DATA SHEET

NEC

DARLINGTON POWER TRANSISTOR

2SD2163

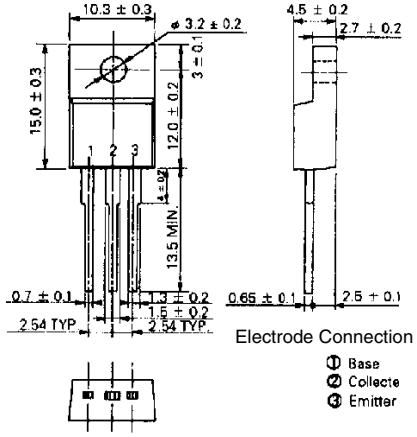
NPN SILICON EPITAXIAL TRANSISTOR (DARLINGTON CONNECTION) FOR LOW-FREQUENCY POWER AMPLIFIERS AND LOW-SPEED HIGH-CURRENT SWITCHING

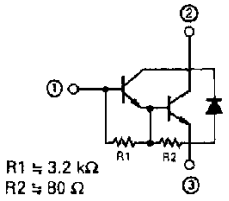
The 2SD2163 is a mold power transistor developed for low-speed high-current switching. This transistor is ideal for direct driving from the IC output of devices such as pulse motor drivers and relay drivers of PC terminals.

FEATURES

- Mold package that does not require an insulating board or insulation bushing
- High DC current gain due to Darlington connection
  h_{FE} = 1,000 MIN. (@I_C = 10 A)
- Low collector saturation voltage:
  $V_{CE(sat)}$ = 1.5 V MAX. (@I_C = 10 A)

PACKAGE DRAWING (UNIT: mm)





ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	150	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	A
Collector current (pulse)	$I_{C(pulse)}$*	±20	A
Base current (DC)	$I_{B(DC)}$	1.0	A
Total power dissipation	P_T (Tc = 25°C)	30	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%

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	V_{CB} = 100 V, I_E = 0			10	μA
DC current gain	h_{FE}**	V_{CE} = 2.0 V, I_C = 10 A	1,000	6,000	30,000	
Collector saturation voltage	$V_{CE(sat)}$**	I_C = 10 A, I_B = 25 mA		1.1	1.5	V
Base saturation voltage	$V_{BE(sat)}$**	I_C = 10 A, I_B = 25 mA		1.8	2.0	V
Turn-on time	t_{on}	I_C = 10 A, I_{B1} = $-I_{B2}$ = 25 mA		1.0		μs
Storage time	t_{stg}	R_L = 5.0 Ω, V_{CC} ≅ 50 V		5.0		μs
Fall time	t_f	Refer to the test circuit.		2.0		μs

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

h_{FE} CLASSIFICATION

Marking	M	L	K	J
h_{FE}	1,000 to 3,000	2,000 to 5,000	4,000 to 10,000	8,000 to 30,000

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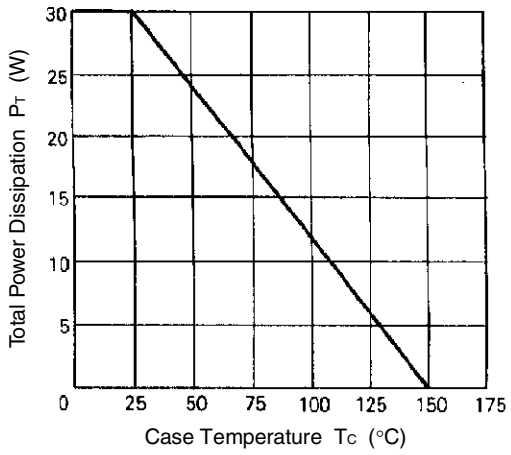
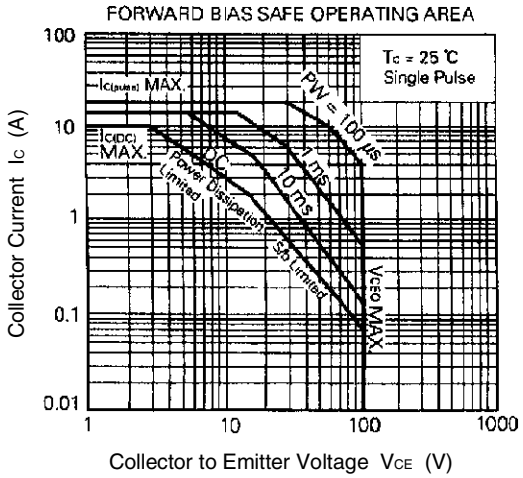
TYPICAL CHARACTERISTICS (Ta = 25°C)

