NEC

SILICON TRANSISTOR
2SD1581

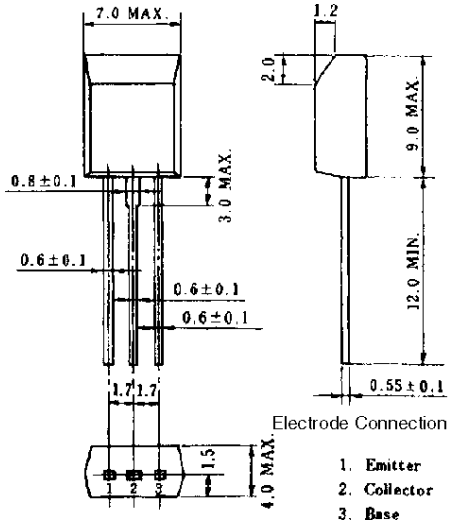
NPN SILICON EPITAXIAL TRANSISTOR FOR LOW-FREQUENCY POWER AMPLIFIERS

The 2SD1581 is a single type super high h_{FE} transistor and low collector saturation voltage and low power loss. This transistor is ideal for use in high current drives such as mortars, relays, and ramps.

FEATURES

- Ultra high h_{FE}
  h_{FE} = 800 to 3200 (@ V_{CE} = 5.0 V, I_C = 500 mA)
- Low collector saturation voltage
  $V_{CE(sat)}$ = 0.18 V TYP. (@ I_C = 1.0 A, I_B = 10 mA)

PACKAGE DRAWING (UNIT: mm)



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	30	V
Collector to emitter voltage	V_{CEO}	25	V
Emitter to base voltage	V_{EBO}	15	V
Collector current (DC)	$I_{C(DC)}$	2.0	A
Collector current (pulse)	$I_{C(pulse)}$*	3.0	A
Total power dissipation	P_T	1.0	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

* PW ≤ 10 ms, duty cycle ≤ 50%

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions		MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 30 V, I_E = 0				100	nA
Emitter cutoff current	I_{EBO}	V_{EB} = 10 V, I_C = 0				100	nA
DC current gain	h_{FE1}	V_{CE} = 5.0 V, I_C = 500 mA	*	800	1500	3200	−
DC current gain	h_{FE2}	V_{CE} = 5.0 V, I_C = 2.0 mA	*	400			−
DC base voltage	V_{BE}	V_{CE} = 5.0 V, I_C = 300 mA	*	600	660	700	mV
Collector saturation voltage	$V_{CE(sat)}$	I_C = 1.0 A, I_B = 10 mA	*		0.18	0.30	V
Base saturation voltage	$V_{BE(sat)}$	I_C = 1.0 A, I_B = 10 mA	*		0.83	1.2	V
Output capacitance	C_{ob}	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz			26	35	pF
Gain bandwidth product	f_T	V_{CE} = 10 V, I_E = −500 mA		150	350		MHz

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

h_{FE1}/h_{FE} CLASSIFICATION M : 800 to 1600 L : 1200 to 2400 K : 2000 to 3200

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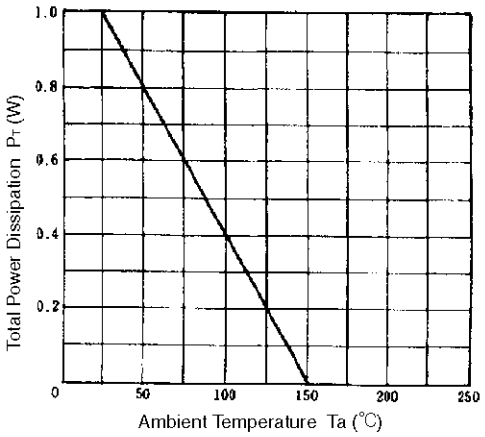
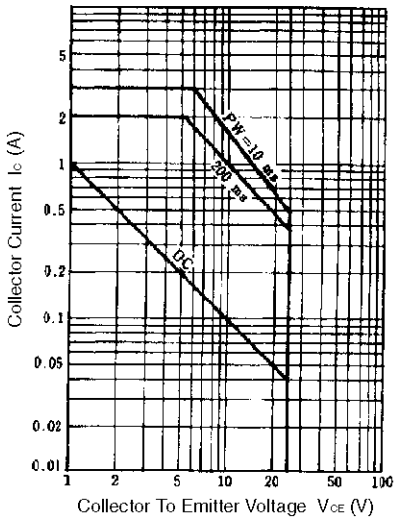
TYPICAL CHARACTERISTICS (Ta = 25°C)

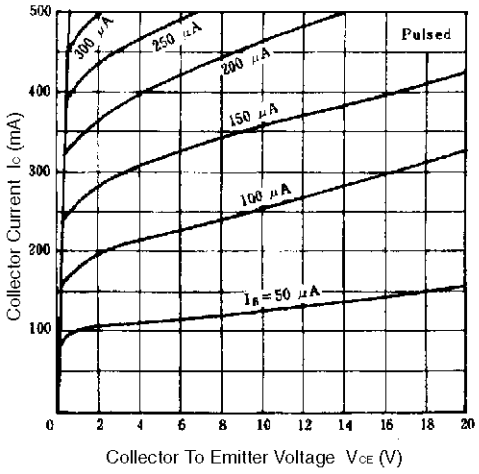
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



