

Medium Power Transistor (60V, 3A)

MP6Z3

●Features

- 1) High speed switching. (t_f : Typ. : 30ns at $I_c = 3A$)
- 2) Low saturation voltage, typically
(Typ. : 200mV at $I_c = 2A$, $I_B = 200mA$)
- 3) Strong discharge power for inductive load and capacitance load.
- 4) Contains 2SC5824-die and 2SA2071-die in a package.

●Applications

Low frequency amplifier
High speed switching

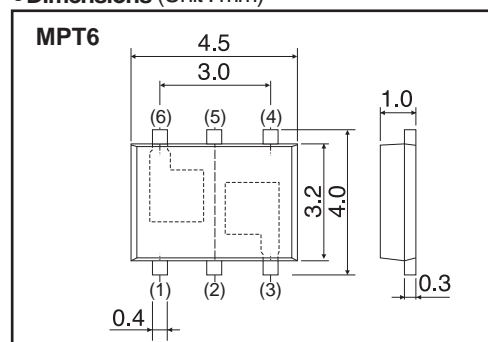
●Structure

Silicon epitaxial planar transistor

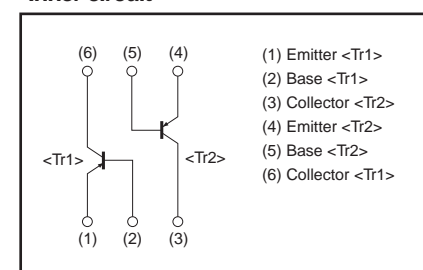
●Packaging specifications

| Type | Package | Taping |
|-------|-----------------------------|--------|
| | Code | TR |
| | Basic ordering unit(pieces) | 1000 |
| MP6Z3 | | ○ |

●Dimensions (Unit : mm)



●Inner circuit



●Absolute maximum ratings ($T_a = 25^\circ C$)

| Parameter | Symbol | Limits | | Unit | |
|------------------------------|------------|-------------|-----|-------------|---|
| | | Tr1 | Tr2 | | |
| Collector-base voltage | V_{CBO} | 60 | -60 | V | |
| Collector-emitter voltage | V_{CEO} | 60 | -60 | V | |
| Emitter-base voltage | V_{EBO} | 6 | -6 | V | |
| Collector current | Continuous | I_c | 3 | -3 | A |
| | Pulsed | I_{CP} *1 | 6 | -6 | A |
| Power dissipation | P_D *2 | 2.0 | | W / TOTAL | |
| | | 1.4 | | W / ELEMENT | |
| Junction temperature | T_j | 150 | | $^\circ C$ | |
| Range of storage temperature | T_{stg} | -55 to 150 | | $^\circ C$ | |

*1 $P_w = 10ms$ 1 Pulse

*2 Mounted on a ceramic board

Transistors

●Electrical characteristics (Ta=25°C)

<Tr1>

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------------|--------------------|------|------|------|---------|---|
| Collector-Emitter breakdown voltage | BV_{CEO} | 60 | – | – | V | $I_C=1mA$ |
| Collector-base breakdown voltage | BV_{CBO} | 60 | – | – | V | $I_C=100\mu A$ |
| Emitter-base breakdown voltage | BV_{EBO} | 6 | – | – | V | $I_E=100\mu A$ |
| Collector cut off current | I_{CBO} | – | – | 1.0 | μA | $V_{CB}=40V$ |
| Emitter cut off current | I_{EBO} | – | – | 1.0 | μA | $V_{EB}=4V$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}^{*1}$ | – | 200 | 500 | mV | $I_C=2.0A, I_B=0.2A$ |
| DC current gain | h_{FE} | 120 | – | 270 | – | $V_{CE}=2V, I_C=100mA$ |
| Transition frequency | f_r^{*1} | – | 200 | – | MHz | $V_{CE}=10V, I_E=-100mA, f=10MHz$ |
| Collector output capacitance | C_{ob} | – | 20 | – | pF | $V_{CB}=10V, I_E=0A, f=1MHz$ |
| Turn-on time | t_{on}^{*2} | – | 50 | – | ns | $I_C=3A$ |
| Storage time | t_{stg}^{*2} | – | 150 | – | ns | $I_{B1}=300mA$ |
| Fall time | t_f^{*2} | – | 30 | – | ns | $I_{B2}=-300mA$ $V_{CC} \approx 25V$ |