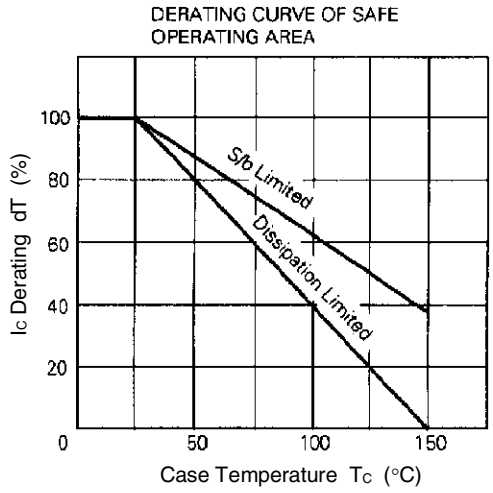
TOTAL POWER DISSIPATION vs. CASE TEMPERATURE



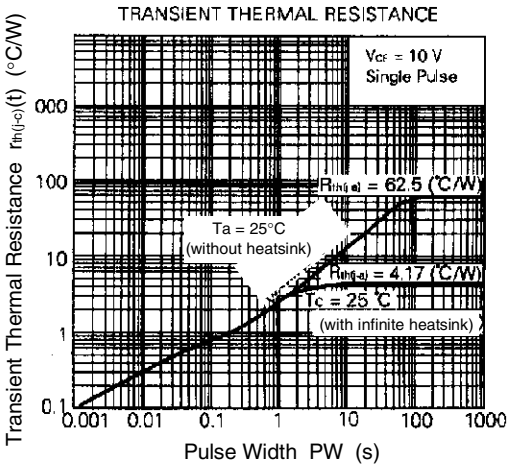
FORWARD BIAS SAFE OPERATING AREA



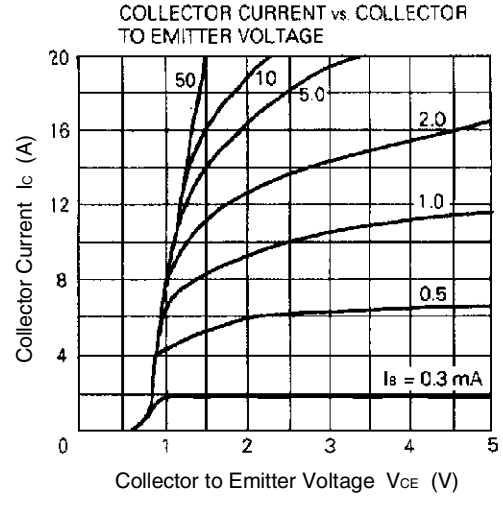
DERATING CURVE OF SAFE OPERATING AREA



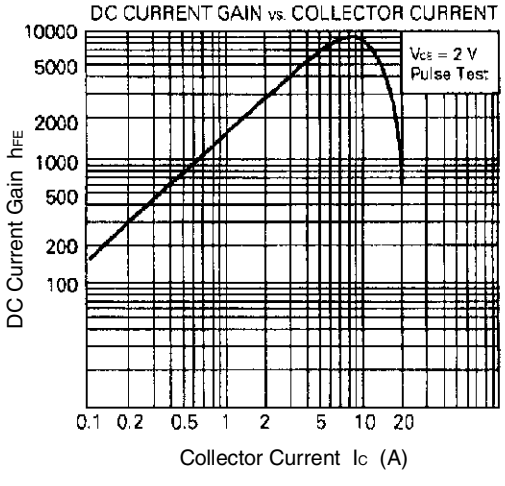
TRANSIENT THERMAL RESISTANCE

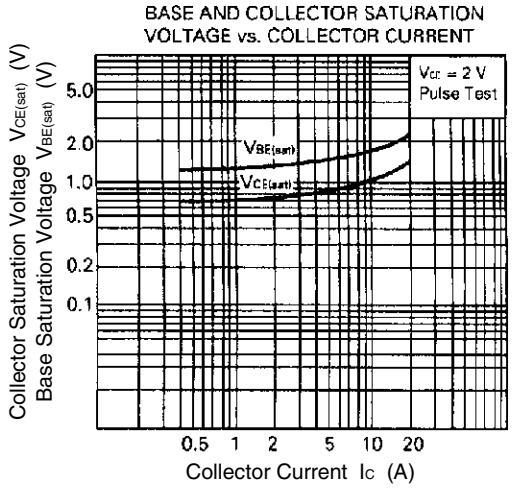


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

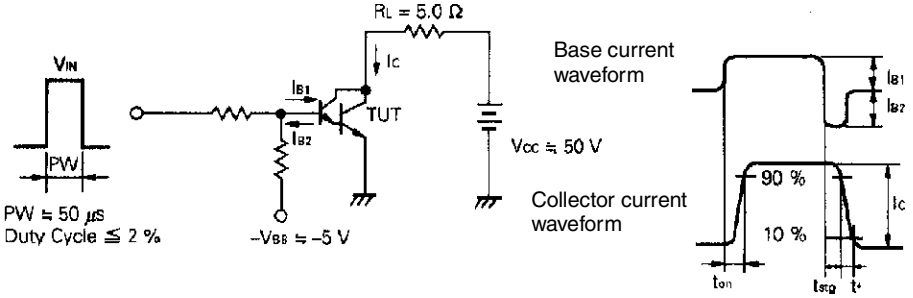


DC CURRENT GAIN vs. COLLECTOR CURRENT





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



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