

# SILICON POWER TRANSISTOR 2SD1695

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

The 2SD1695 is a Darlington connection transistor and incorporates a dumper diode between the collector and emitter and a constant voltage diode and protection elements between the collector and base. This transistor is ideal for drives in solenoid and actuators.

#### FEATURES

- On-chip protection elements enable time and cost reduction.
  - C to E: Dumper diode
  - C to B: Constant diode
- Low collector saturation voltage

#### QUALITY GRADES

- Standard
 

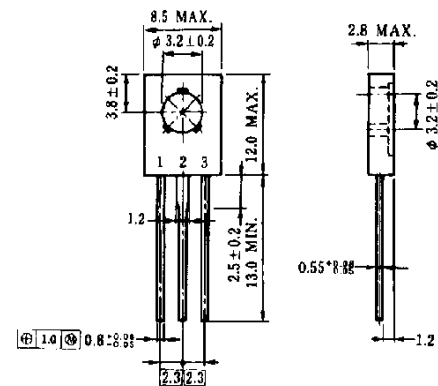
Please refer to "Quality Grades on NEC Semiconductor Devices" (Document No. C11531E) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

#### ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V <sub>CBO</sub>	31 ±4	V
Collector to emitter voltage	V <sub>CEO</sub>	31 ±4	V
Emitter to base voltage	V <sub>EBO</sub>	8.0	V
Collector current (DC)	I <sub>C(DC)</sub>	±2.0	A
Collector current (pulse)	I <sub>C(pulse)*</sub>	±3.0	A
Base current (DC)	I <sub>B(DC)</sub>	0.2	A
Total power dissipation	P <sub>T</sub> (Ta = 25°C)	1.3	W
Total power dissipation	P <sub>T</sub> (Tc = 25°C)	10	W
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

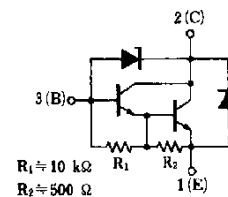
\* PW ≤ 10 ms, duty cycle ≤ 50%

#### PACKAGE DRAWING (UNIT: mm)



Electrode Connection

1. Emitter
2. Collector
3. Base
4. Collector (fin)



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## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

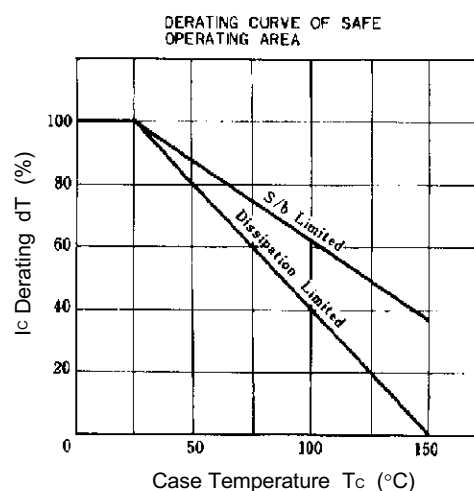
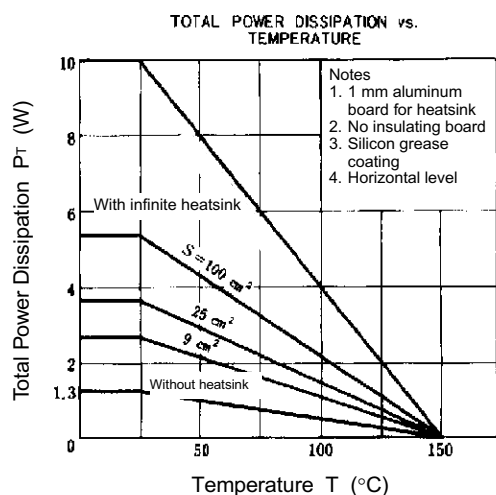
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector to base voltage	V <sub>CB0</sub>	I <sub>C</sub> = 1.0 mA, I <sub>E</sub> = 0	27	31	35	V
Collector to emitter voltage	V <sub>CE0</sub>	I <sub>C</sub> = 10 mA, R <sub>BE</sub> = ∞	27	31	35	V
Collector cutoff current	I <sub>CB0</sub>	V <sub>CB</sub> = 20 V, I <sub>E</sub> = 0			10	μA
DC current gain	h <sub>FE1</sub> *	V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 0.5 A	1,000			
DC current gain	h <sub>FE2</sub> *	V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 1.0 A	2,000		30,000	
Collector saturation voltage	V <sub>CE(sat)</sub> *	I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 1.0 mA		0.9	1.2	V
Base saturation voltage	V <sub>BE(sat)</sub> *	I <sub>C</sub> = 1.0 A, I <sub>B</sub> = 1.0 mA		1.6	2.0	V
Turn-on time	t <sub>on</sub>	I <sub>C</sub> = 1.0 A, I <sub>B1</sub> = -I <sub>B2</sub> = 5.0 mA R <sub>L</sub> = 20 Ω, V <sub>CC</sub> ≅ 20 V		0.5		μs
Storage time	t <sub>stg</sub>			3.0		μs
Fall time	t <sub>f</sub>			1.0		μs

