DATA SHEET

NEC

DARLINGTON POWER TRANSISTOR

2SC4351

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

The 2SC4351 is a high-speed Darlington power transistor. This transistor is ideal for high-precision control such as PWM control for pulse motors or blushless motor of OA and FA equipment.

FEATURES

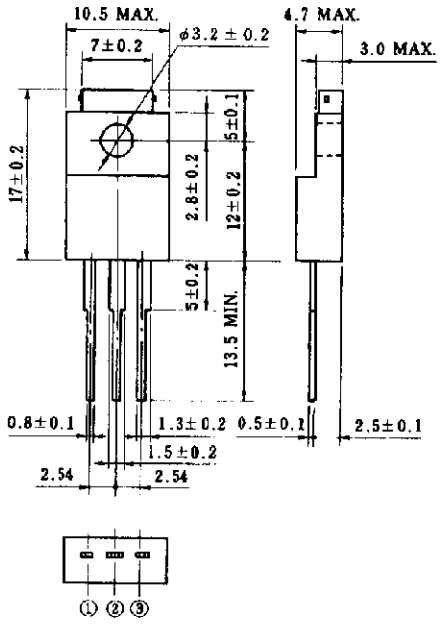
- Mold package that does not require an insulating board or insulation bushing
- On-chip C to B constant voltage diode for surge voltage absorption
- On-chip C to E reverse diode
- Fast switching speed

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

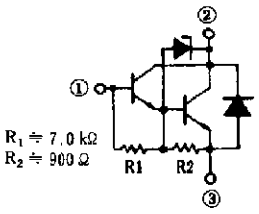
Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	60 ± 10	V
Collector to emitter voltage	V_{CEO}	60 ± 10	V
Emitter to base voltage	V_{EBO}	8.0	V
Collector current (DC)	$I_{C(DC)}$	±5.0	A
Collector current (pulse)	$I_{C(pulse)}$*	±10	A
Base current (DC)	$I_{B(DC)}$	0.5	A
Total power dissipation	P_T (Tc = 25°C)	20	W
Total power dissipation	P_T (Ta = 25°C)	2.0	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
1. Base
2. Collector
3. Emitter



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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 40 V, I_E = 0			0.5	μA
DC current gain	h_{FE1}*	V_{CE} = 2.0 V, I_C = 2.0 A	2,000		20,000	
DC current gain	h_{FE2}*	V_{CE} = 2.0 V, I_C = 4.0 A	500			
Collector saturation voltage	$V_{CE(sat)}$*	I_C = 2.0 A, I_B = 2.0 mA			1.5	V
Base saturation voltage	$V_{BE(sat)}$*	I_C = 2.0 A, I_B = 2.0 mA			2.0	V
Turn-on time	t_{on}	I_C = 2.0 A, I_{B1} = −I_{B2} = 2.0 mA, R_L = 25 Ω, V_{CC} ≅ 50 V Refer to the test circuit.		0.7		μs
Storage time	t_{stg}			2.5		μs
Fall time	t_f			0.6		μs

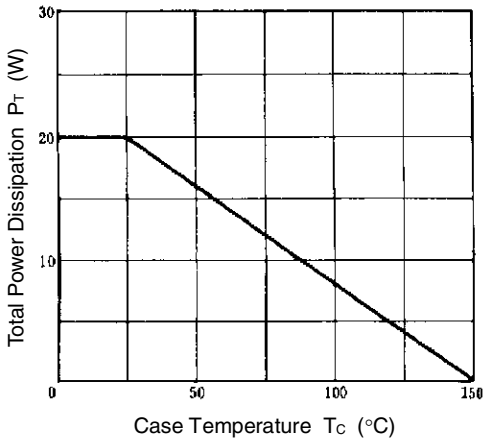
* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

h_{FE} CLASSIFICATION

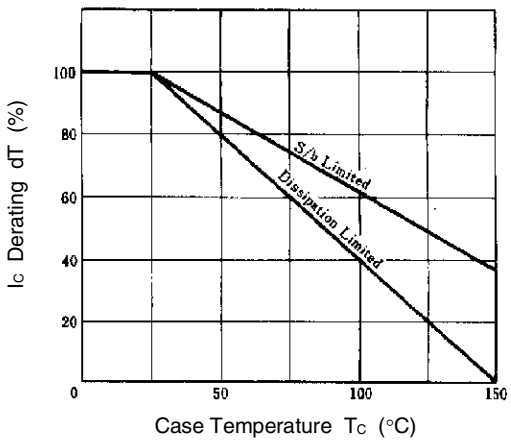
Marking	M	L	K
h_{FE1}	2,000 to 5,000	4,000 to 10,000	8,000 to 20,000

