

NPN SILICON EPITAXIAL TRANSISTOR
MP-3

DESCRIPTION

2SD1583-Z is designed for Audio Frequency Amplifier and Switching, especially in Hybrid Integrated Circuits.

FEATURES

- High h_{FE} : $h_{FE} = 800$ to $3\,200$
- Low $V_{CE(sat)}$ $V_{CE(sat)} = 0.18\text{ V TYP.}$

QUALITY GRADE

Standard

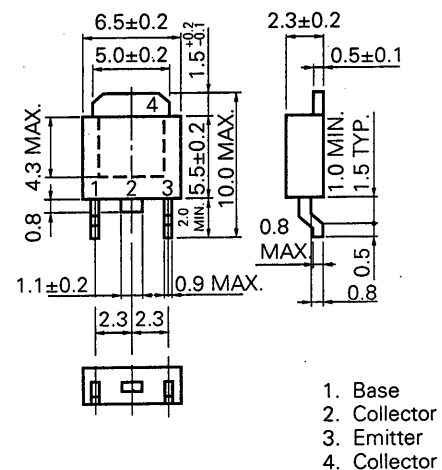
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS ($T_a = 25\text{ }^{\circ}\text{C}$)

Collector to Base Voltage	V_{CBO}	30	V
Collector to Emitter Voltage	V_{CEO}	20	V
Emitter to Base Voltage	V_{EBO}	5	V
Collector Current (DC)	I_C	2	A
Collector Current (Pulse)*	I_C	3	A
Total Power Dissipation ($T_a = 25\text{ }^{\circ}\text{C}$)**	P_T	2.0	W
Junction Temperature	T_j	150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 to +150	$^{\circ}\text{C}$

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

** When mounted on ceramic substrate of $7.5\text{ cm}^2 \times 0.7\text{ mm}$

PACKAGE DIMENSIONS
(in millimeters)

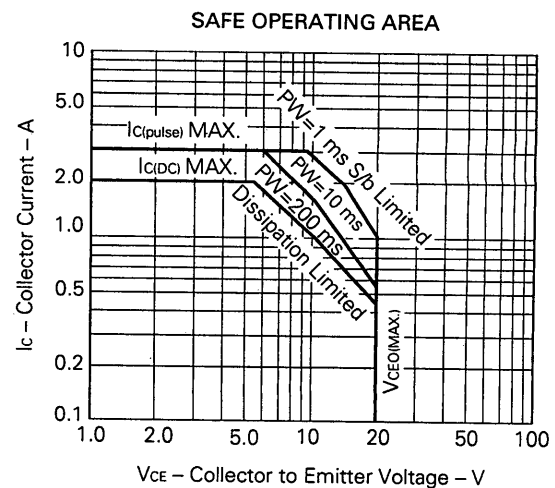
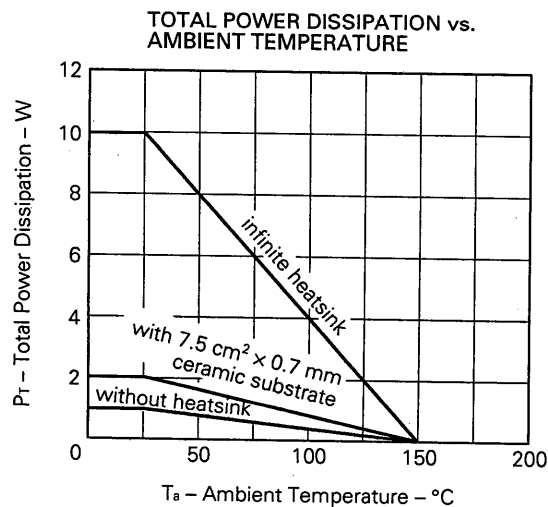
ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			10	μA	$V_{CB} = 20\text{ V}, I_E = 0$
Emitter Cutoff Current	I_{EBO}			10	μA	$V_{EB} = 5.0\text{ V}, I_C = 0$
DC Current Gain	h_{FE1}^*	600	2 000			$V_{CE} = 5.0\text{ V}, I_C = 50\text{ mA}$
DC Current Gain	h_{FE2}^*	800	2 000	3 200		$V_{CE} = 5.0\text{ V}, I_C = 0.5\text{ A}$
DC Current Gain	h_{FE3}^*	500	1 400			$V_{CE} = 5.0\text{ V}, I_C = 2.0\text{ A}$
Collector Saturation Voltage	$V_{CE(sat)}^*$		0.18	0.5	V	$I_C = 1.0\text{ A}, I_B = 10\text{ mA}$
Base Saturation Voltage	$V_{BE(sat)}^*$		0.85	1.2	V	$I_C = 1.0\text{ A}, I_B = 10\text{ mA}$
Gain Bandwidth Product	f_r		270		MHz	$V_{CE} = 5.0\text{ V}, I_E = 100\text{ mA}$
Output Capacitance	C_{ob}		20		pF	$V_{CB} = 10\text{ V}, I_E = 0, f \approx 1.0\text{ MHz}$
Turn-on Time	t_{on}		0.6		μs	$I_C = 1\text{ A}, V_{CC} \approx 10\text{ V}$ $I_{B1} = -I_{B2} = 10\text{ mA}$
Storage Time	t_{stg}		1.5		μs	
Fall Time	t_f		0.3		μs	