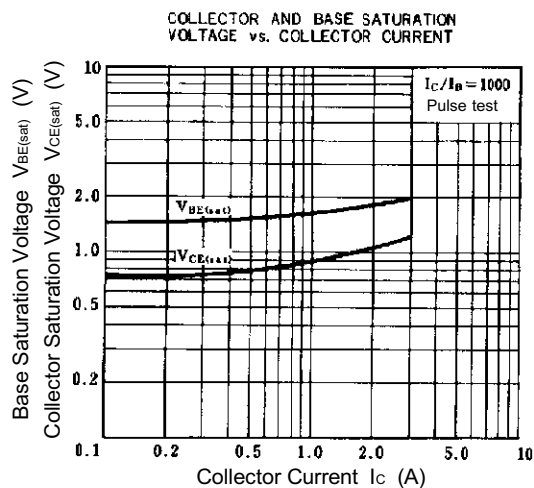
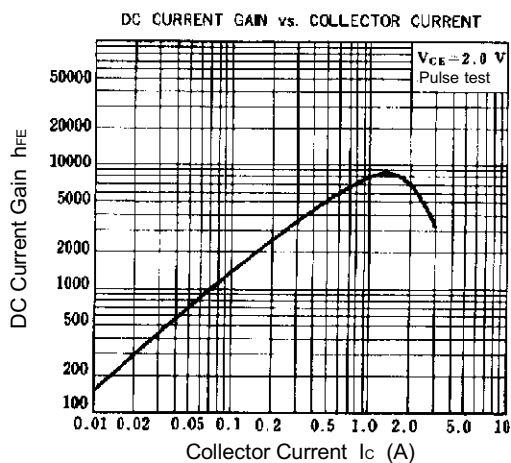
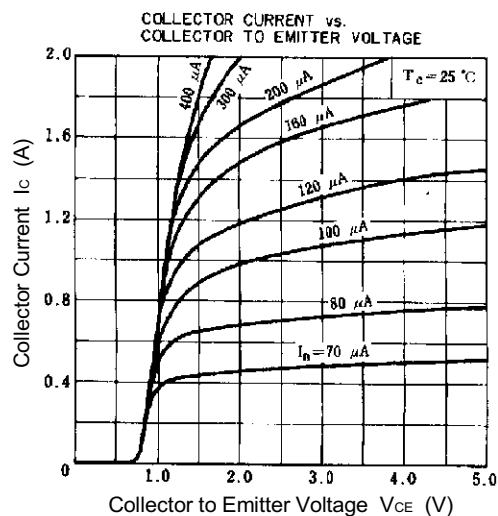
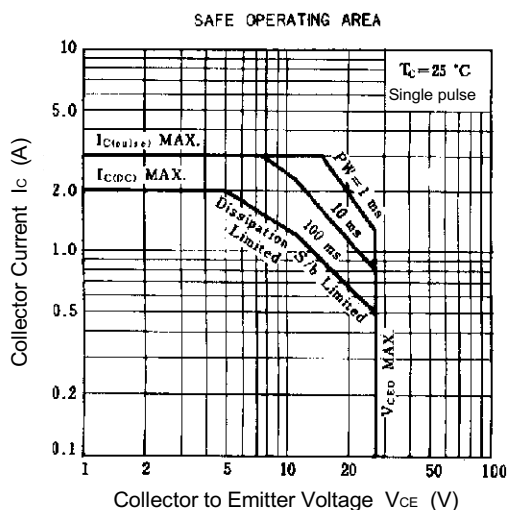
\* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

h<sub>FE2</sub> CLASSIFICATION

Marking	M	L	K
h <sub>FE2</sub>	2,000 to 5,000	4,000 to 10,000	8,000 to 30,000

## TYPICAL CHARACTERISTICS (Ta = 25°C)





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