

NPN SILICON EPITAXIAL TRANSISTOR
FOR LOW-FREQUENCY POWER AMPLIFIERS

The 2SD2230 is an element realizing ultra low $V_{CE(sat)}$. This transistor is ideal for muting such as stereo recorders, VCRs, and TVs.

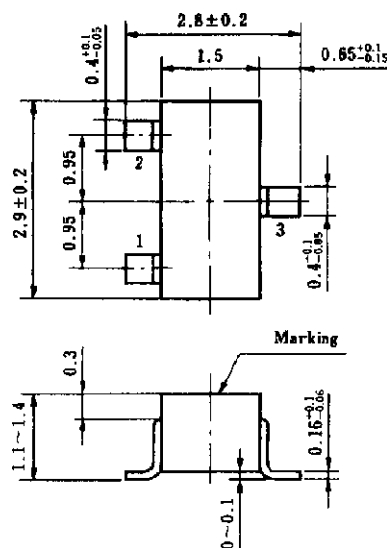
FEATURES

- Low $V_{CE(sat)}$:
 $V_{CE(sat)1} = 33 \text{ mV TYP. @ } I_c = 100 \text{ mA, } I_B = 10 \text{ mA}$
 $V_{CE(sat)2} = 150 \text{ mV TYP. @ } I_c = 500 \text{ mA, } I_B = 20 \text{ mA}$
- High h_{FE} and high current

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.

PACKAGE DRAWING (UNIT: mm)



Electrode connection
 1. Emitter (E)
 2. Base (B)
 3. Collector (C)
 Marking: D46

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

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	16	V
Collector to emitter voltage	V_{CEO}	16	V
Emitter to base voltage	V_{EBO}	5	V
Collector current (DC)	$I_{D(DC)}$	500	mA
Total power dissipation	P_T	200	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

