DATA SHEET

NEC

SILICON TRANSISTOR
2SD2230

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.

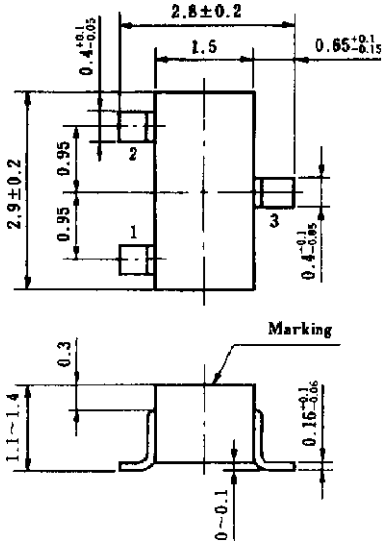
FEATURES

- Low $V_{CE(sat)}$:
  $V_{CE(sat)1}$ = 33 mV TYP. @ I_C = 100 mA, I_B = 10 mA
  $V_{CE(sat)2}$ = 150 mV TYP. @ I_C = 500 mA, I_B = 20 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 (Ta = 25°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	°C
Storage temperature	T_{stg}	–55 to +150	°C

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

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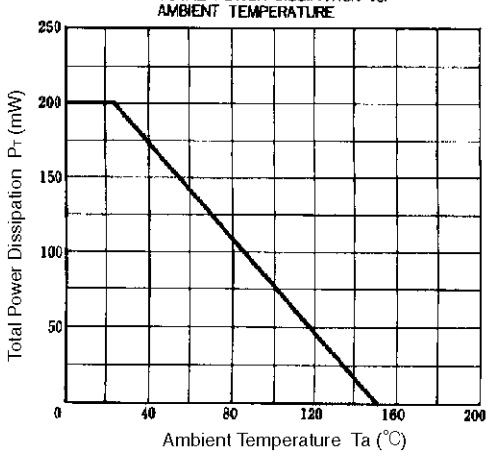
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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

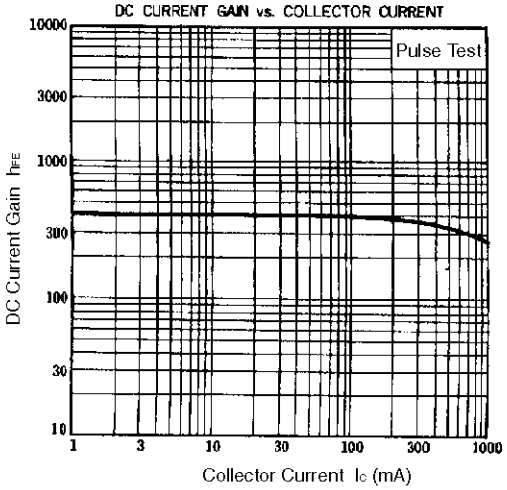
* Pulse test PW ≤ 350 μs, duty cycle ≤ 2%

TYPICAL CHARACTERISTICS (Ta = 25°C)

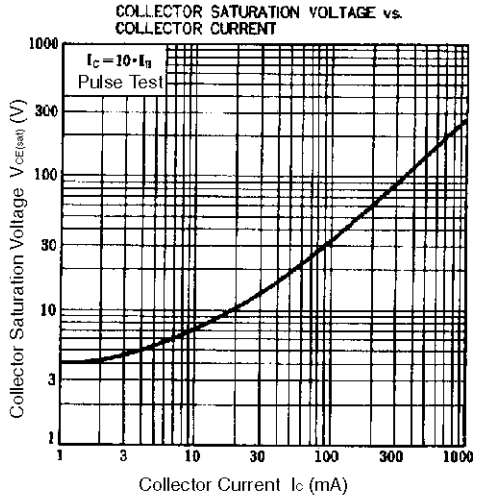
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



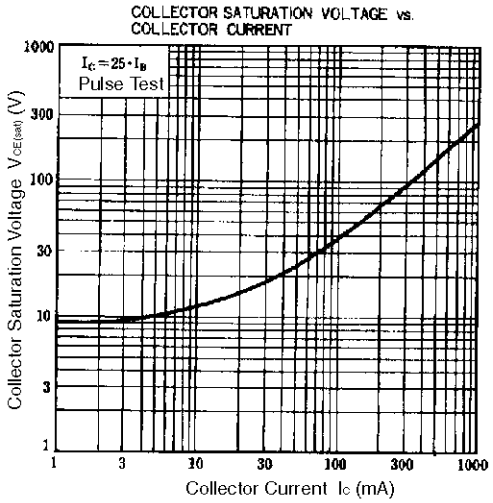
DC CURRENT GAIN vs. COLLECTOR CURRENT



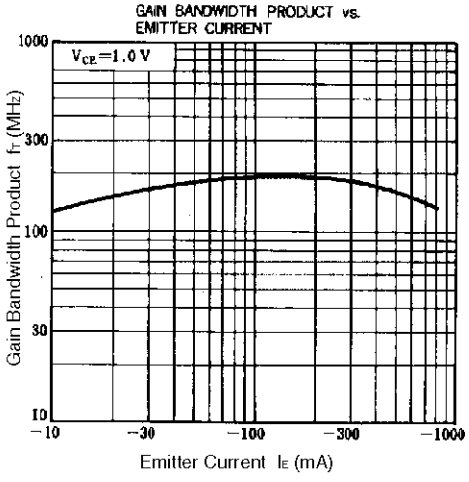
COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



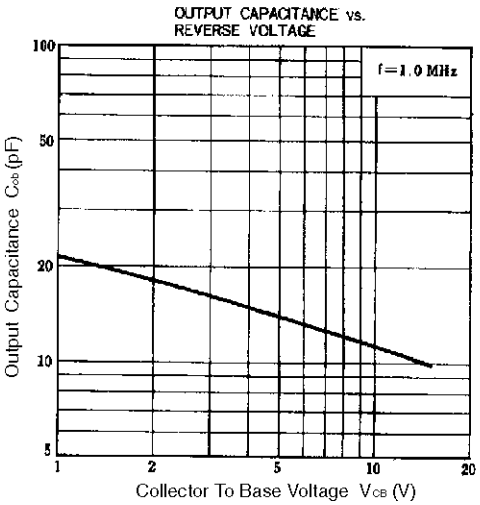
COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



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)
  "Specific": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.
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  (2) "NEC semiconductor products" means any semiconductor product developed or manufactured by or for NEC (as defined above).

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