NEC

DATA SHEET

SILICON POWER TRANSISTOR

2SB601

PNP SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION) FOR LOW-FREQUENCY POWER AMPLIFIERS AND LOW-SPEED SWITCHING

FEATURES

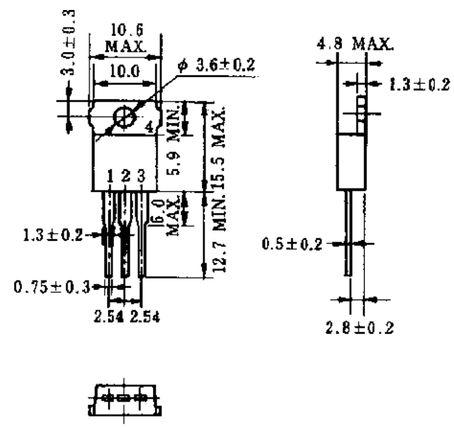
- High-DC current gain due to Darlington connection
- Low collector saturation voltage
- Low collector cutoff current
- Ideal for use in direct drive from IC output for magnet drivers such as treminal equipment or cash registers

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

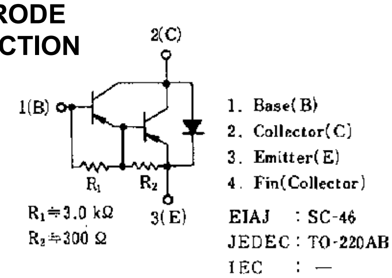
Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	–100	V
Collector to emitter voltage	V_{CEO}	–100	V
Emitter to base voltage	V_{EBO}	–7.0	V
Collector current	$I_{C(DC)}$	∓5.0	A
Collector current	$I_{C(pulse)}$*	∓8.0	A
Base current	$I_{B(DC)}$	–0.5	A
Total power dissipation	P_T (Ta = 25°C)	1.5	W
Total power dissipation	P_T (Tc = 25°C)	30	W
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

* PW ≤ 10 ms, duty cycle ≤ 50%

PACKAGE DRAWING (UNIT: mm)



ELECTRODE CONNECTION



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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

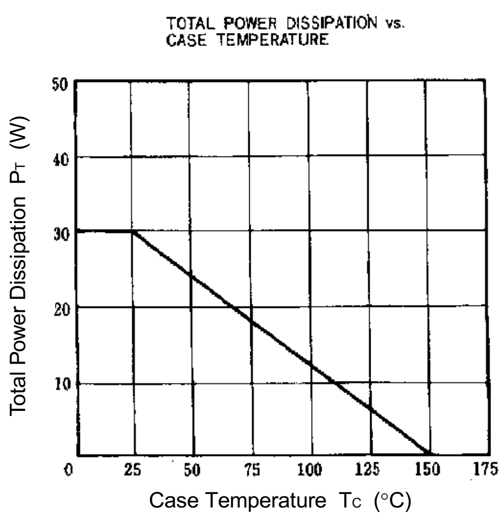
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to emitter voltage	$V_{CEO(SUS)}$	I_C = –3 A, I_{B1} = –3 mA, L = 1 mH	–100			V
Collector to emitter voltage	$V_{CEX(SUS)1}$	I_C = –3 A, I_{B1} = $-I_{B2}$ = –3 mA, $V_{BE(OFF)}$ = 5.0 V, L = 180 μH, clamped	–100			V
Collector to emitter voltage	$V_{CEX(SUS)2}$	I_C = –6 A, I_{B1} = –12 mA, I_{B2} = 3 mA, $V_{BE(OFF)}$ = 5.0 V, L = 180 μH, clamped	–100			V
Collector cutoff current	I_{CBO}	V_{CB} = –100 V, I_E = 0			–10	μA
Collector cutoff current	I_{CER}	V_{CE} = –100 V, R_{BE} = 51 Ω, Ta = 125°C			–1.0	mA
Collector cutoff current	I_{CEX1}	V_{CE} = –100 V, $V_{BE(OFF)}$ = 1.5 V			–10	μA
Collector cutoff current	I_{CEX2}	V_{CE} = –100 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			–3.0	mA
DC current gain	h_{FE1}*	V_{CE} = –2.0 V, I_C = –3.0 A	2,000		15,000	
DC current gain	h_{FE2}*	V_{CE} = –2.0 V, I_C = –5.0 A	500			
Collector saturation voltage	$V_{CE(sat)}$*	I_C = –3.0 A, I_B = –3.0 mA			–1.5	V
Base saturation voltage	$V_{BE(sat)}$*	I_C = –3.0 A, I_B = –3.0 mA			–2.0	V
Turn-on time	t_{on}	I_C = –3.0 A, R_L = 17 Ω, I_{B1} = $-I_{B2}$ = –3.0 mA, V_{CC} ≅ –50 V Refer to the test circuit.		0.5		μs
Storage time	t_{stg}			1.0		μs
Fall time	t_f			1.0		μs

