

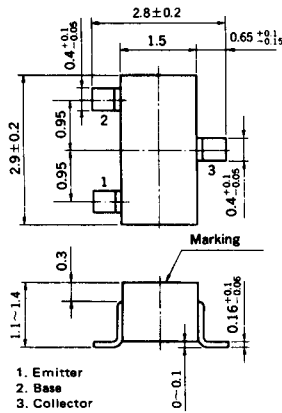
# SILICON TRANSISTOR

## 2SA1411

### AUDIO FREQUENCY AMPLIFIER, SWITCHING

### PNP SILICON EPITAXIAL TRANSISTOR

#### PACKAGE DIMENSIONS in millimeters



#### FEATURES

- Very high DC current gain :  $h_{FE} = 500$  to  $1600$
- High  $V_{EBO}$  Voltage :  $V_{EBO} = -10$  V

#### ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Current ( $T_a = 25^\circ\text{C}$ )

Collector to Base Voltage	$V_{CBO}$	-25	V
Collector to Emitter Voltage	$V_{CEO}$	-25	V
Emitter to Base Voltage	$V_{EBO}$	-10	V
Collector Current (DC)	$I_C$	-150	mA

Maximum Power Dissipation

Total power Dissipation at $25^\circ\text{C}$ Ambient Temperature	$P_T$	200	mW
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Maximum Temperatures

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

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	$I_{CBO}$			-100	nA	$V_{CB} = -25$ V, $I_E = 0$
Emitter Cutoff Current	$I_{EBO}$			-100	nA	$V_{EB} = -7$ V, $I_C = 0$
DC Current Gain	$h_{FE1}^*$	500	1000	1600		$V_{CE} = -5.0$ V, $I_C = -1.0$ mA
DC Current Gain	$h_{FE2}^*$	200	400			$V_{CE} = -5.0$ V, $I_C = -100$ mA
Base to Emitter Voltage	$V_{BE}^*$		-580		mV	$V_{CE} = -5.0$ V, $I_C = -1.0$ mA
Collector Saturation Voltage	$V_{CE(sat)}^*$		-0.15	-0.30	V	$I_C = -50$ mA, $I_B = -5.0$ mA
Base Saturation Voltage	$V_{BE(sat)}^*$		-0.8	-1.2	V	$I_C = -50$ mA, $I_B = -5.0$ mA
Gain Bandwidth Product	$f_T$		200		MHz	$V_{CE} = -5.0$ V, $I_E = 10$ mA
Output Capacitance	$C_{ob}$		4.6		pF	$V_{CB} = -5.0$ V, $I_E = 0$ , $f = 1.0$ MHz
Turn-on Time	$t_{on}$		0.12		ns	$V_{CC} = -10$ V, $V_{BE(off)} = 2.7$ V
Storage Time	$t_{stg}$		0.58		ns	$I_C = -50$ mA
Turn-off Time	$t_{off}$		0.75		ns	$I_{B1} = -I_{B2} = -1.0$ mA

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

#### $h_{FE}$ Classification

Making	M15	M16
$h_{FE1}$	500 to 1000	800 to 1600