TYPICAL CHARACTERISTICS (Ta = 25°C)

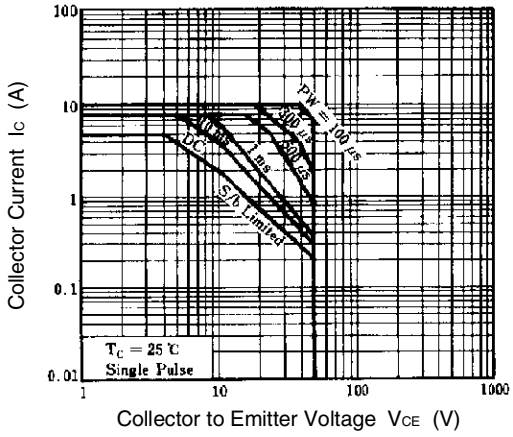
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



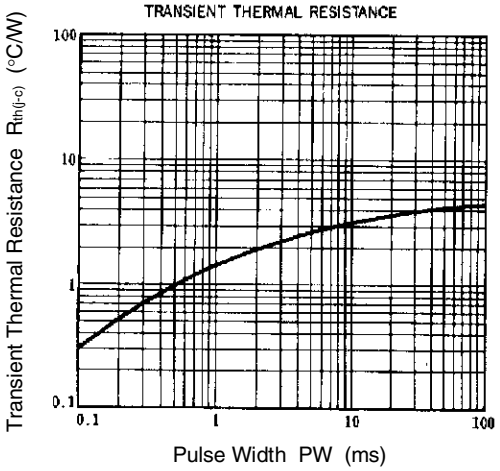
DERATING CURVE OF SAFE OPERATING AREA



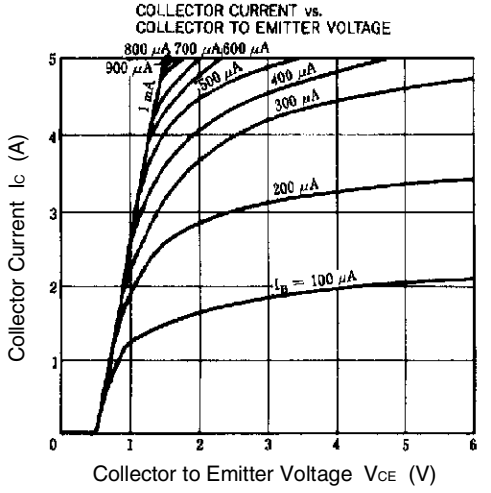
FORWARD BIAS SAFE OPERATING AREA



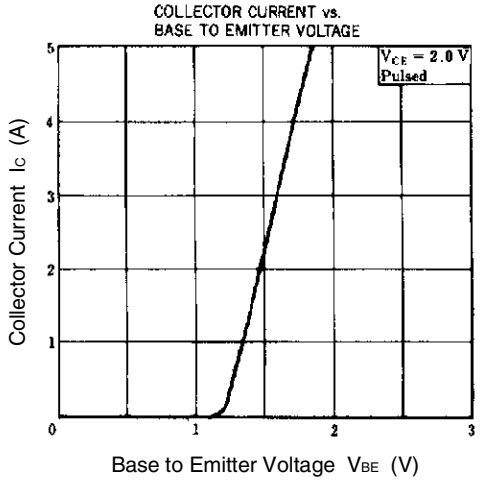
TRANSIENT THERMAL RESISTANCE

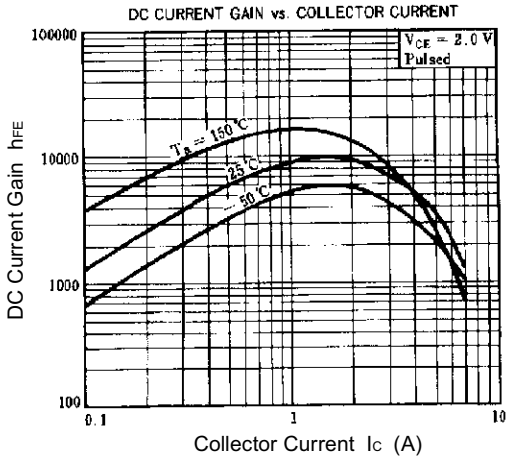


