NEC

DARLINGTON POWER TRANSISTOR
2SA1720

PNP SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION) FOR HIGH-SPEED SWITCHING

The 2SA1720 is a high-speed Darlington power transistor.

This transistor is ideal for high-precision control such as PWM control for pulse motors or brushless motors in OA and FA equipment.

ORDERING INFORMATION

Part No.	Package
2SA1720	Isolated TO-220

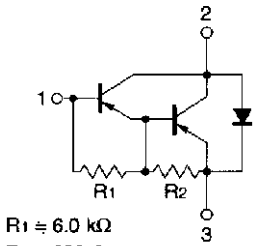
FEATURES

- Mold package that does not require an insulating board or insulation bushing
- On-chip C-to-E reverse diode
- Fast switching speed

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameter	Symbol	Conditions	Ratings	Unit
Collector to base voltage	V_{CBO}		−100	V
Collector to emitter voltage	V_{CEO}		−100	V
Emitter to base voltage	V_{EBO}		−8.0	V
Collector current (DC)	$I_{C(DC)}$		−10, +3.0	A
Collector current (pulse)	$I_{C(pulse)}$	PW ≤ 10 ms, duty cycle ≤ 50%	∓20	A
Base current (DC)	$I_{B(DC)}$		−1.0	A
Total power dissipation	P_T	T_C = 25°C	25	W
		T_A = 25°C	2.0	W
Junction temperature	T_j		150	°C
Storage temperature	T_{stg}		−55 to +150	°C

EQUIVALENT CIRCUIT



R1 ≒ 6.0 kΩ
R2 ≒ 800 Ω

1. Base
2. Collector
3. Emitter

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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 (T_A = 25°C)

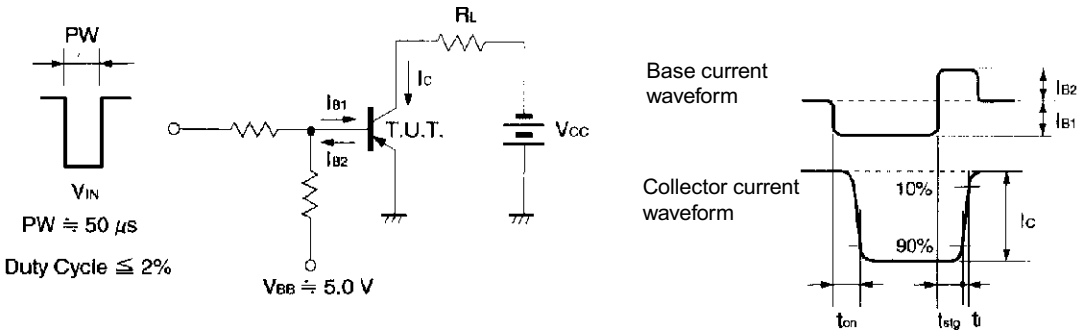
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = –100 V, I_E = 0 A			–10	μA
DC current gain	h_{FE1}	V_{CE} = –2.0 V, I_C = –5.0 A[Note]	4,000		20,000	
DC current gain	h_{FE2}	V_{CE} = –2.0 V, I_C = –10 A[Note]	500			
Collector saturation voltage	$V_{CE(sat)}$	I_C = –5.0 A, I_B = –5.0 mA[Note]		–0.9	–1.5	V
Base saturation voltage	$V_{BE(sat)}$	I_C = –5.0 A, I_B = –5.0 mA[Note]		–1.5	–2.0	V
Gain bandwidth product	f_T	V_{CE} = –5.0 V, I_C = –5.0 A		100		MHz
Turn-on time	t_{on}	I_C = –5.0 A, R_L = 10 Ω, I_{B1} = –I_{B2} = –5 mA, V_{CC} ≅ –50 V Refer to the switching time (t_{on}, t_{stg}, t_f) test circuit.		0.2		μs
Storage time	t_{stg}			1.5		μs
Fall time	t_f			0.7		μs