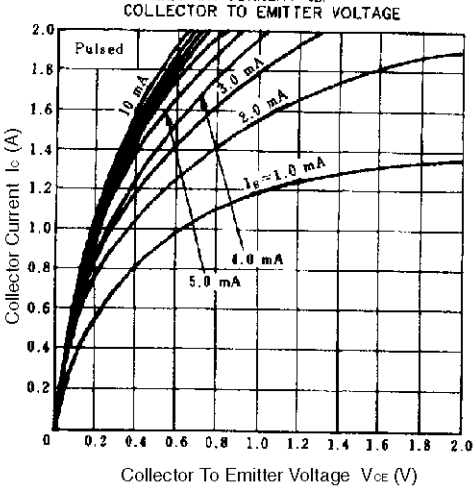
SAFE OPERATING AREAS(TRANSIENT THERMAL RESISTANCE METHOD)



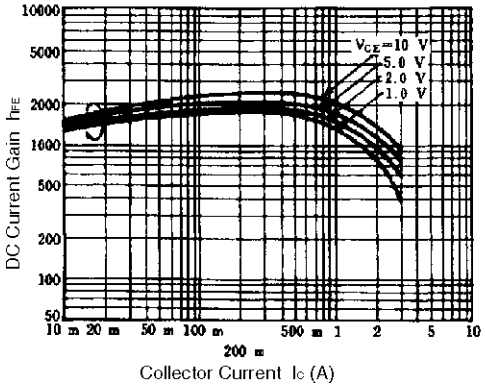
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



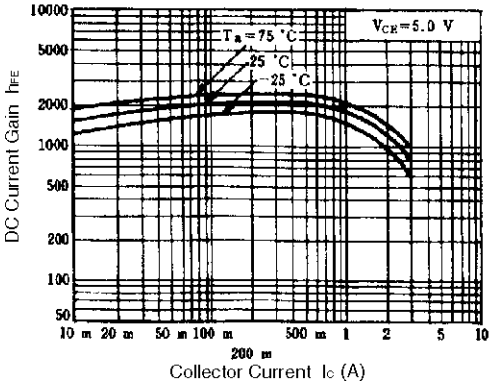
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



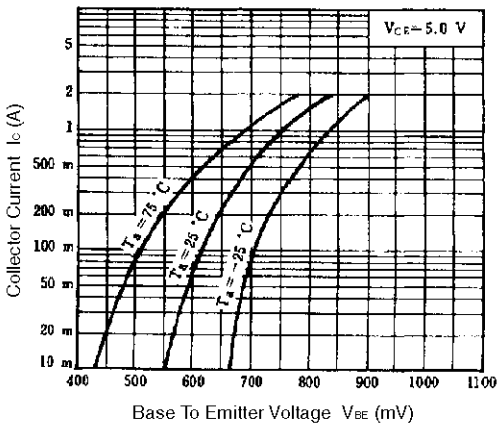
DC CURRENT vs. COLLECTOR CURRENT



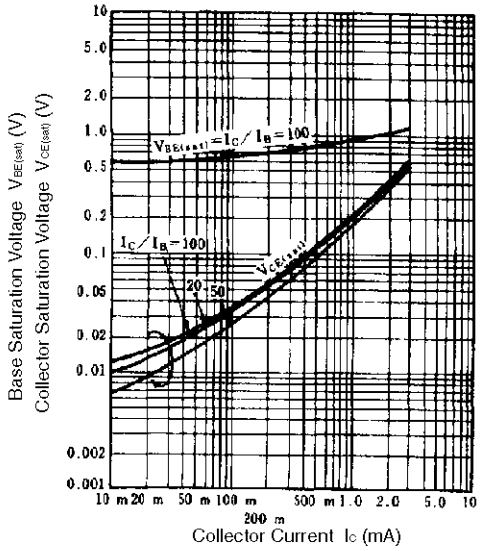
DC CURRENT GAIN vs. COLLECTOR CURRENT



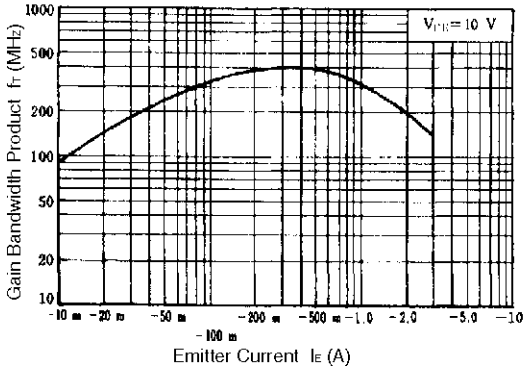
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



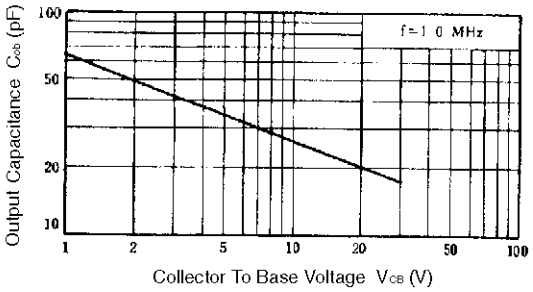
COLLECTOR AND BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs.
EMITTER CURRENT



OUTPUT CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



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