NEC

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SILICON TRANSISTOR
2SA1412-Z

PNP SILICON TRIPLE DIFFUSED TRANSISTOR
MP-3

DESCRIPTION

2SA1412-Z is designed for High Voltage Switching, especially in Hybrid Integrated Circuits.

FEATURES

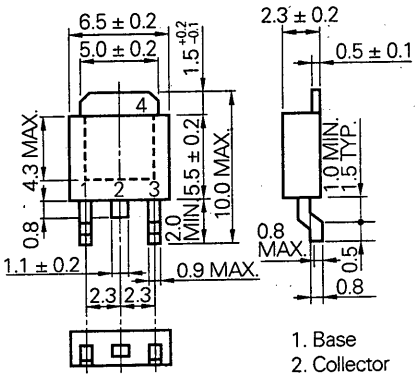
- High Voltage : V_{CEO} = –400 V
- High Speed : $t_f \leqq 0.7$ μs
- Complement to 2SC3631-Z

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.

PACKAGE DIMENSIONS
(in millimeters)



ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Collector to Base Voltage	V_{CBO}	–400	V
Collector to Emitter Voltage	V_{CEO}	–400	V
Emitter to Base Voltage	V_{EBO}	–7	V
Collector Current (DC)	I_C	–2.0	A
Collector Current (Pulse)*	I_C	–4.0	A
Total Power Dissipation (T_a = 25 °C)**	P_T	2.0	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–55 to +150	°C

* PW ≦ 10 ms, Duty Cycle ≦ 50 %

** When mounted on ceramic substrate of 7.5 cm² × 0.7 mm

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ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			−10	μA	V_{CB} = −400 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			−10	μA	V_{EB} = −5.0 V, I_C = 0
DC Current Gain	h_{FE1}*	40	60	120		V_{CE} = −5.0 V, I_C = −0.1 A
DC Current Gain	h_{FE2}*	10	22			V_{CE} = −5.0 V, I_C = −1.0 A
Collector Saturation Voltage	$V_{CE(sat)}$*		−0.25	−0.5	V	I_C = −0.5 A, I_B = −0.1 A
Base Saturation Voltage	$V_{BE(sat)}$*		−0.85	−1.2	V	I_C = −0.5 A, I_B = −0.1 A
Gain Bandwidth Product	f_T		40		MHz	V_{CE} = −10 V, I_E = −100 mA
Output Capacitance	C_{ob}		30		pF	V_{CB} = −10 V, I_E = 0, f = 1.0 MHz
Turn-on Time	t_{on}		0.03	0.5	μs	I_C = −1.0 A, R_L = 150 Ω I_{B1} = −I_{B2} = −0.2 A, V_{CC} = −150 V
Storage Time	t_{stg}		1.4	2.0	μs	
Fall time	t_f		0.1	0.7	μs	

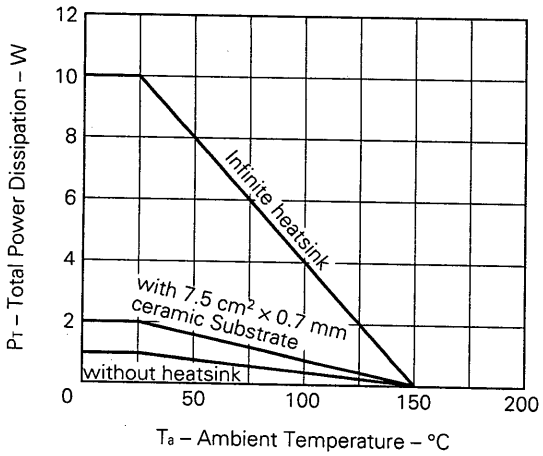
* Pulsed: PW ≦ 350 μs, Duty Cycle ≦ 2 %

h_{FE} Classification

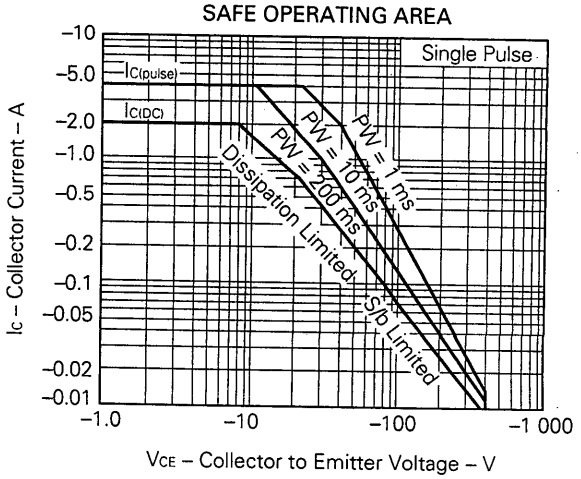
MARKING	L	K
h_{FE1}	40 to 80	60 to 120

TYPICAL CHARACTERISTICS (T_a = 25 °C)

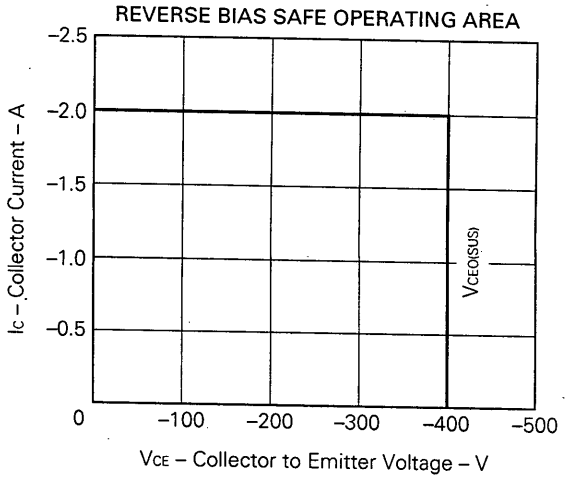
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