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

h_{FE} CLASSIFICATION

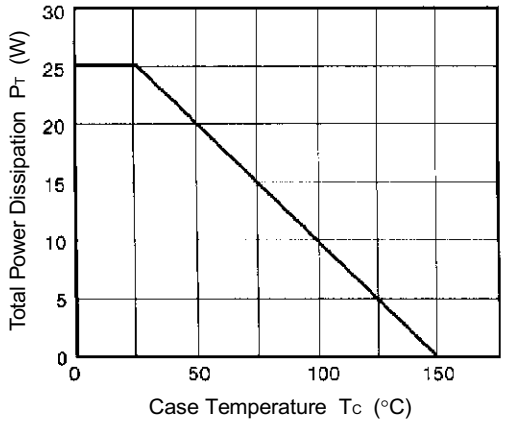
Marking	L	K
h_{FE1}	4,000 to 10,000	8,000 to 20,000

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

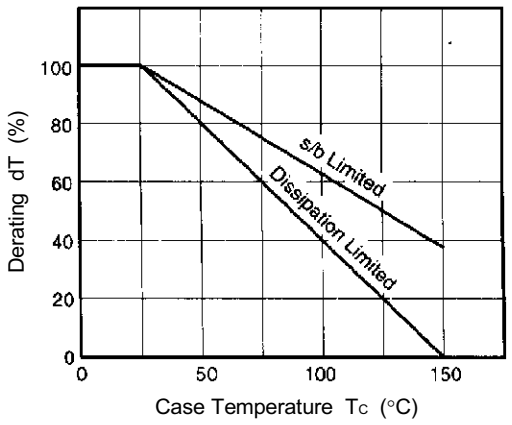


TYPICAL CHARACTERISTICS (T_A = 25°C)

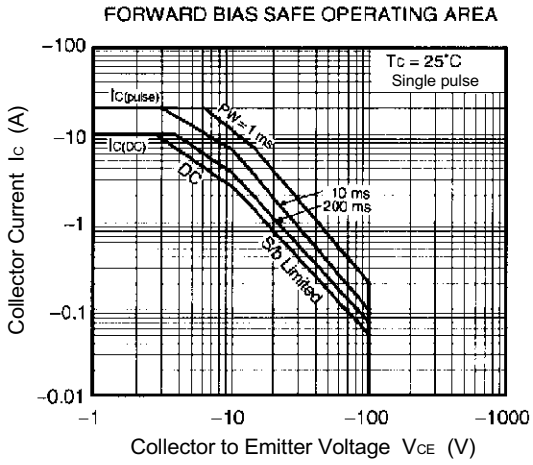
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



