

NPN SILICON EPITAXIAL TRANSISTOR
POWER MINI MOLD

DESCRIPTION

The 2SD1699 is NPN silicon epitaxial darlington transistor designed for pulse motor, printer driver, solenoid driver. Circuits.

FEATURES

- High DC Current gain.
- Includes a dumpter diode at E-C.

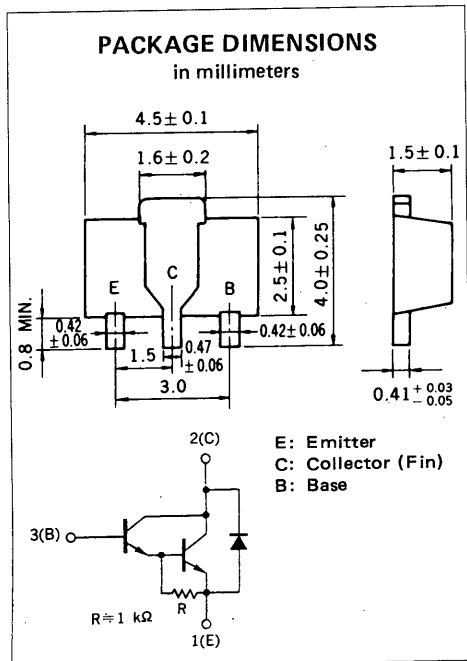
ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Currents ($T_a = 25^\circ\text{C}$)

Collector to Base Voltage	V_{CBO}	100	V
Collector to Emitter Voltage	V_{CEO}	80	V
Emitter to Base Voltage	V_{EBO}	8.0	V
Collector Current (DC)	I_C	± 0.8	A
Collector Current (Pulse)*	I_C	± 1.2	A
Maximum Power Dissipation			
Total Power Dissipation			
at 25°C Ambient Temperature**	P_T	2.0	W
Maximum Temperatures			
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$

* $PW \leq 10\text{ ms}$, Duty Cycle $\leq 50\%$

** When mounted on ceramic substrate of $16\text{ cm}^2 \times 0.7\text{ mm}$



E: Emitter
C: Collector (Fin)
B: Base

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

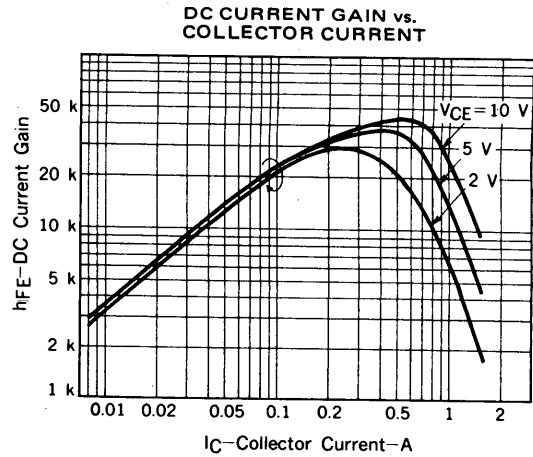
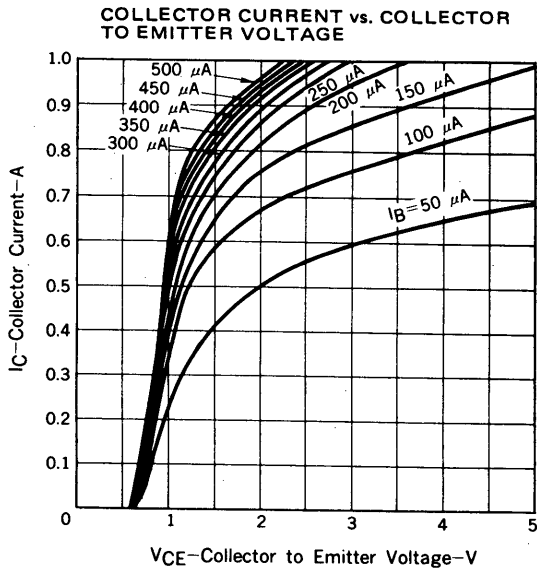
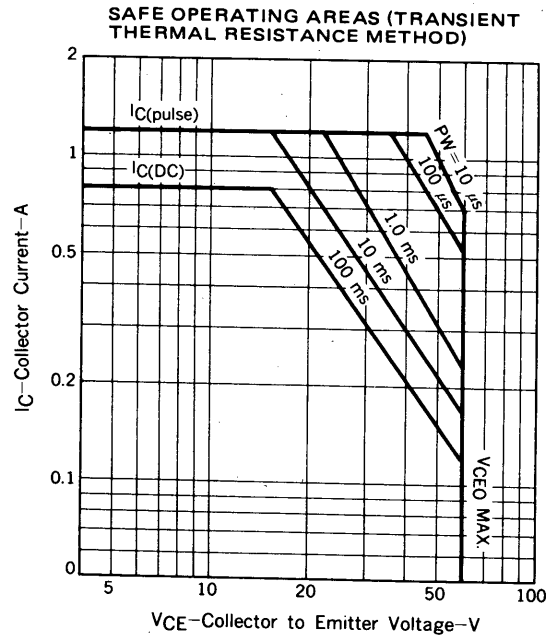
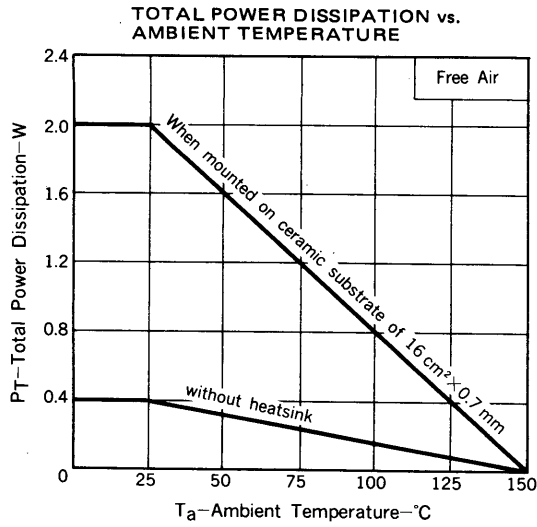
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDICTIONS
DC Current Gain	h_{FE1}^{***}	4000		50000		$V_{CE} = 2.0\text{ V}$, $I_C = 0.3\text{ A}$
DC Current Gain	h_{FE2}^{***}	1000				$V_{CE} = 2.0\text{ V}$, $I_C = 0.8\text{ A}$
Turn-on Time	t_{on}		0.5		μs	$I_C = 0.5\text{ A}$ $I_{B1} = -I_{B2} = 1.0\text{ mA}$ $V_{CC} = 40\text{ V}$, $R_L = 80\ \Omega$
Storage Time	t_{stg}		2.5		μs	
Fall Time	t_f		1.0		μs	
Collector Saturation Voltage	$V_{CE(sat)}^{***}$		0.9	1.2	V	$I_C = 0.5\text{ A}$, $I_B = 1.0\text{ mA}$
Base Saturation Voltage	$V_{BE(sat)}^{***}$		1.5	2.0	V	$I_C = 0.5\text{ A}$, $I_B = 1.0\text{ mA}$
Collector to Base Voltage	V_{CBO}	100			V	$I_C = 0.1\text{ mA}$, $I_E = 0$
Collector to Emitter Voltage	V_{CEO}	80			V	$I_C = 5.0\text{ mA}$, $I_B = 0$
Collector Cutoff Current	I_{CBO}			1.0	μA	$V_{CB} = 80\text{ V}$, $I_E = 0$
Emitter Cutoff Current	I_{EBO}			1.0	μA	$V_{EB} = 5.0\text{ V}$, $I_C = 0$