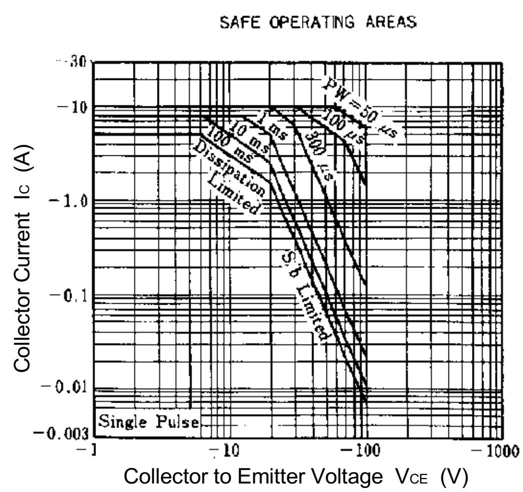
* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

h_{FE} CLASSIFICATION

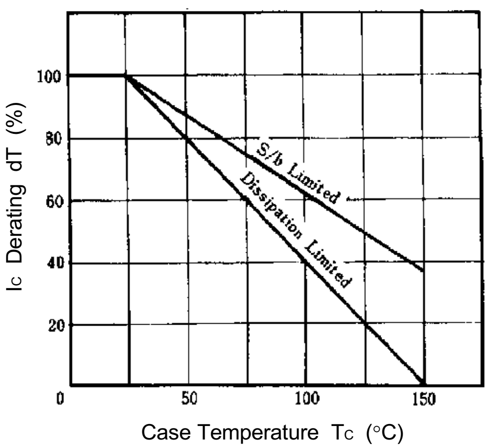
Marking	M	L	K
h_{FE1}	2,000 to 5,000	3,000 to 7,000	5,000 to 15,000

TYPICAL CHARACTERISTICS (Ta = 25°C)