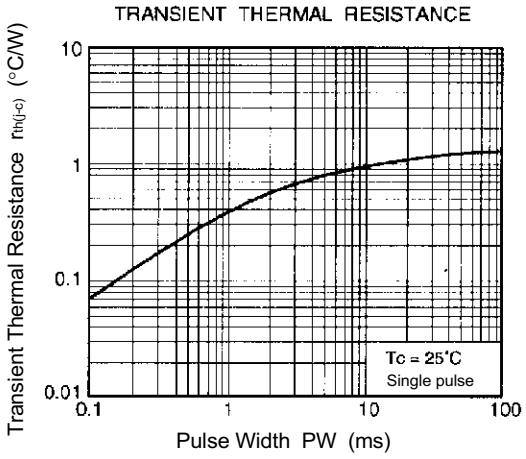
DERATING CURVE OF SAFE OPERATING AREA



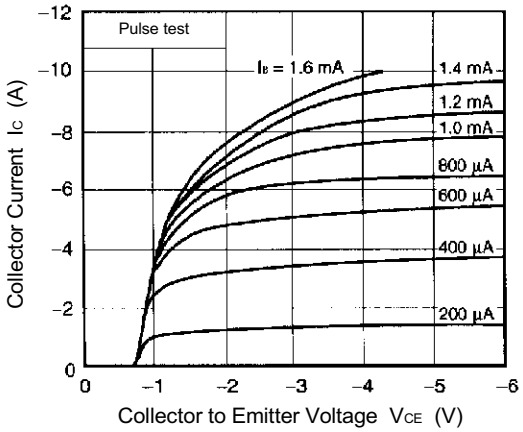
FORWARD BIAS SAFE OPERATING AREA



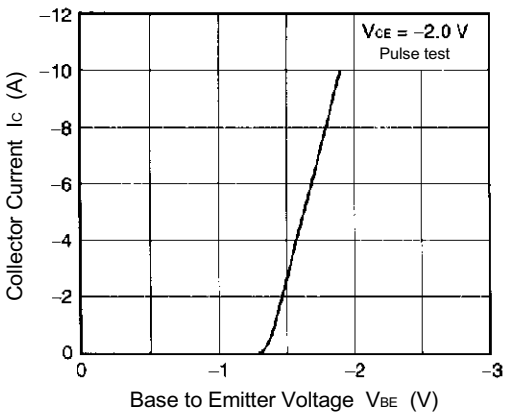
TRANSIENT THERMAL RESISTANCE



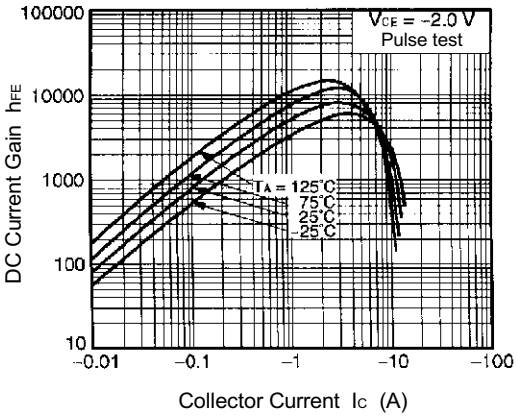
COLLECTOR CURRENT vs. COLLECTOR TOEMITTER VOLTAGE



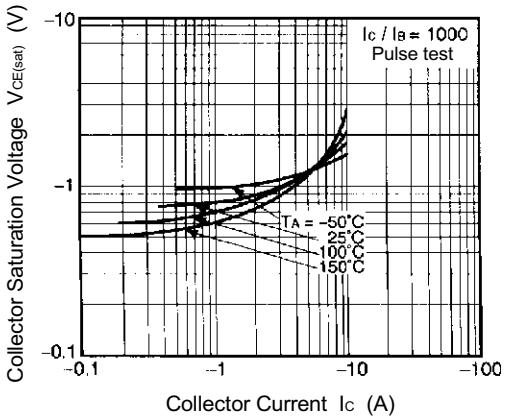
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



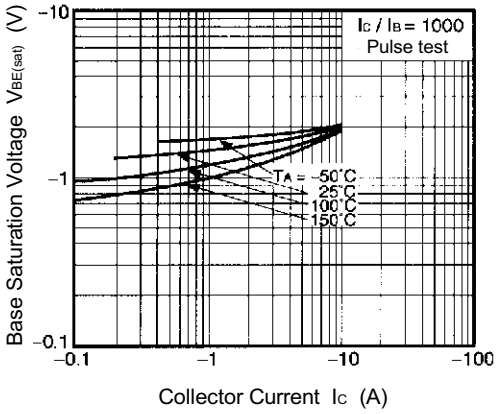
DC CURRENT GAIN vs. COLLECTOR CURRENT



COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT

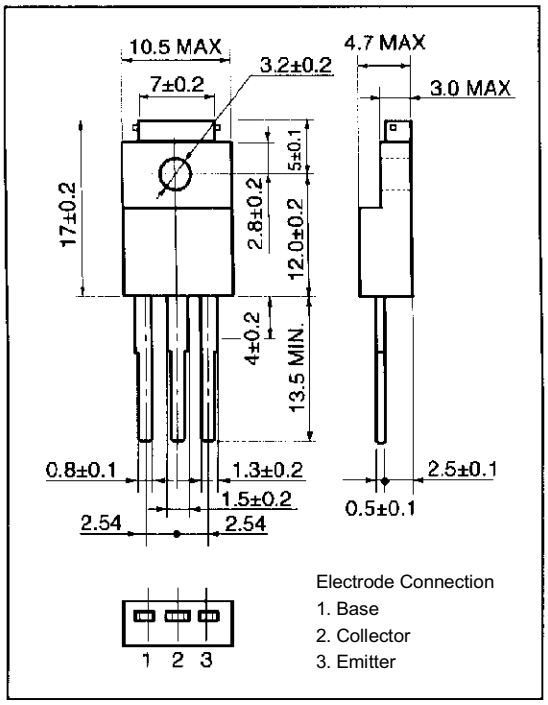


BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



PACKAGE DRAWING (UNIT: mm)

Isolated TO-220 (MP-45)



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