NEC

SILICON TRANSISTORS
2SC2885, 2946, 2946(1)

NPN SILICON EPITAXIAL TRANSISTOR FOR HIGH-VOLTAGE HIGH-SPEED SWITCHING

The 2SC2885, 2946, and 2946(1) are high-voltage high-speed switching power transistors featuring a small package (MP-3) which is suitable for high-density mounting. These transistors are ideal for drivers in DC/DC converters and switching regulators.

There are three types of transistors selectable according to the reliability requirments: 2SC2946 and 2946(1) for industrial use, 2SC2885 for general use. The 2SC2946(1) is produced with leads so as to enable mounting directly in a hybrid IC.

QUALITY GRADES

- Standard

  Please refer to “Quality Grades on NEC Semiconductor Devices” (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	330	V
Collector to emitter voltage	V_{CEO}	200	V
Emitter to base voltage	V_{EBO}	7.0	V
Collector current (DC)	$I_{C(DC)}$	2.0	A
Collector current (pulse)	$I_{C(pulse)}$*	4.0	A
Base current (DC)	$I_{B(DC)}$	1.0	A
Total power dissipation	P_T (Tc = 25°C)	15	W
Total power dissipation	P_T (Ta = 25°C)	600	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

* PW ≤ 300 μs, duty cycle ≤ 10%

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Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CEO(SUS)}$	I_C = 1.0 A, I_B = 0.1 A, L = 500 μH*	200			V
Collector to emitter voltage	$V_{CEX(SUS)}$	I_C = 1.0 A, I_{B1} = $-I_{B2}$ = 0.1 A* Ta = 125°C, L = 180 μH, clamped	200			V
Collector cutoff current	I_{CBO}	V_{CB} = 250 V, I_E = 0			10	μA
Collector cutoff current	I_{CEX1}	V_{CE} = 250 V, $V_{BE(OFF)}$ = –1.5 V			10	μA
Collector cutoff current	I_{CEX2}	V_{CE} = 250 V, $V_{BE(OFF)}$ = –1.5 V, Ta = 125°C			1.0	mA
Emitter cutoff current	I_{EBO}	V_{EB} = 5.0 V, I_C = 0			1.0	μA
DC current gain	h_{FE1}	V_{CE} = 5.0 V, I_C = 0.1 A*	20	60	160	
	h_{FE2}	V_{CE} = 5.0 V, I_C = 1.0 A*	15			
Collector saturation voltage	$V_{CE(sat)}$	I_C = 1.0 A, I_B = 0.1 A*			1.0	V
Base saturation voltage	$V_{BE(sat)}$	I_C = 1.0 A, I_B = 0.1 A*			1.5	V
Turn-on time	t_{on}	I_C = 1.0 A, R_L = 100 Ω I_{B1} = $-I_{B2}$ = 0.1 A, V_{CC} ≅ 100 V Refer to the test circuit.			1.0	μs
Storage time	t_{stg}				2.0	μs
Fall time	t_f				1.0	μs

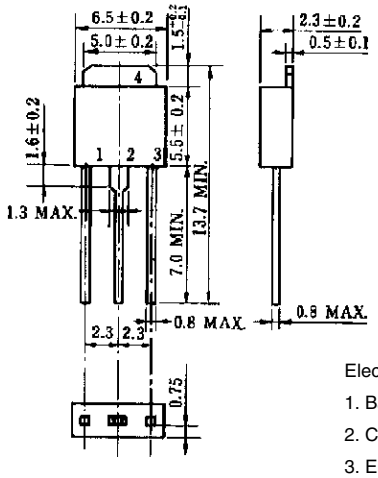
* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

h_{FE} CLASSIFICATION

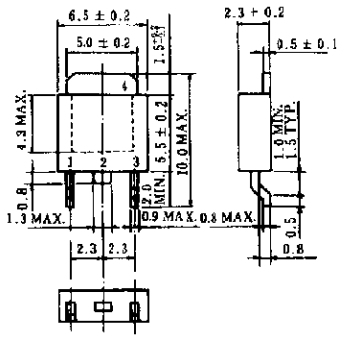
Marking	N	M	L	K
h_{FE1}	20 to 50	30 to 70	50 to 100	80 to 160

