

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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SILICON POWER TRANSISTORS

NTC2885, NTC2946, NTC2946(1)

HIGH SPEED HIGH CURRENT SWITCHING NPN SILICON EPITAXIAL TRANSISTOR

DESCRIPTION

The NTC2885, 2946, 2946(1) are high voltage and high speed switching type power transistors, and are most suitable for driver circuits of DC-DC converters or switching regulators.

These transistors are put in specially designed plastic molded packages called MP-3 and suitable for high density assembling.

The NTC2946, 2946(1) are for industrial use (passed lot reliable test), and NTC2885 are for consumer use.

The NTC2946(1) has trimmed leads and can be directly mounted on hybrid IC's.

ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Currents ($T_a = 25^\circ\text{C}$)

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
Continuous Collector Current	$I_C(\text{DC})$	2.0	A
Peak Collector Current*	$I_C(\text{pulse})$	4.0	A
Continuous Base Current	$I_B(\text{DC})$	1.0	A

Maximum Power Dissipations

Total Power Dissipation	$P_T(T_c = 25^\circ\text{C})$	15	W
Total Power Dissipation	$P_T(T_a = 25^\circ\text{C})$	600	mW

Maximum Temperatures

Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Temperature			
3.18 mm (1/8 inch) from case for 10 second	T_L	260	$^\circ\text{C}$
Fin Temperature			
Collector Fin for 3 second	T_F	250	$^\circ\text{C}$

* Pulsed PW $\leq 300 \mu\text{s}$, duty cycle $\leq 10\%$.

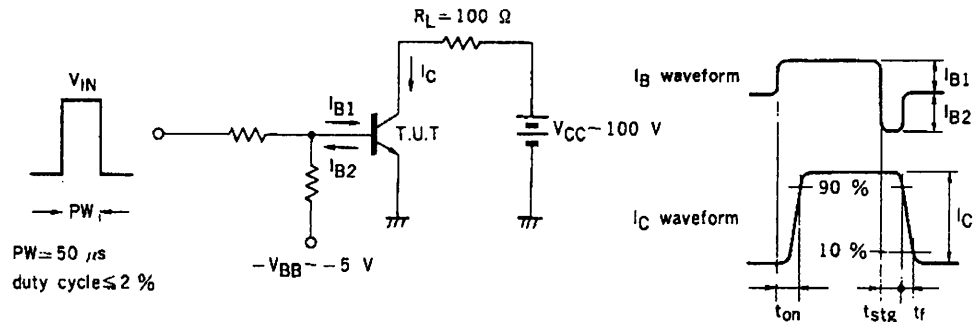
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$ unless otherwise noted)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector to Emitter Sustaining Voltage	$V_{CEO(SUS)}$	200			V	$I_C = 1.0\text{ A}$, $I_B = 0.1\text{ A}$, $L = 500\text{ }\mu\text{H}$ *
	$V_{CEX(SUS)}$	200			V	$I_C = 1.0\text{ A}$, $I_{B1} = -I_{B2} = 0.1\text{ A}$, $T_a = 125^\circ\text{C}$, $L = 180\text{ }\mu\text{H}$, Clamped *
Collector to Base Cutoff Current	I_{CBO}			10	μA	$V_{CB} = 250\text{ V}$, $I_E = 0$
Collector to Emitter Cutoff Current	I_{CEX1}			10	μA	$V_{CE} = 250\text{ V}$, $V_{BE(OFF)} = -1.5\text{ V}$
	I_{CEX2}			1.0	mA	$V_{CE} = 250\text{ V}$, $V_{BE(OFF)} = -1.5\text{ V}$, $T_a = 125^\circ\text{C}$
Emitter to Base Cutoff Current	I_{EBO}			1.0	μA	$V_{EB} = 5.0\text{ V}$, $I_C = 0$
DC Current Gain	h_{FE1}	20	60	160		$V_{CE} = 5.0\text{ V}$, $I_C = 0.1\text{ A}$ *
	h_{FE2}	15				$V_{CE} = 5.0\text{ V}$, $I_C = 1.0\text{ A}$ *
Collector Saturation Voltage	$V_{CE(sat)}$			1.0	V	$I_C = 1.0\text{ A}$, $I_B = 0.1\text{ A}$ *
Base Saturation Voltage	$V_{BE(sat)}$			1.5	V	$I_C = 1.0\text{ A}$, $I_B = 0.1\text{ A}$ *
Turn-on Time	t_{on}			1.0	μs	$I_C = 1.0\text{ A}$, $R_L = 100\text{ }\Omega$
Storage Time	t_{stg}			2.0	μs	$I_{B1} = -I_{B2} = 0.1\text{ A}$, $V_{CC} = 100\text{ V}$
Fall Time	t_f			1.0	μs	See Test Circuit