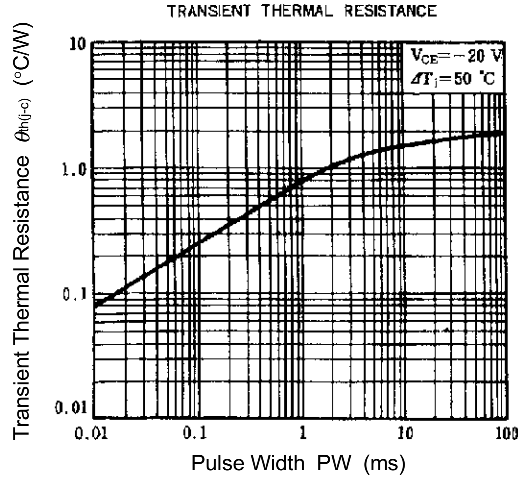




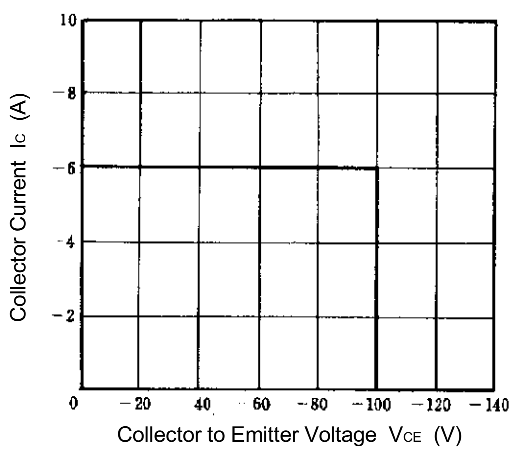
DERATING CURVE OF SAFE OPERATING AREA



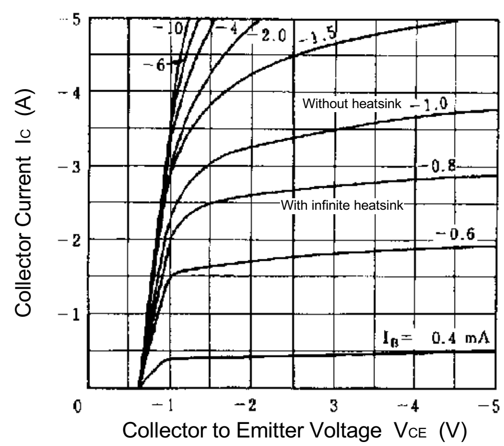
TRANSIENT THERMAL RESISTANCE



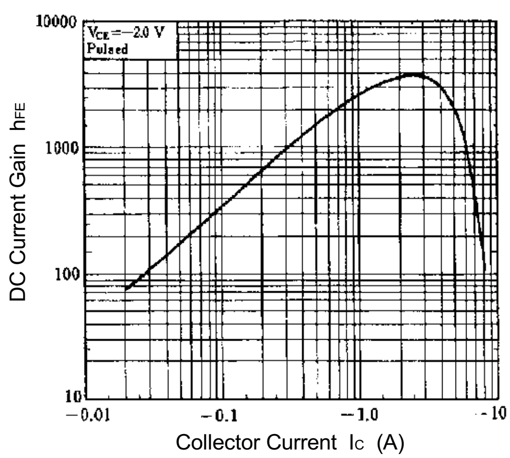
REVERSE BIAS SAFE OPERATING AREAS



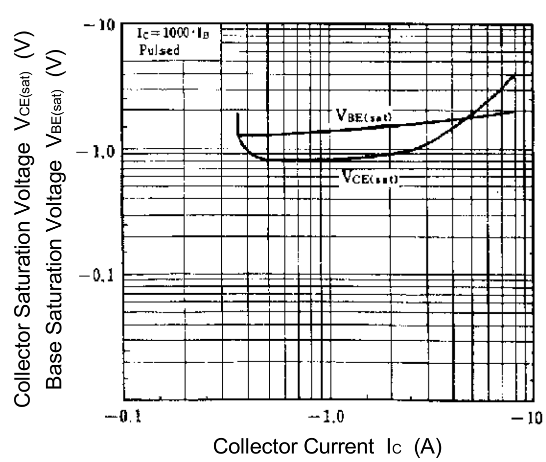
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



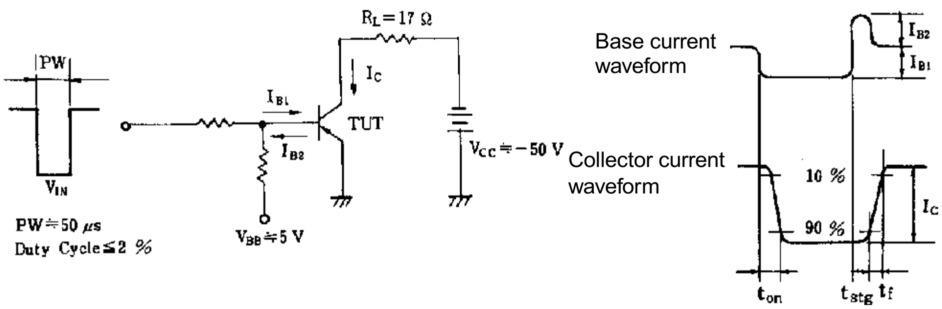
DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



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



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