

NPN SILICON EPITAXIAL TRANSISTOR  
POWER MINI MOLD

DESCRIPTION

The 2SD1950 is designed for general-purpose applications requiring High DC Current Gain.  
This is suitable for all kind of driving or muting.

FEATURES

- High DC Current Gain and good  $h_{FE}$  linearity.  
 $h_{FE} = 800$  to  $3\ 200$  ( $V_{CE} = 5.0\ V, I_C = 1.0\ A$ )
- Low Collector Saturation Voltage.  
 $V_{CE(sat)} = 0.18\ V$  TYP. ( $I_C = 1.0\ A, I_B = 10\ mA$ )
- High  $V_{EBO} : V_{EBO} = 15\ V$

ABSOLUTE MAXIMUM RATINGS

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

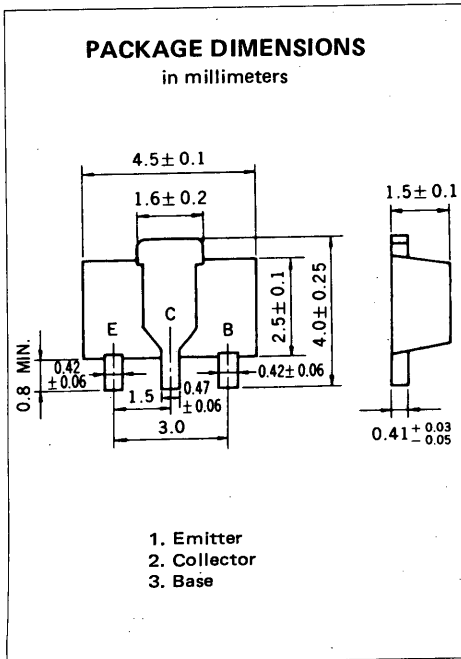
Collector to Base Voltage	$V_{CBO}$	30	V
Collector to Emitter Voltage	$V_{CEO}$	25	V
Emitter to Base Voltage	$V_{EBO}$	15	V
Collector Current (DC)	$I_C$	2	A
Collector Current (Pulse)*	$I_C$	3	A

Maximum Power Dissipation

Total Power Dissipation at $25\ ^\circ C$ Ambient Temperature**	$P_T$	2.0	W
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Maximum Temperatures

Junction Temperature	$T_j$	150	$^\circ C$
Storage Temperature Range	$T_{stg}$	-55 to +150	$^\circ C$



