NEC

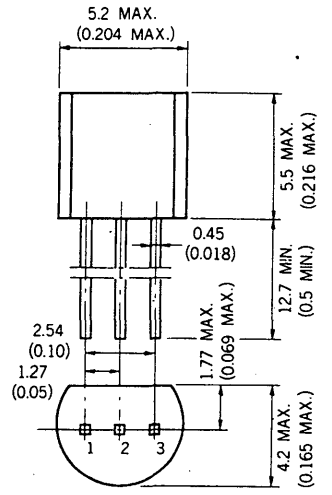
NPN SILICON TRANSISTORS
2SC3478, 2SC3478A

DESCRIPTION The 2SC3478/3478A is designed for general-purpose applications requiring high Breakdown Voltages.

FEATURES

- High Breakdown Voltage.
  V_{CEO} = 180 V/200 V (2SC3478/2SC3478A)
- Good h_{FE} linearity.
- A complementary pair with 2SA1376/2SA1376A.

PACKAGE DIMENSIONS
in millimeters (inches)



1. EMITTER
2. COLLECTOR
3. BASE

EIAJ : SC-43B
JEDEC : TO-92
IEC : PA33

ABSOLUTE MAXIMUM RATINGS

Maximum Temperatures

Storage Temperature . . . . . −55 to +150 °C

Junction Temperature . . . . . 150 °C Maximum

Maximum Power Dissipation (T_a = 25 °C)

Total Power Dissipation . . . . . 750 mW

Maximum Voltages and Currents (T_a = 25 °C)

		2SC3478/2SC3478A	
V_{CBO}	Collector to Base Voltage	200	V
V_{CEO}	Collector to Emitter Voltage . .	180/200	V
V_{EBO}	Emitter to Base Voltage	5.0	V
I_C	Collector Current (DC)	100	mA
I_C	Collector Current (pulse)*	200	mA
I_B	Base Current (DC)	20	mA

*PW ≦ 10 ms, Duty Cycle ≦ 50 %

ELECTRICAL CHARACTERISTICS (T_a = 25 °C)

2SC3478/2SC3478A

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{FE}	DC Current Gain	135		400/600	–	V_{CE} = 10 V, I_C = 10 mA
t_{on}	Turn-on Time		0.15		μs	I_C = 10 mA
t_{off}	Turn-off Time		1.6		μs	I_{B1} = −I_{B2} = 1 mA, V_{CC} = 10 V
f_T	Gain Bandwidth Product	100	150		MHz	V_{CE} = 10 V, I_E = −10 mA
C_{ob}	Output Capacitance		2.6	3.5	pF	V_{CB} = 30 V, I_E = 0, f = 1.0 MHz
I_{CBO}	Collector Cutoff Current			100	nA	V_{CB} = 200 V, I_E = 0
I_{EBO}	Emitter Cutoff Current			100	nA	V_{EB} = 4.0 V, I_C = 0
V_{BE}	Base to Emitter Voltage	600	660	700	mV	V_{CE} = 10 V, I_C = 10 mA
$V_{CE(sat)}$	Collector Saturation Voltage		0.1	0.3	V	I_C = 50 mA, I_B = 5.0 mA
$V_{BE(sat)}$	Base Saturation Voltage		0.8	1.2	V	I_C = 50 mA, I_B = 5.0 mA

Classification of h_{FE}

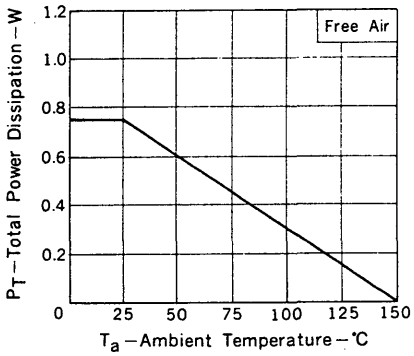
Rank	L	K	U**
Range	135 – 270	200 – 400	300 – 600

Test Conditions: V_{CE} = 10 V, I_C = 10 mA

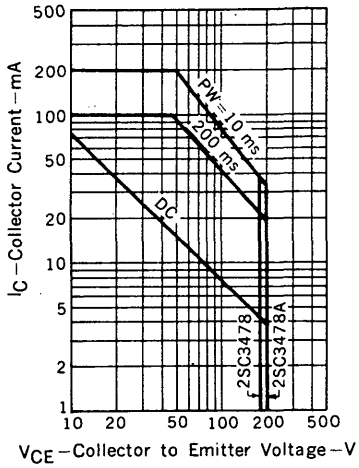
** 2SC3478A has no U rank.