*1 Pulsed

*2 See switching time test circuit

<Tr2>

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------------|--------------------|------|------|------|---------|---|
| Collector-Emitter breakdown voltage | BV_{CEO} | -60 | – | – | V | $I_C=-1mA$ |
| Collector-base breakdown voltage | BV_{CBO} | -60 | – | – | V | $I_C=-100\mu A$ |
| Emitter-base breakdown voltage | BV_{EBO} | -6 | – | – | V | $I_E=-100\mu A$ |
| Collector cut off current | I_{CBO} | – | – | -1.0 | μA | $V_{CB}=-40V$ |
| Emitter cut off current | I_{EBO} | – | – | -1.0 | μA | $V_{EB}=-4V$ |
| Collector-emitter saturation voltage | $V_{CE(sat)}^{*1}$ | – | -200 | -500 | mV | $I_C=-2.0A, I_B=-0.2A$ |
| DC current gain | h_{FE} | 120 | – | 270 | – | $V_{CE}=-2V, I_C=-100mA$ |
| Transition frequency | f_r^{*1} | – | 180 | – | MHz | $V_{CE}=-10V, I_E=100mA, f=10MHz$ |
| Collector output capacitance | C_{ob} | – | 50 | – | pF | $V_{CB}=-10V, I_E=0A, f=1MHz$ |
| Turn-on time | t_{on}^{*2} | – | 20 | – | ns | $I_C=-3A$ |
| Storage time | t_{stg}^{*2} | – | 150 | – | ns | $I_{B1}=-300mA$ |
| Fall time | t_f^{*2} | – | 20 | – | ns | $I_{B2}=300mA$ $V_{CC} \approx -25V$ |

*1 Pulsed

*2 See switching time test circuit

Transistors

●Electrical characteristics curves

<Tr1>

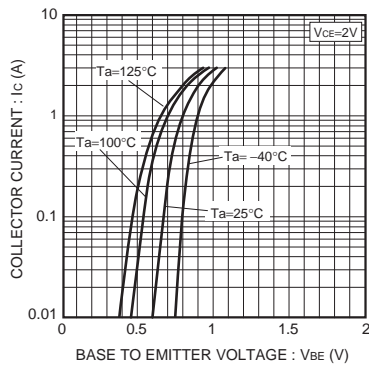


Fig.1 Ground emitter propagation characteristics

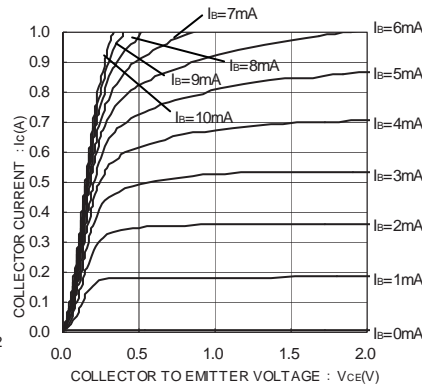


Fig.2 Grounded Emitter Output Characteristics

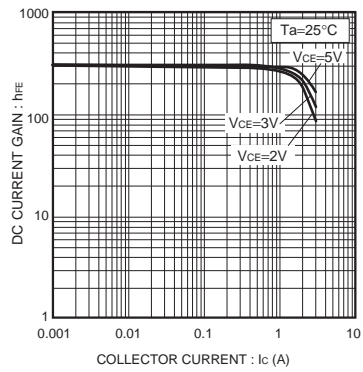


Fig.3 DC current gain vs. collector current

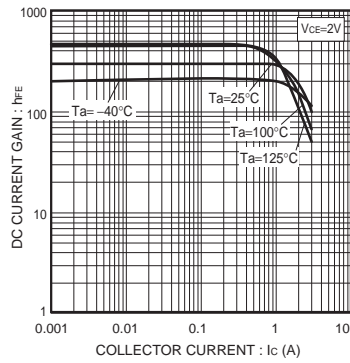


Fig.4 DC current gain vs. collector current (II)