PACKAGE DRAWING (UNIT: mm)

2SC2885, 2SC2946



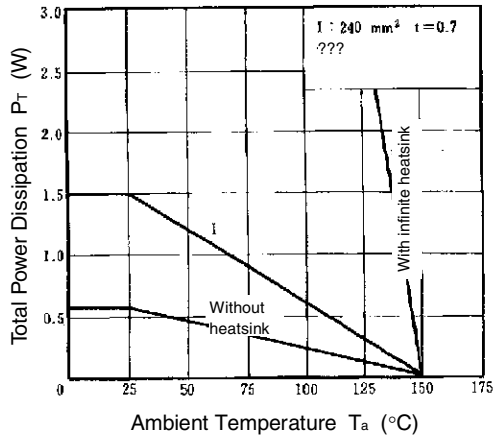
2SC2946(1)



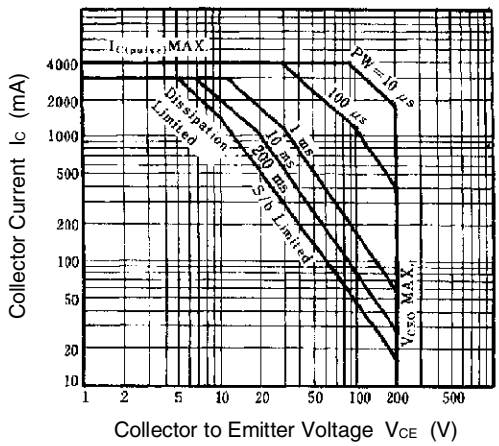
Electrode Connection
1. Base
2. Collector
3. Emitter
4. Collector (fin)

TYPICAL CHARACTERISTICS (Ta = 25°C)

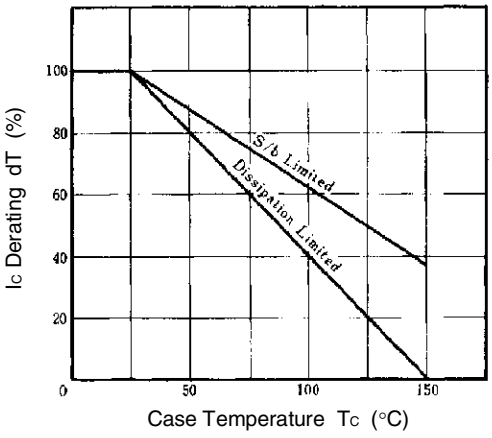
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