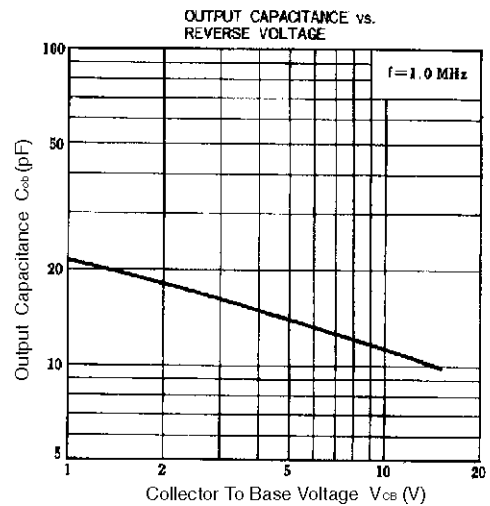
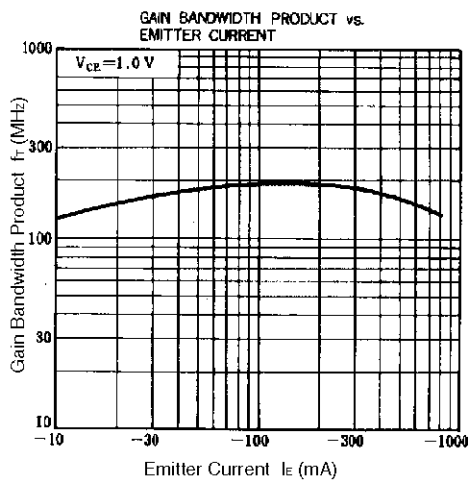
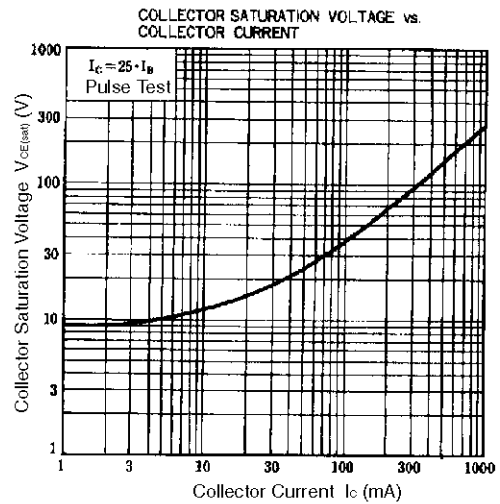
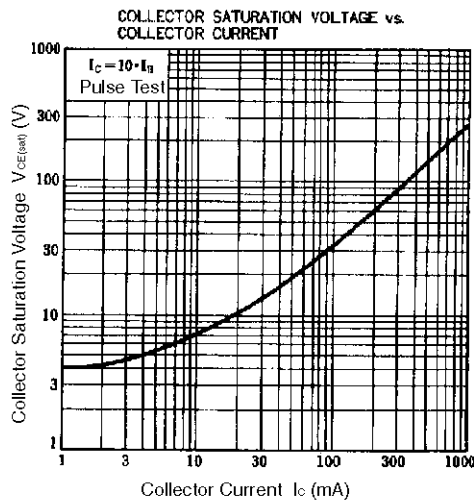
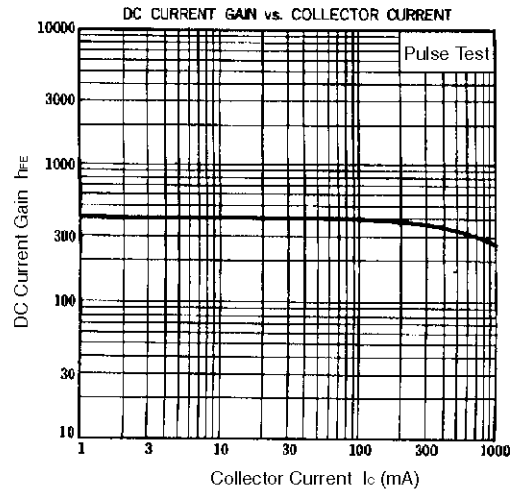
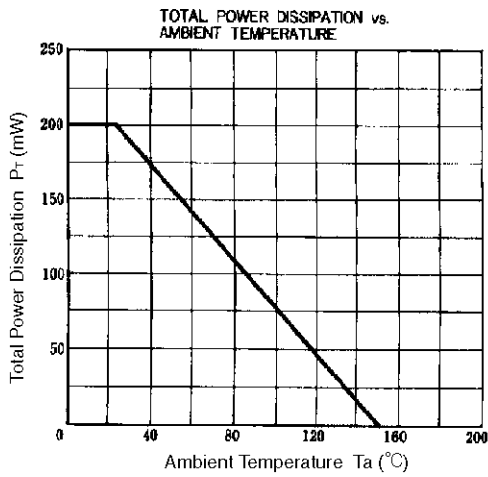
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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Collector cutoff current	I_{CBO}	$V_{CB} = 16\text{ V}, I_E = 0$			100	nA
Emitter cutoff current	I_{EBO}	$V_{EB} = 6.0\text{ V}, I_C = 0$			100	nA
DC current gain	h_{FE1}^*	$V_{CE} = 1.0\text{ V}, I_C = 100\text{ mA}$	200			–
DC current gain	h_{FE2}^*	$V_{CE} = 1.0\text{ V}, I_C = 500\text{ mA}$	200			–
DC base voltage	V_{BE}^*	$V_{CE} = 1.0\text{ V}, I_C = 10\text{ mA}$	550		700	mV
Collector saturation voltage	$V_{CE(sat)1}$	$I_C = 100\text{ mA}, I_B = 10\text{ mA}$		33	50	mV
Collector saturation voltage	$V_{CE(sat)2}$	$I_C = 500\text{ mA}, I_B = 20\text{ mA}$		150	200	mV
Output capacitance	C_{ob}	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$			15	pF
Gain bandwidth product	f_T	$V_{CE} = 1.0\text{ V}, I_E = -100\text{ mA}$	50			MHz

* Pulse test $PW \leq 350\ \mu s$, duty cycle $\leq 2\%$

TYPICAL CHARACTERISTICS (Ta = 25°C)



RECOMMENDED SOLDERING CONDITIONS

This product should be soldered and mounted under the following recommended conditions.

For soldering methods and conditions other than those recommended below, contact an NEC sales representative.

Surface Mounting Type

For details of the recommended soldering conditions, refer to the document **Semiconductor Device Mounting Technology Manual (C10535E)**.

Soldering Method	Soldering Conditions	Recommended Condition Symbol
Infrared reflow	Package peak temperature: 230°C, Time: 30 sec. max. (at 210°C or higher), Count: Once, Exposure limit: None*	IR30-00
VPS	Package peak temperature: 215°C, Time: 40 sec. max. (at 200°C or higher), Count: Once, Exposure limit: None*	VP15-00
Partial heating	Pin temperature: 300°C max., Time: 10 sec. max. Exposure limit: None*	O

* After opening the dry pack, store it at 25°C or less and 65% RH or less for the allowable storage period.

Caution Do not use different soldering methods together (except for partial heating).

[MEMO]

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 - "Special": Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
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