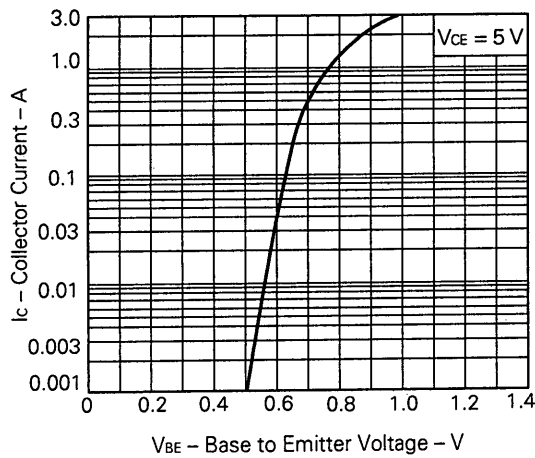
* Pulsed: $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

 h_{FE} Classification

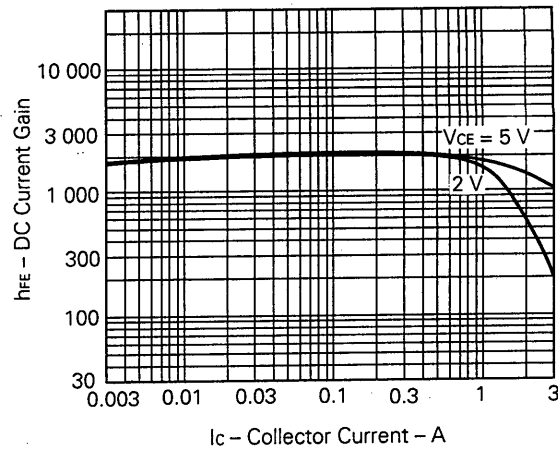
MARKING	M	L	K
h_{FE2}	800 to 1 600	1 000 to 2 000	1 600 to 3 200

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

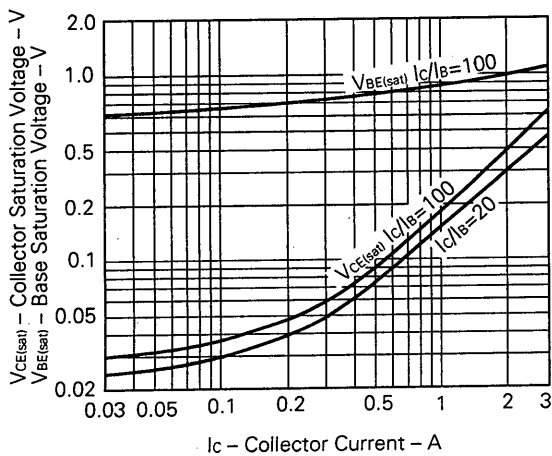
BASE TO EMITTER VOLTAGE vs.
COLLECTOR CURRENT



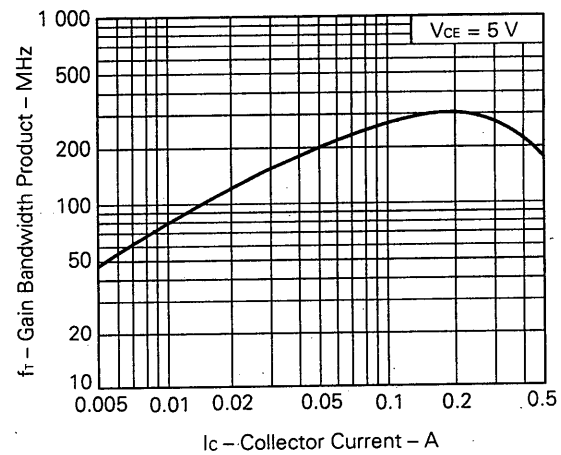
DC CURRENT GAIN vs.
COLLECTOR CURRENT



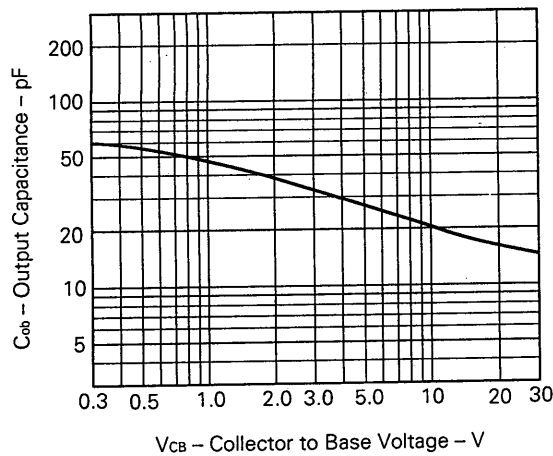
COLLECTOR TO BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs.
COLLECTOR CURRENT



OUTPUT CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



Reference

Application note name	No.
Quality control of NEC semiconductors devices.	TEI-1202
Quality control guide of semiconductors devices.	MEI-1202
Assembly manual of semiconductors devices.	IEI-1207
Design of Push-Pull Type Switching Regulators (Basic)	TEB-1002
Design of Push-Pull Type Switching Regulators (Applications)	TEB-1003
Optimum Base Drive Conditions of Switching Power Transistors	TEB-1014

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Application examples recommended by NEC Corporation.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.