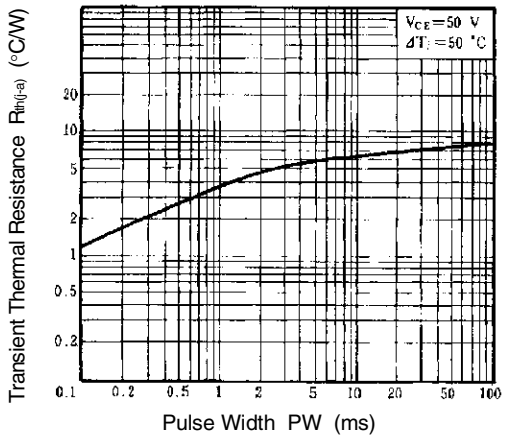
FORWARD BIAS SAFE OPERATING AREA



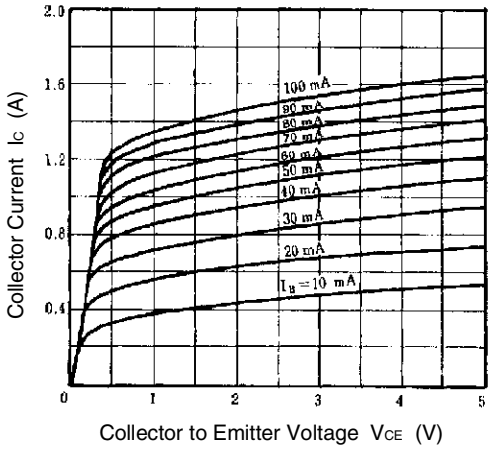
DERATING CURVE OF SAFE OPERATING AREA



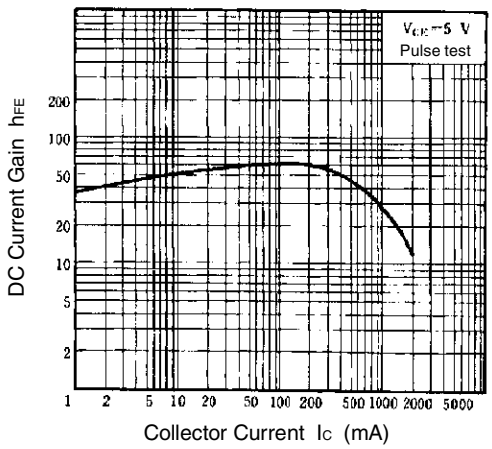
TRANSIENT THERMAL RESISTANCE



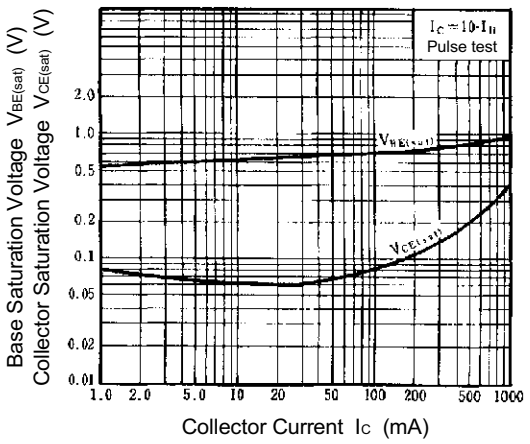
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



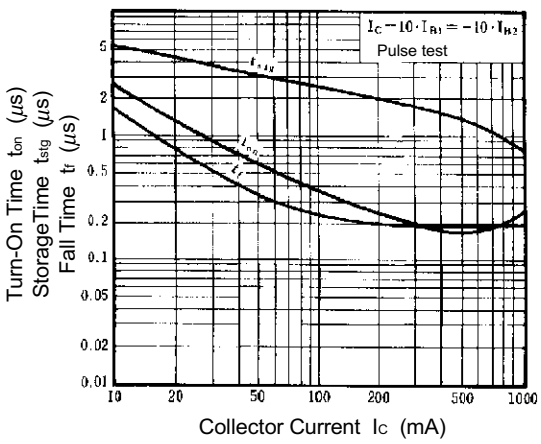
DC CURRENT GAIN vs. COLLECTOR CURRENT



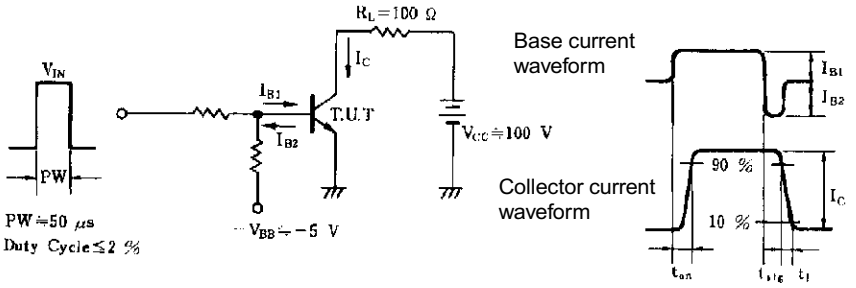
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



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



SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



[MEMO]

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