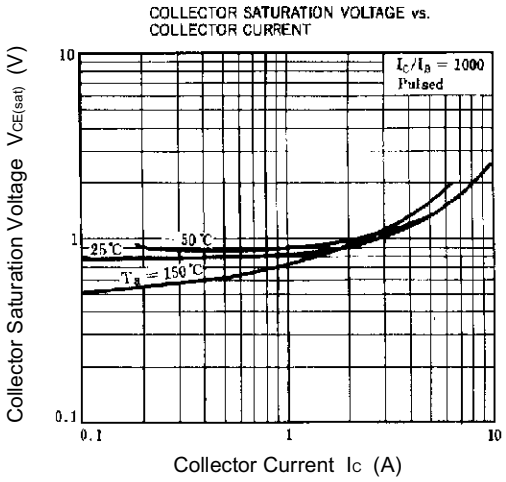
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

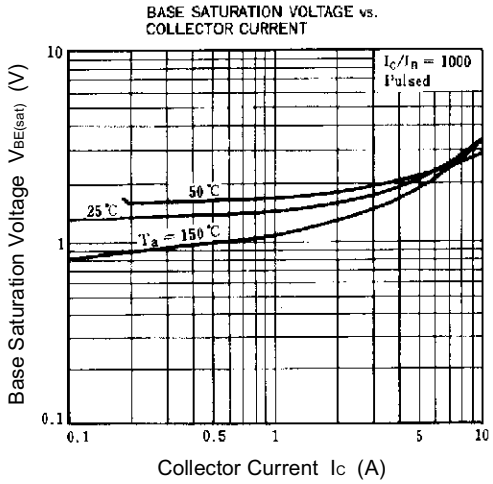


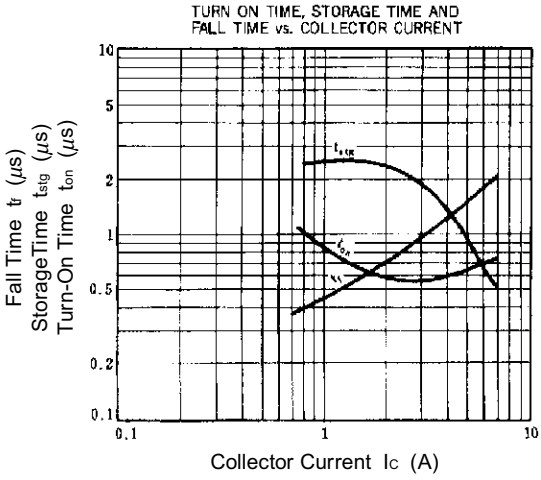
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



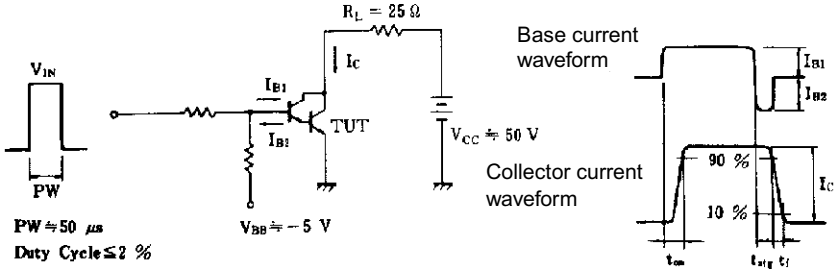








SWITCHING TIME (t_{on}, t_{stg}, t_f) TEST CIRCUIT



[MEMO]

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