

NPN SILICON EPITAXIAL TRANSISTOR  
MP-3

## DESCRIPTION

2SC3518-Z is designed for Audio Frequency Amplifier and Switching, especially in Hybrid Integrated Circuits.

## FEATURES

- High DC Current Gain  $h_{FE} = 100$  to  $400$
- Low  $V_{CE(sat)}$ :  $V_{CE(sat)} = 0.09$  V TYP.
- Complement to 2SA1385-Z

## QUALITY GRADE

Standard

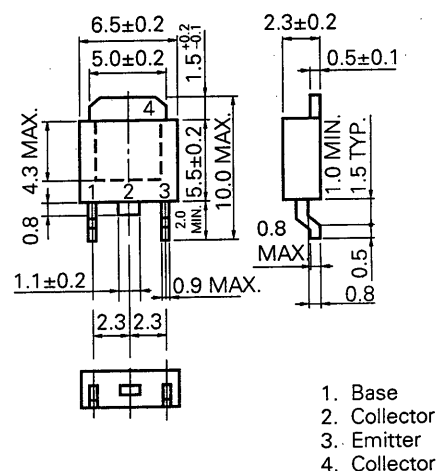
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

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

|                                                                  |           |             |                    |
|------------------------------------------------------------------|-----------|-------------|--------------------|
| Collector to Base Voltage                                        | $V_{CBO}$ | 60          | V                  |
| Collector to Emitter Voltage                                     | $V_{CEO}$ | 60          | V                  |
| Emitter to Base Voltage                                          | $V_{EBO}$ | 7           | V                  |
| Collector Current (DC)                                           | $I_C$     | 5           | A                  |
| Collector Current (Pulse)*                                       | $I_C$     | 7           | A                  |
| Total Power Dissipation ( $T_a = 25\text{ }^{\circ}\text{C}$ )** | $P_T$     | 2.0         | W                  |
| Junction Temperature                                             | $T_j$     | 150         | $^{\circ}\text{C}$ |
| Storage Temperature                                              | $T_{stg}$ | -55 to +150 | $^{\circ}\text{C}$ |

\*  $PW \leq 10$  ms, Duty Cycle  $\leq 50\%$

\*\* When mounted on ceramic substrate of  $7.5\text{ cm}^2 \times 0.7\text{ mm}$

PACKAGE DIMENSIONS  
(in millimeters)