TYPICAL CHARACTERISTICS (T_a = 25 °C)

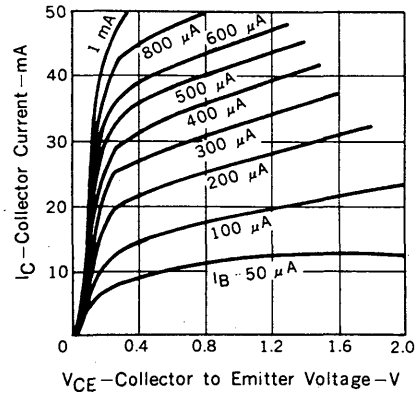
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



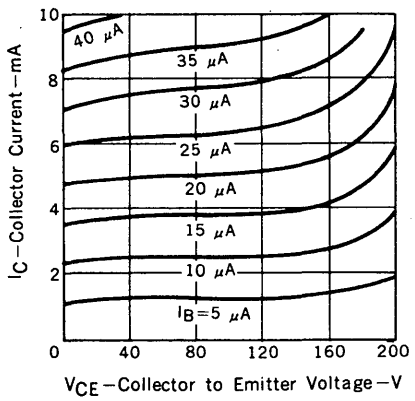
SAFE OPERATING AREAS (TRANSIENT THERMAL RESISTANCE METHOD)



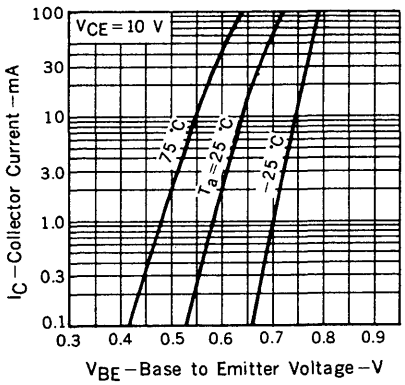
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



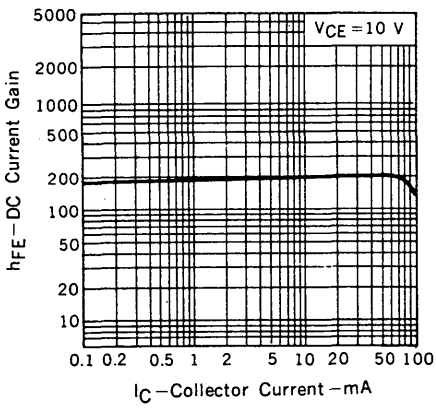
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



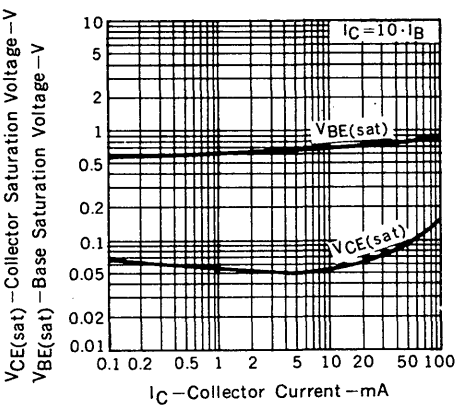
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



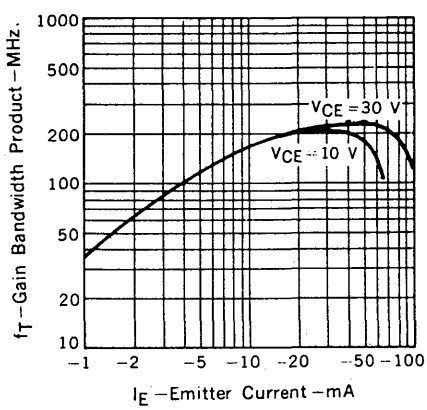
DC CURRENT GAIN vs. COLLECTOR CURRENT



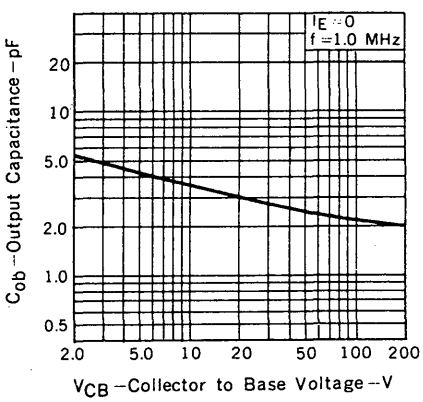
BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



SWITCHING TIME vs.
COLLECTOR CURRENT