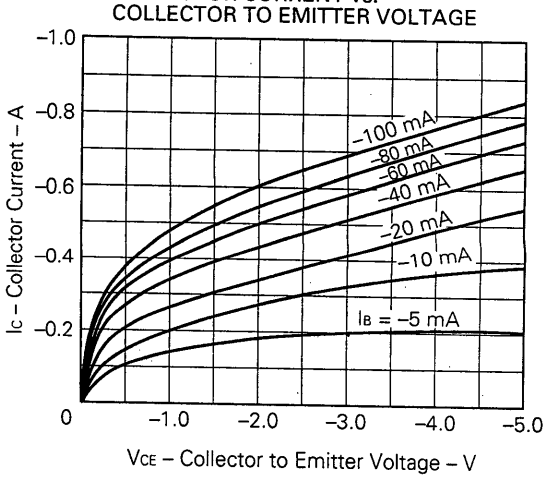
SAFE OPERATING AREA



REVERSE BIAS SAFE OPERATING AREA



COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



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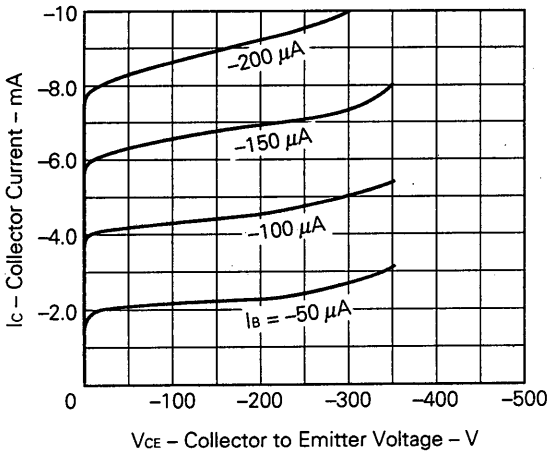
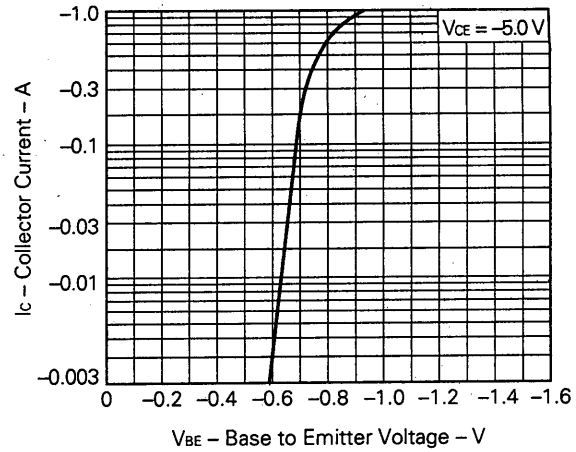
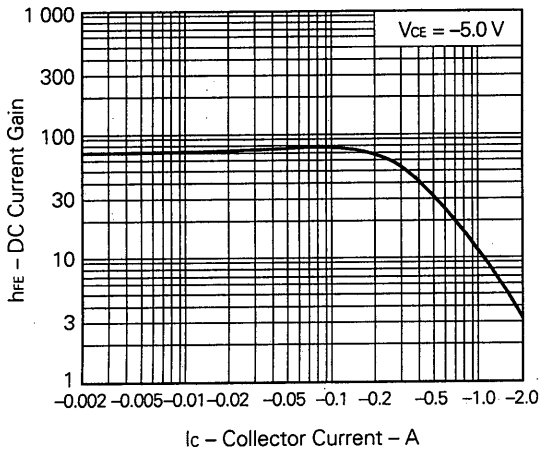
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



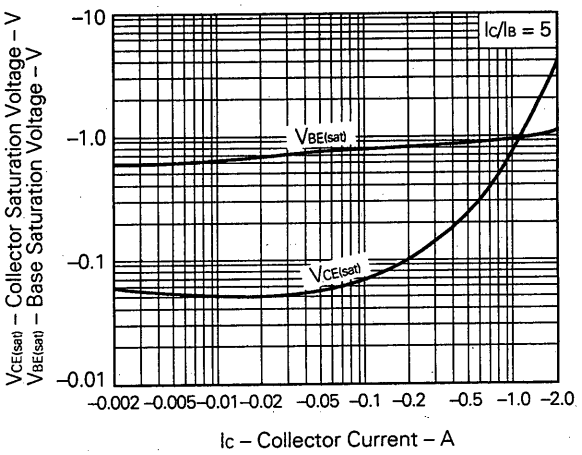
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



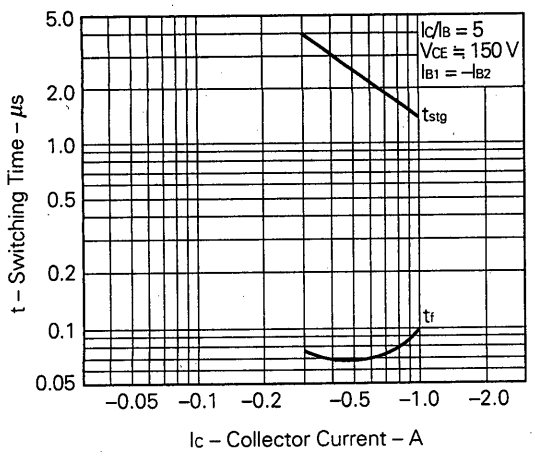
DC CURRENT GAIN vs.
COLLECTOR CURRENT



COLLECTOR AND BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT



TURN-OFF TIME vs. COLLECTOR CURRENT



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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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