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

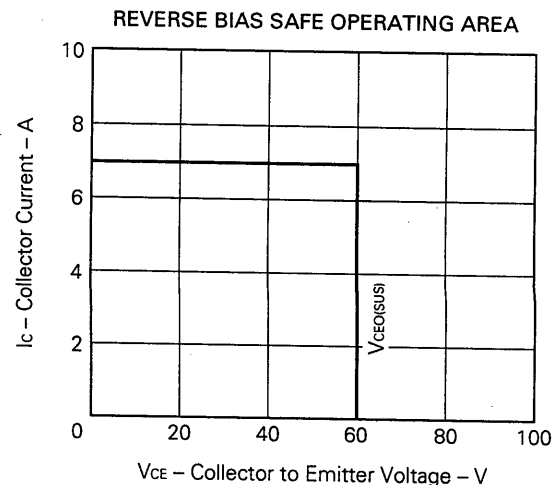
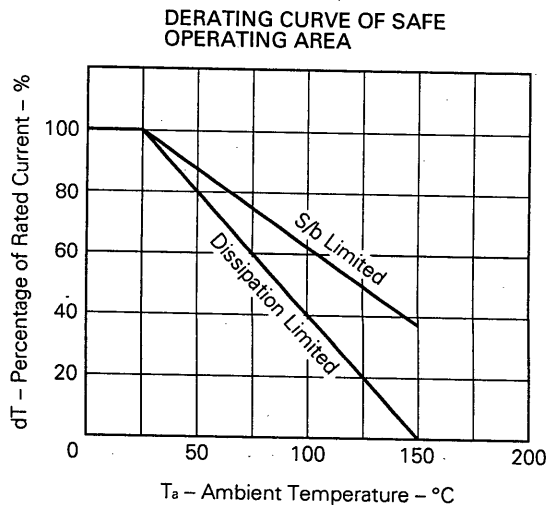
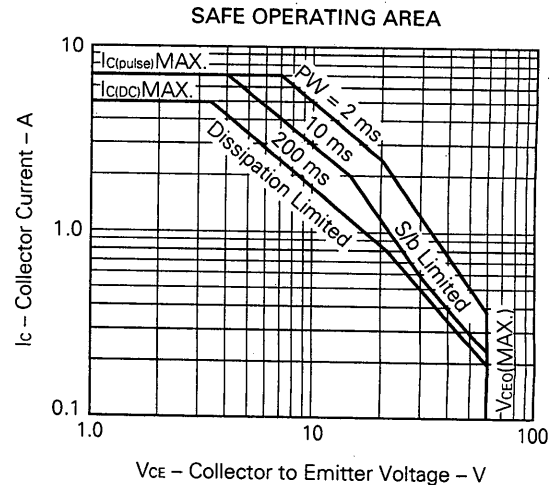
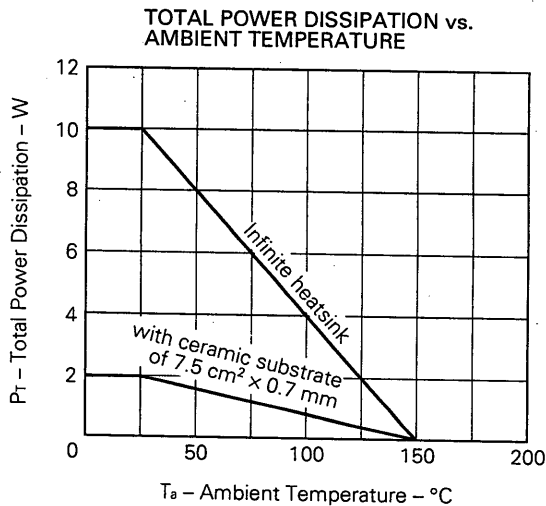
| CHARACTERISTIC               | SYMBOL          | MIN. | TYP. | MAX. | UNIT          | TEST CONDITIONS                                                                                              |
|------------------------------|-----------------|------|------|------|---------------|--------------------------------------------------------------------------------------------------------------|
| Collector Cutoff Current     | $I_{CBO}$       |      |      | 10   | $\mu\text{A}$ | $V_{CB} = 50\text{ V}, I_E = 0$                                                                              |
| Emitter Cutoff Current       | $I_{EBO}$       |      |      | 10   | $\mu\text{A}$ | $V_{EB} = 7.0\text{ V}, I_C = 0$                                                                             |
| DC Current Gain              | $h_{FE1}^*$     | 100  |      | 400  |               | $V_{CE} = 1.0\text{ V}, I_C = 2.0\text{ A}$                                                                  |
| DC Current Gain              | $h_{FE2}^*$     | 50   |      |      |               | $V_{CE} = 1.0\text{ V}, I_C = 5.0\text{ A}$                                                                  |
| Collector Saturation Voltage | $V_{CE(sat)}^*$ |      |      | 0.3  | V             | $I_C = 2.0\text{ A}, I_B = 0.2\text{ A}$                                                                     |
| Base Saturation Voltage      | $V_{BE(sat)}^*$ |      |      | 1.2  | V             | $I_C = 2.0\text{ A}, I_B = 0.2\text{ A}$                                                                     |
| Gain Bandwidth Product       | $f_T^*$         |      | 120  |      | MHz           | $V_{CE} = 10\text{ V}, I_E = 500\text{ mA}$                                                                  |
| Turn-on Time                 | $t_{on}$        |      | 0.07 | 1.0  | $\mu\text{s}$ | $I_C = 2.0\text{ A}, V_{CC} \approx 10\text{ V}$<br>$R_L = 5.0\ \Omega$<br>$I_{B1} = -I_{B2} = 0.2\text{ A}$ |
| Storage Time                 | $t_{stg}$       |      | 0.8  | 2.5  | $\mu\text{s}$ |                                                                                                              |
| Fall Time                    | $t_f$           |      | 0.12 | 1.0  | $\mu\text{s}$ |                                                                                                              |

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

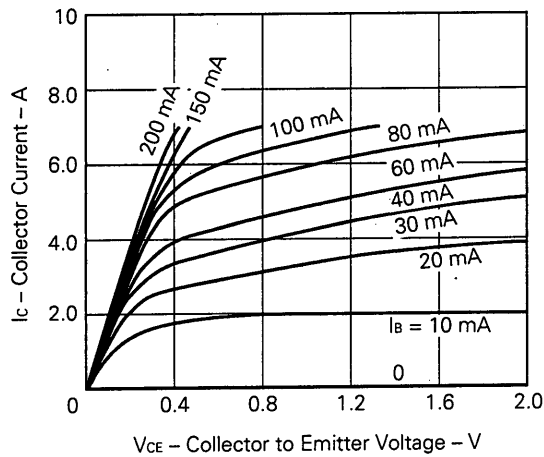
**$h_{FE}$  Classification**

| MARKING   | M          | L          | K          |
|-----------|------------|------------|------------|
| $h_{FE1}$ | 100 to 200 | 160 to 320 | 200 to 400 |