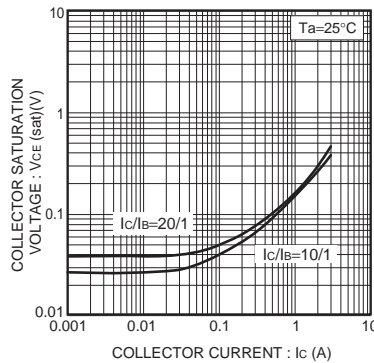


Fig.5 Collector-emitter saturation voltage vs. collector current (I)

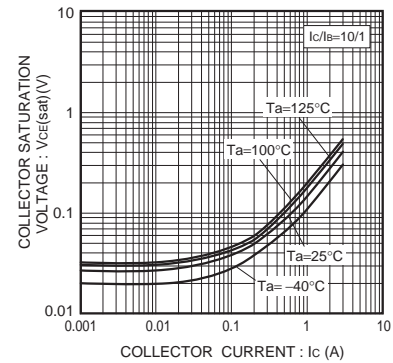


Fig.6 Collector-emitter saturation voltage vs. Collector Current (II)

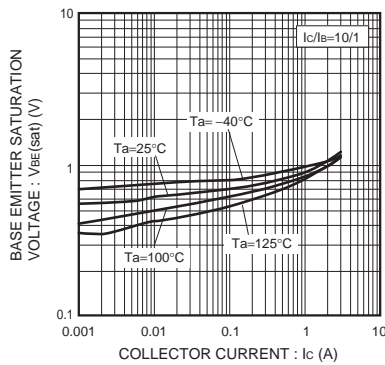


Fig.7 Base-emitter saturation voltage vs. collector current

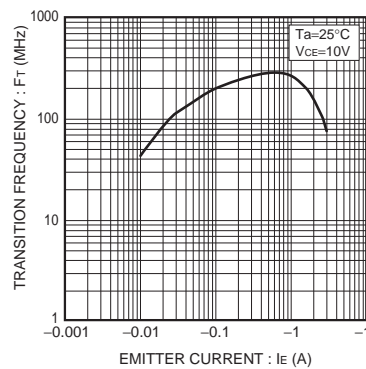


Fig.8 Transition frequency

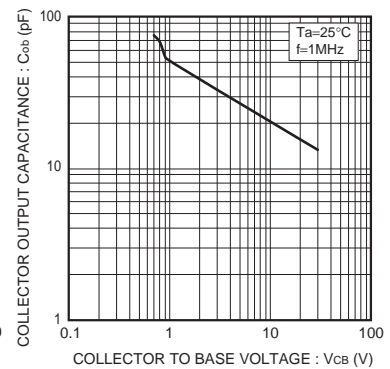


Fig.9 Collector output capacitance

Transistors

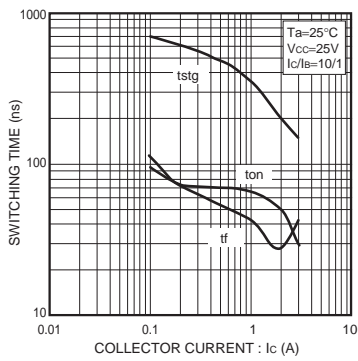


Fig.10 Switching Time

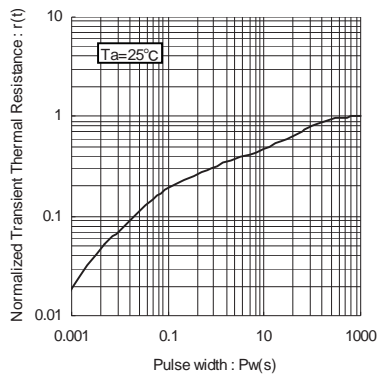


Fig.11 Normalized Thermal Resistance (Element)