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

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

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

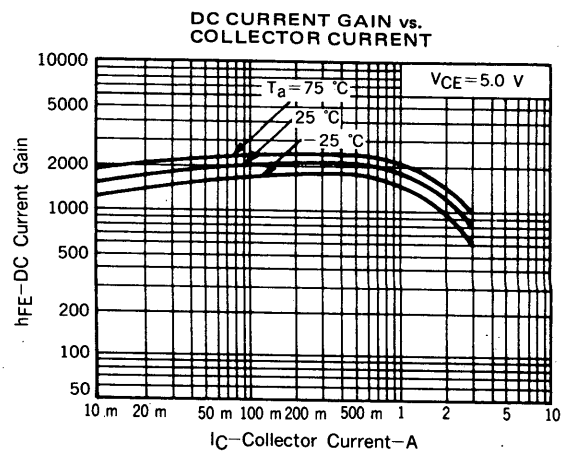
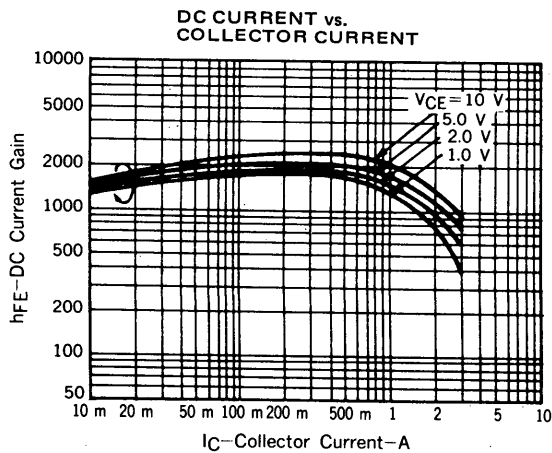
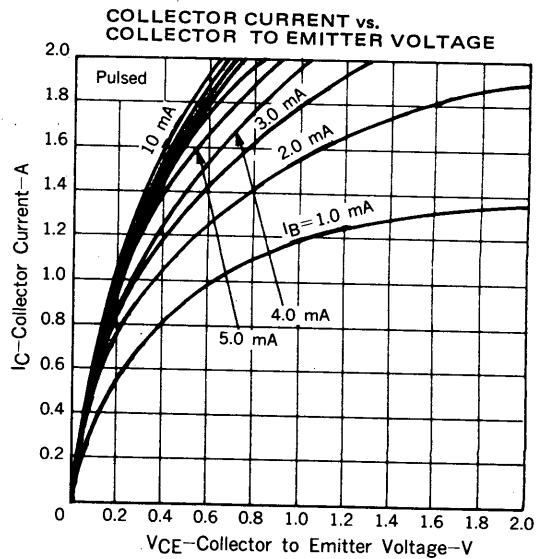
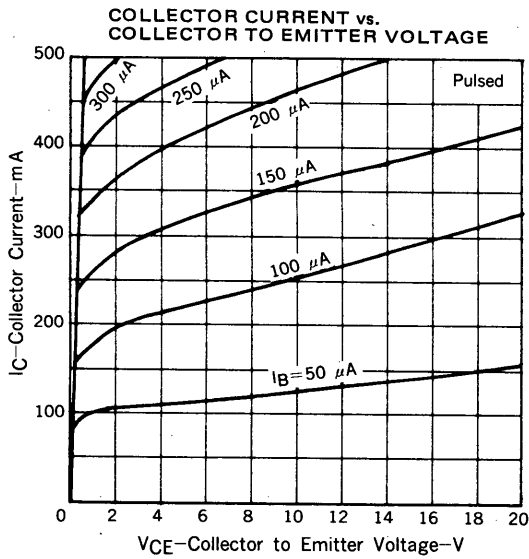
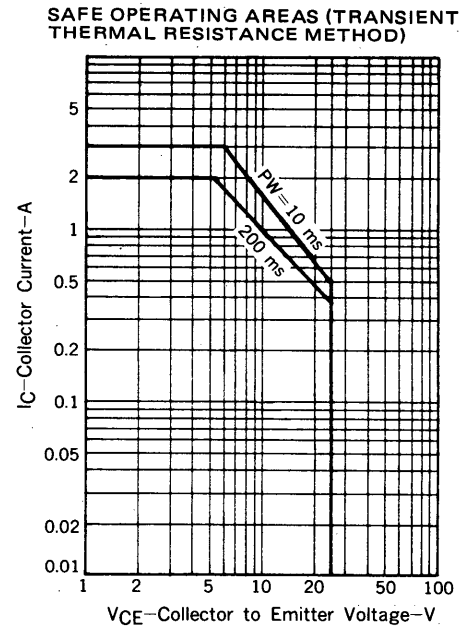
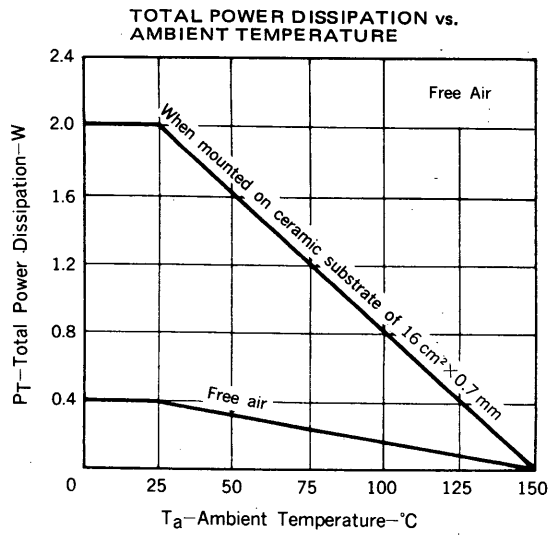
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDICTIONS
Collector Cutoff Current	$I_{CBO}$			100	nA	$V_{CB} = 30\ V, I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			100	nA	$V_{EB} = 10\ V, I_C = 0$
DC Current Gain	$h_{FE1}^{***}$	800	1500	3200		$V_{CE} = 5.0\ V, I_C = 1.0\ A$
DC Current Gain	$h_{FE2}^{***}$	400				$V_{CE} = 5.0\ V, I_C = 2.0\ A$
Collector Saturation Voltage	$V_{CE(sat)}^{***}$		0.18	0.3	V	$I_C = 1.0\ A, I_B = 10\ mA$
Base Saturation Voltage	$V_{BE(sat)}^{***}$		0.83	1.2	V	$I_C = 1.0\ A, I_B = 10\ mA$
Base to Emitter Voltage	$V_{BE}^{***}$	600	660	700	mV	$V_{CE} = 5.0\ V, I_C = 300\ mA$
Gain Bandwidth Product	$f_T$	150	350		MHz	$V_{CE} = 10\ V, I_E = -500\ mA$
Output Capacitance	$C_{ob}$		26	35	pF	$V_{CB} = 10\ V, I_E = 0, f = 1.0\ MHz$