* $PW \leq 350\text{ }\mu\text{s}$, duty cycle $\leq 2\%$ /Pulsed

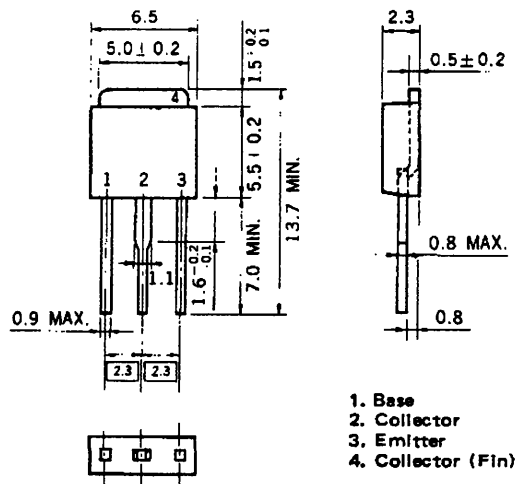
h_{FE} Classification $h_{FE1}/N: 20-50$ $M: 30-70$ $L: 50-100$ $K: 80-160$

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

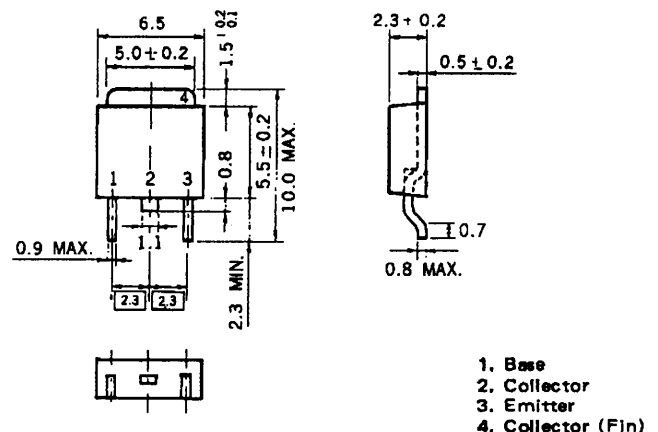


PACKAGE DIMENSIONS (Unit : mm)

NTC2885, NTC2946

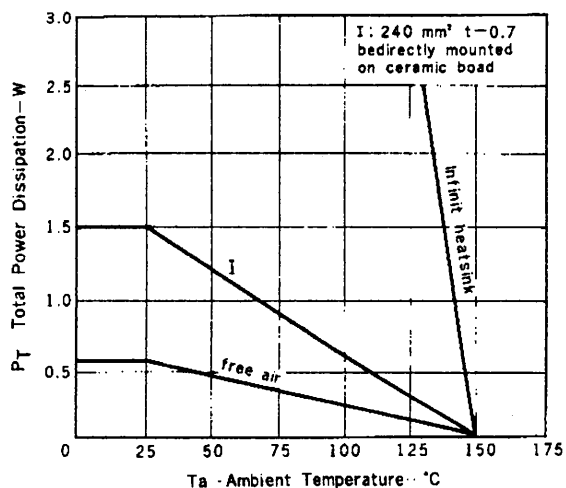


NTC2946(1)

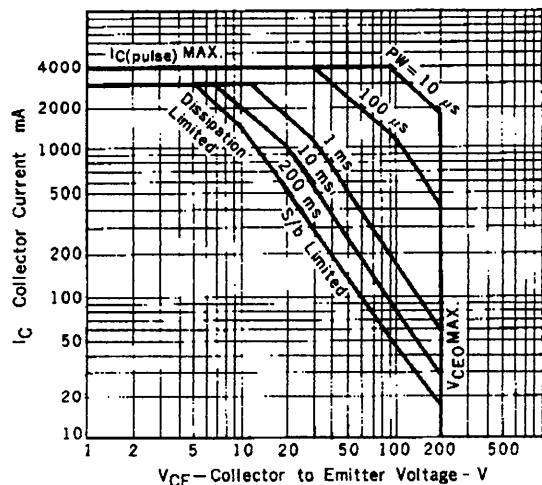


TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

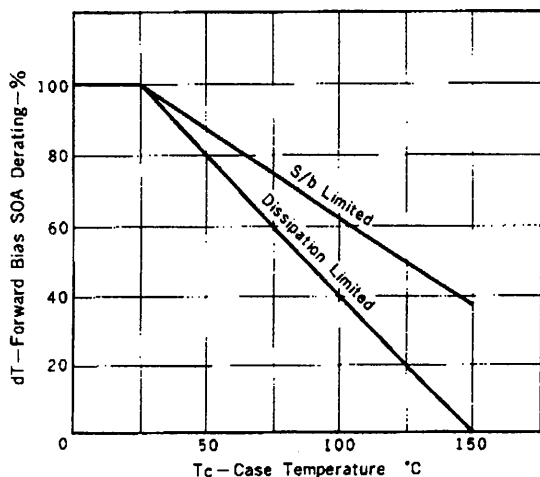
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