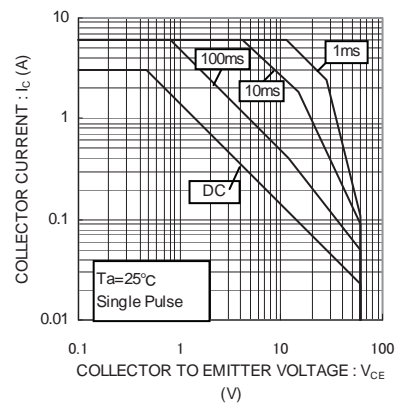
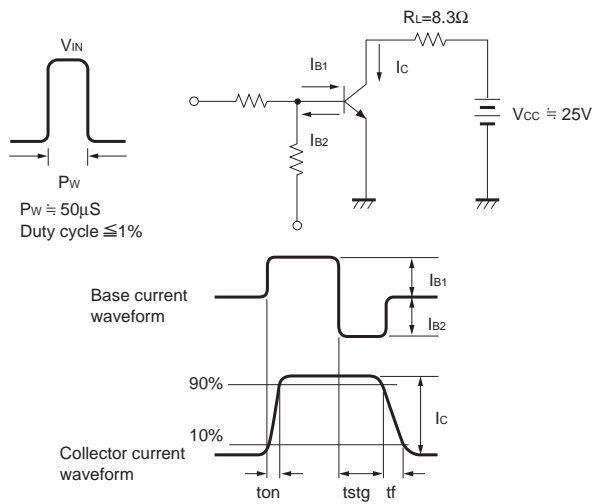


Fig.12 Safe Operating Area

●Switching characteristics measurement circuits

<Tr1>



Transistors

●Electrical characteristics curves
 <Tr2>

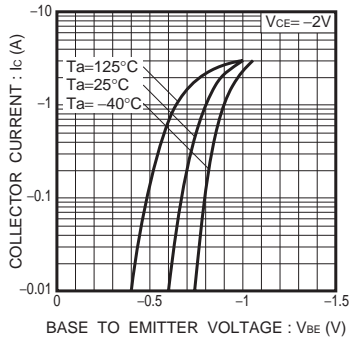


Fig.1 Grounded Emitter Propagation Characteristics

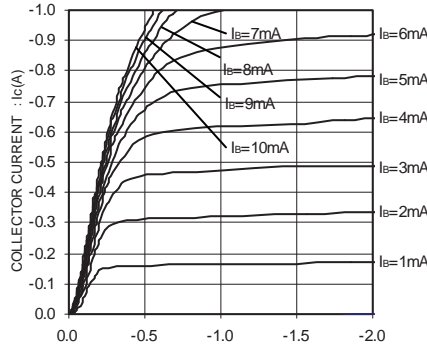


Fig.2 Grounded Emitter Output Characteristics

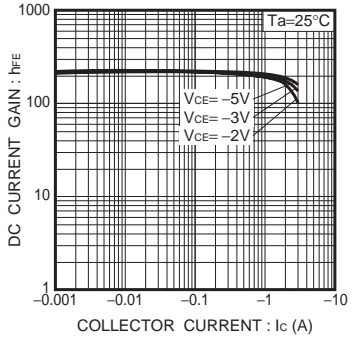


Fig.3 DC Current Gain vs. Collector Current (I)

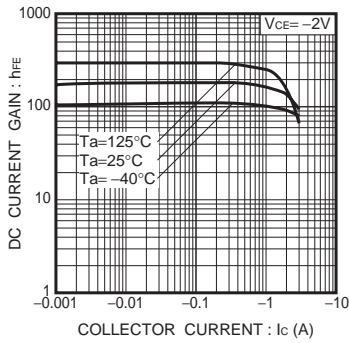


Fig.4 DC Current Gain vs. Collector Current (II)

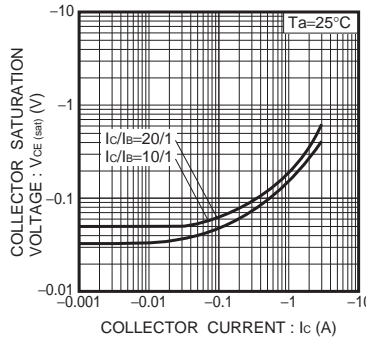


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (I)