***Pulsed: $PW \leq 350\ \mu\text{s}$, Duty Cycle $\leq 2\%$

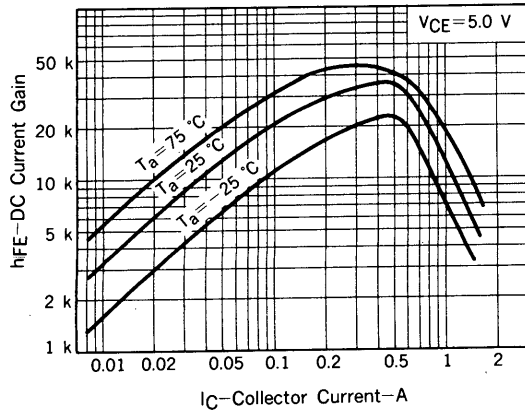
h_{FE} Classification

MARKING	TR	TQ
h_{FE}	4000 to 12000	8000 to 50000

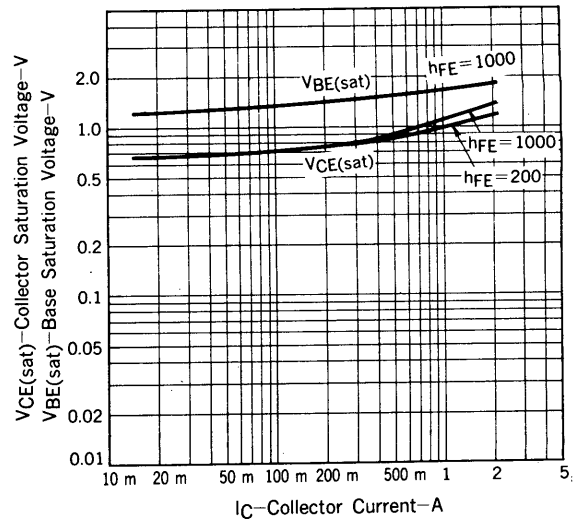
TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system.	TEI-1202
Quality grade on NEC semiconductor devices.	IEI-1209
Semiconductor device mounting technology manual.	IEI-1207
Semiconductor device package manual.	IEI-1213
Guide to quality assurance for semiconductor devices.	MEI-1202
Semiconductor selection guide.	MF-1134

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