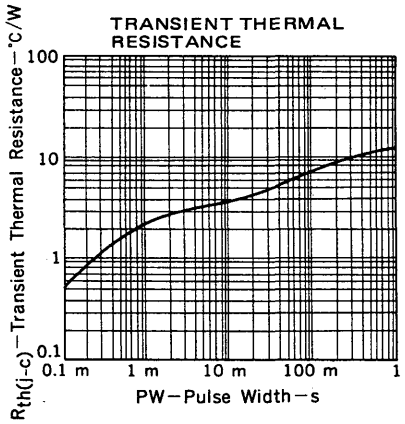
FORWARD BIAS SAFE OPERATION AREA



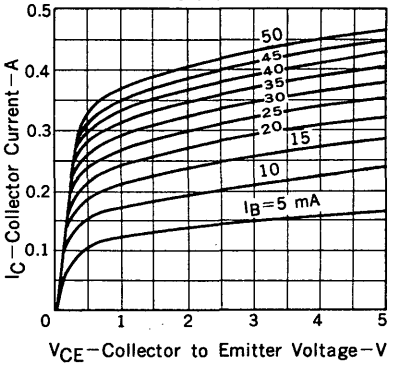
DERATING CURVE OF SAFE OPERATING AREA



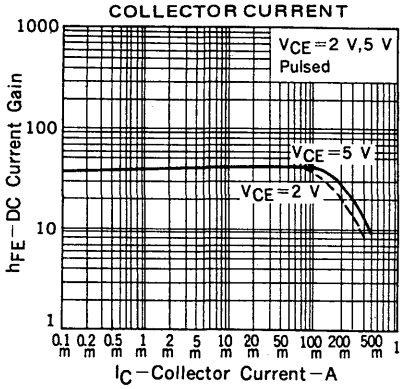
TRANSIENT THERMAL RESISTANCE



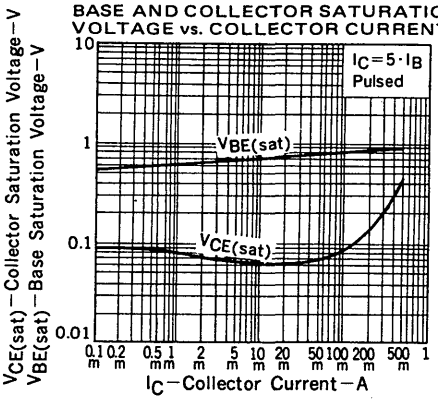
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



TURN ON TIME, STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT

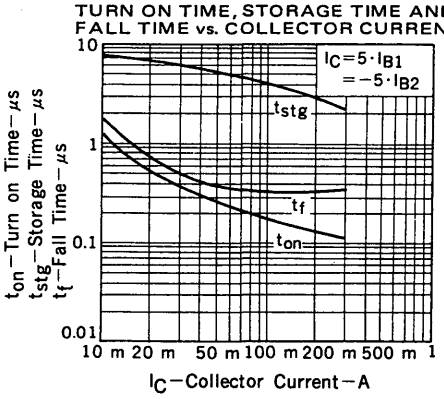
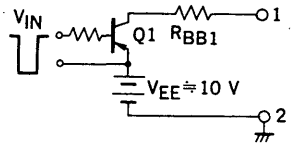
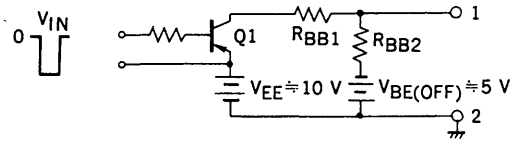
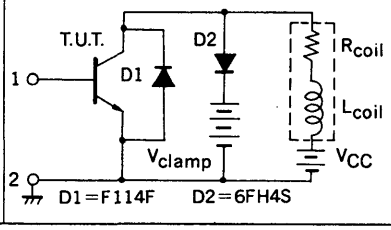
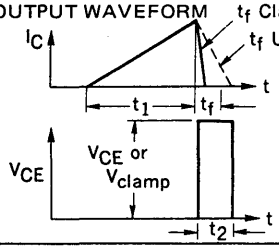


TABLE 1. – TEST CONDITIONS FOR DYNAMIC PERFORMANCE

	V_{CEO} (SUS)	V_{CEX} (SUS)	RESISTIVE SWITCHING
INPUT CONDITIONS	 PW Varied to Attain I_C = 10 A	 PW Varied to Attain I_C = 10 A Duty Cycle ≦ 2 % Q_1 = 2SA959	
CIRCUIT VALUES	L_{coil} = 10 mH, V_{CC} = 10 V R_{coil} ≦ 0.5 Ω V_{clamp} (Unclamped)	L_{coil} = 10 mH, V_{CC} = 20 V R_{coil} ≦ 0.5 Ω V_{clamp} = Rated V_{CEX} Value	R_L = 500 Ω, V_{CC} ≒ 150 V
TEST CIRCUITS	INDUCTIVE TEST CIRCUIT 	OUTPUT WAVEFORM  $t_1 = \frac{L_{coil}(I_{C\ pk})}{V_{CC}}$ $t_2 = \frac{L_{coil}(I_{C\ pk})}{V_{clamp}}$	RESISTIVE TEST CIRCUIT