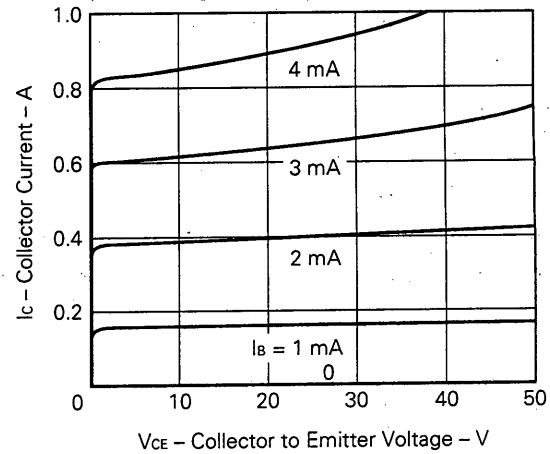
**TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )**



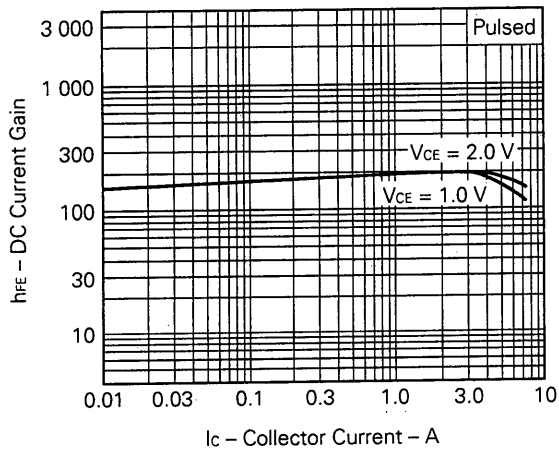
COLLECTOR CURRENT vs.  
COLLECTOR TO EMITTER VOLTAGE



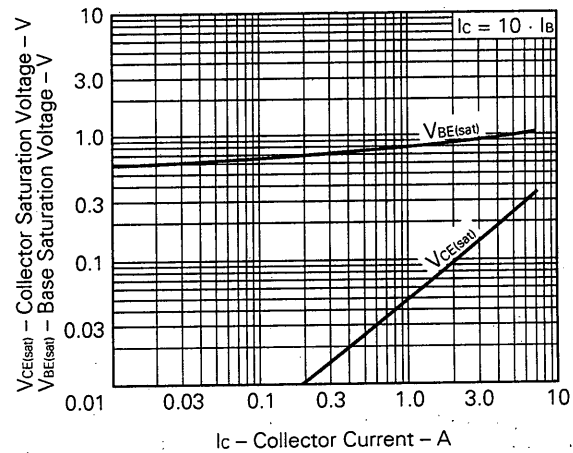
COLLECTOR CURRENT vs.  
COLLECTOR TO EMITTER VOLTAGE



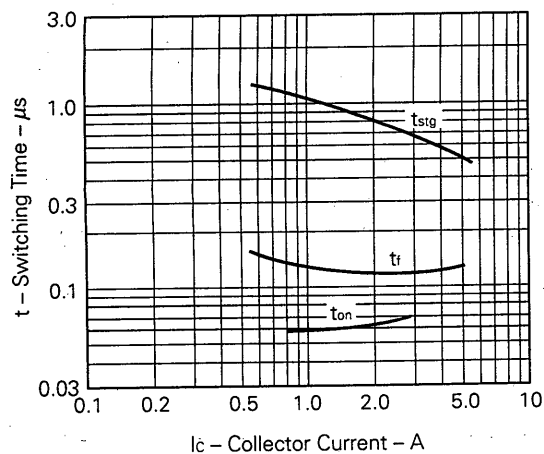
DC CURRENT GAIN vs.  
COLLECTOR CURRENT



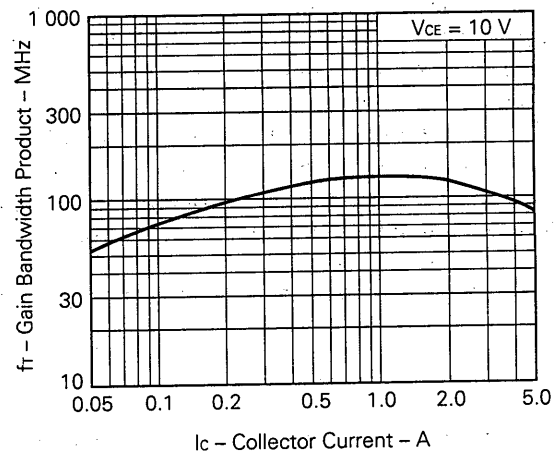
COLLECTOR AND BASE SATURATION  
VOLTAGE vs. COLLECTOR CURRENT



SWITCHING TIME vs.  
COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs.  
COLLECTOR CURRENT



**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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Application examples recommended by NEC Corporation.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.