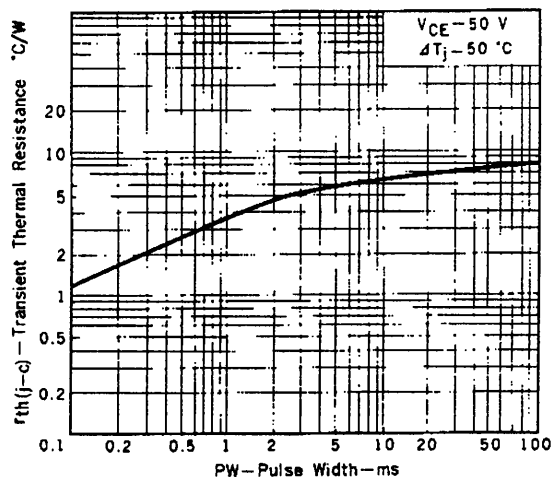
FORWARD BIAS SAFE OPERATING AREAS



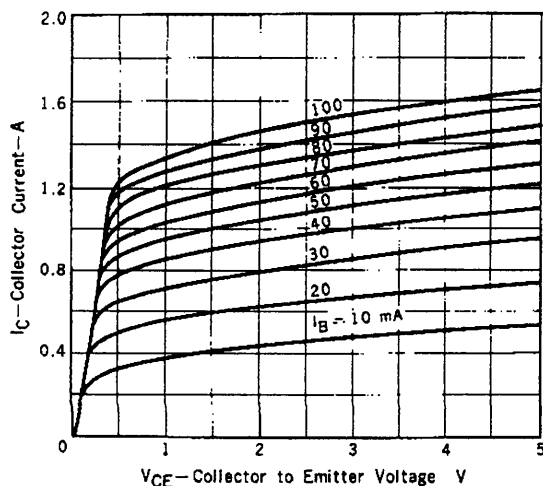
DERATING CURVE OF SAFE OPERATING AREAS



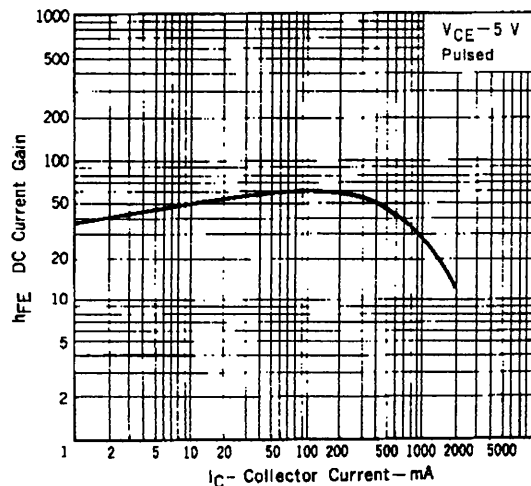
TRANSIENT THERMAL RESISTANCE



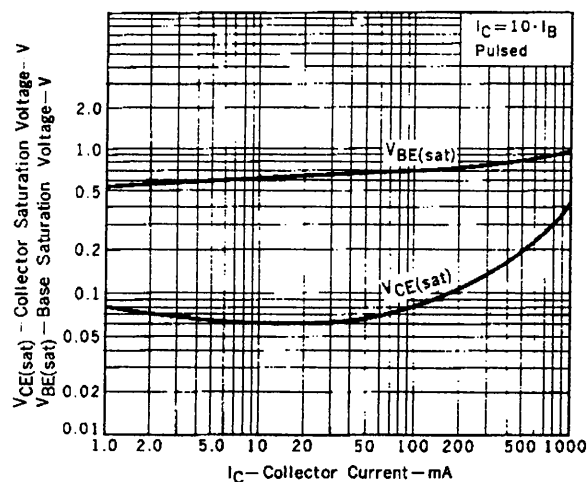
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



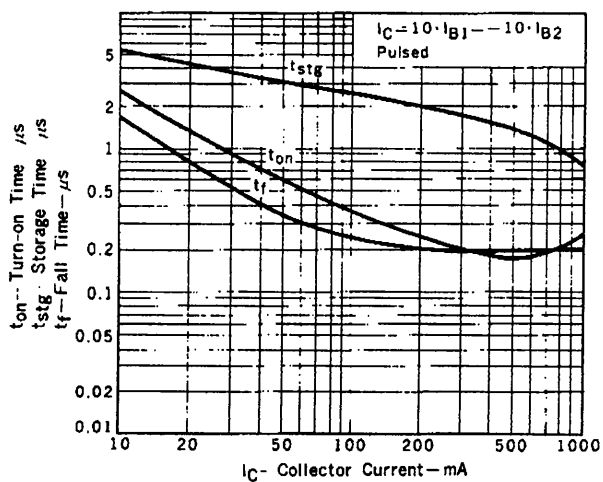
DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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



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