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

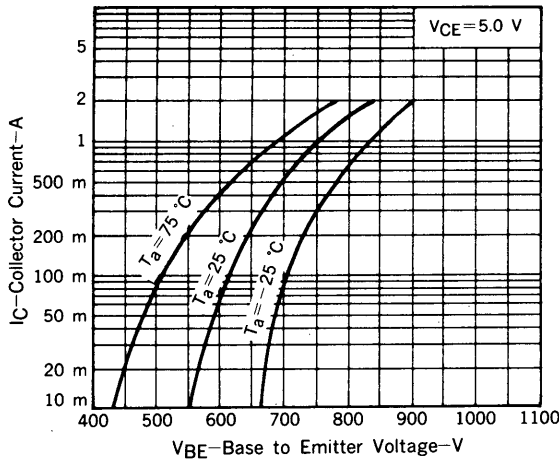
$h_{FE}$  Classification

MARKING	VM	VL	VK
$h_{FE}$	800 to 1600	1200 to 2400	2000 to 3200

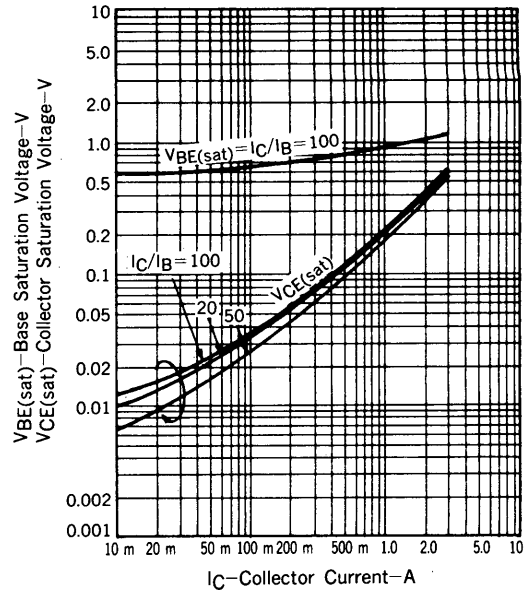
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



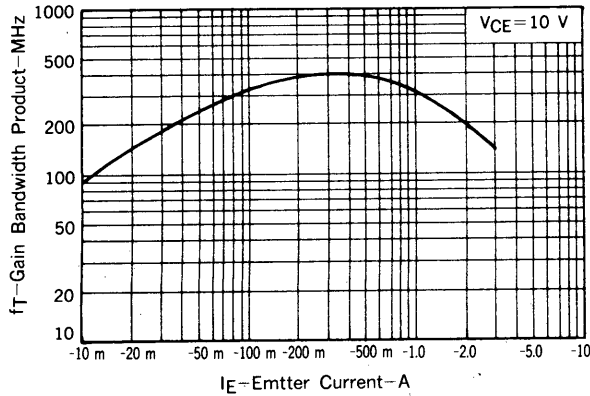
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



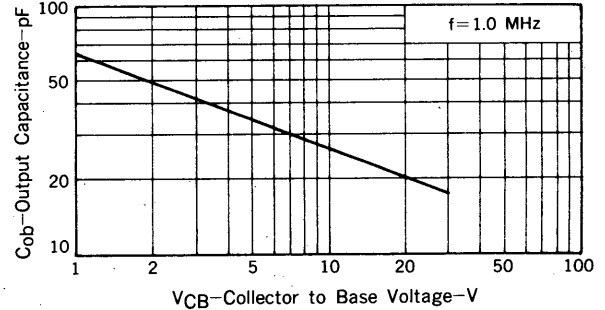
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



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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