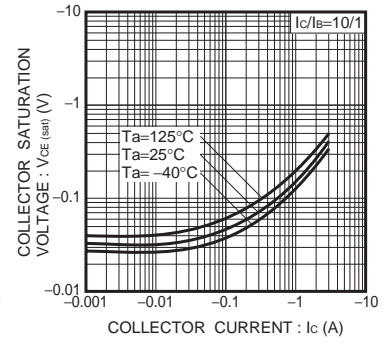


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

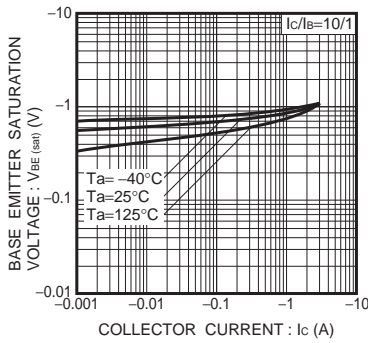


Fig.7 Base-Emitter Saturation Voltage vs. Collector Current

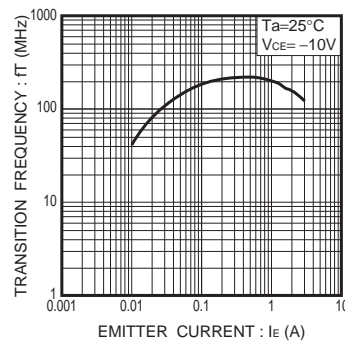


Fig.8 Transition Frequency

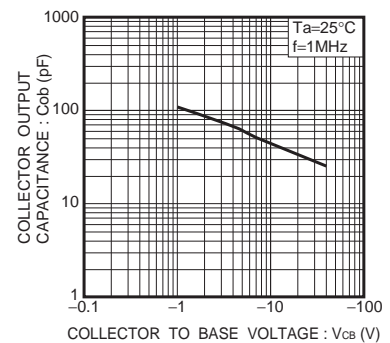


Fig.9 Collector Output Capacitance

Transistors

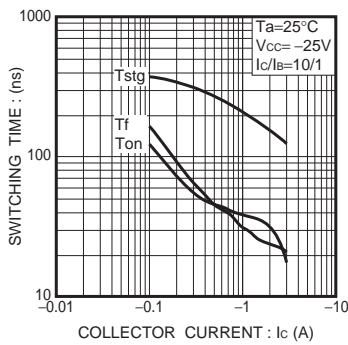


Fig.10 Switching Time

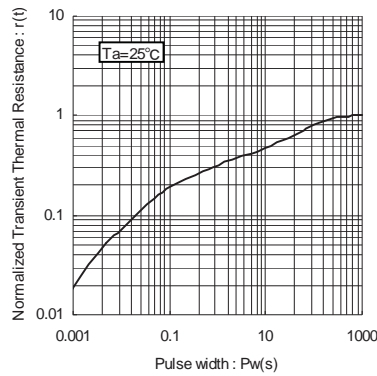


Fig.11 Normalized Thermal Resistance (Element)

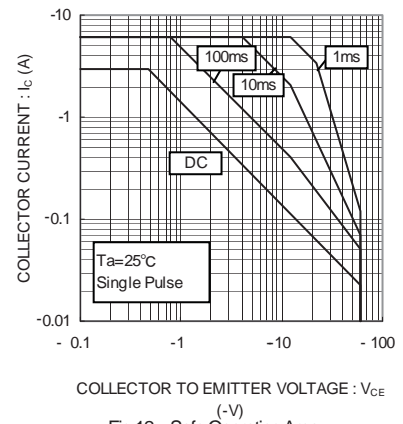
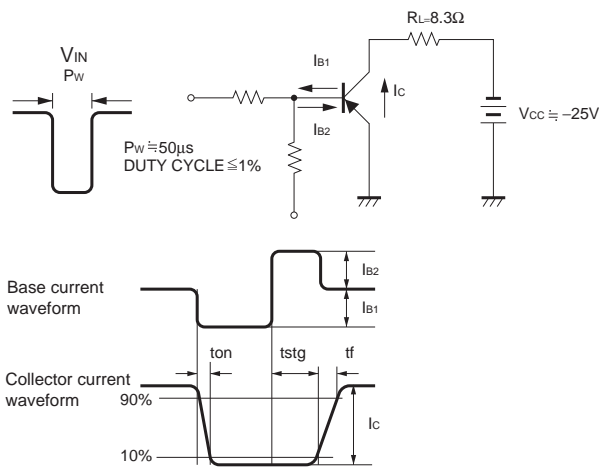


Fig.12 Safe Operating Area

●Switching characteristics measurement circuits

<Tr2>



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