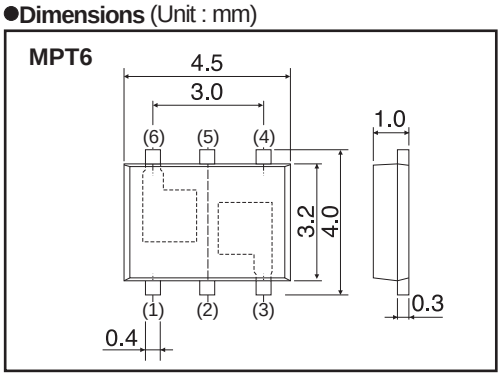
Medium Power Transistor (60V, 3A)

MP6Z3

●Features

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

●Dimensions (Unit : mm)



●Applications

Low frequency amplifier
High speed switching

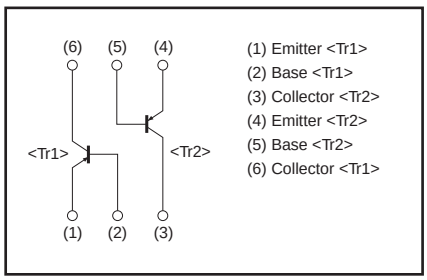
●Structure

Silicon epitaxial planar transistor

●Packaging specifications

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

●Inner circuit



●Absolute maximum ratings (Ta=25°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		°C
Range of storage temperature		Tstg	–55 to 150		°C

*1 Pw=10ms 1 Pulse
*2 Mounted on a ceramic board

●**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=100μA
Emitter-base breakdown voltage	BV_{EBO}	6	–	–	V	I_E=100μA
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_T *1	–	200	–	MHz	V_{CE}=10V, I_E=–100mA, f=10MHz
Collector output capacitance	Cob	–	20	–	pF	V_{CB}=10V, I_E=0A, f=1MHz
Turn-on time	t_{on} *2	–	50	–	ns	I_C=3A I_{B1}=300mA I_{B2}= –300mA V_{CC} ≃ 25V
Storage time	t_{stg} *2	–	150	–	ns	
Fall time	t_f *2	–	30	–	ns	

*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= –100μA
Emitter-base breakdown voltage	BV_{EBO}	–6	–	–	V	I_E= –100μA
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_T *1	–	180	–	MHz	V_{CE}= –10V, I_E=100mA, f=10MHz
Collector output capacitance	Cob	–	50	–	pF	V_{CB}= –10V, I_E=0A, f=1MHz
Turn-on time	t_{on} *2	–	20	–	ns	I_C= –3A I_{B1}= –300mA I_{B2}= 300mA V_{CC} ≃ –25V
Storage time	t_{stg} *2	–	150	–	ns	
Fall time	t_f *2	–	20	–	ns	

*1 Pulsed
*2 See switching time test circuit

●Electrical characteristics curves

〈Tr1〉

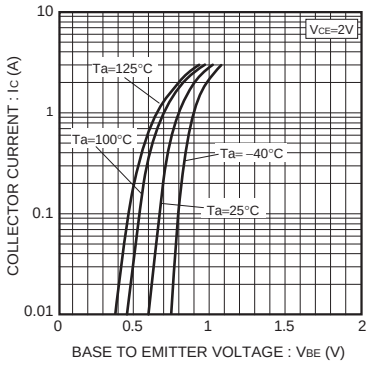


Fig.1 Ground emitter propagation characteristics

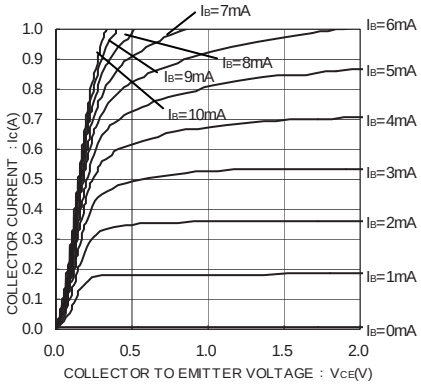


Fig.2 Grounded Emitter Output Characteristics

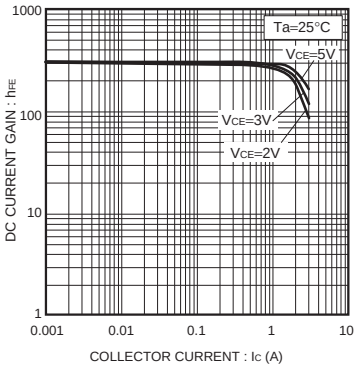


Fig.3 DC current gain vs. collector current

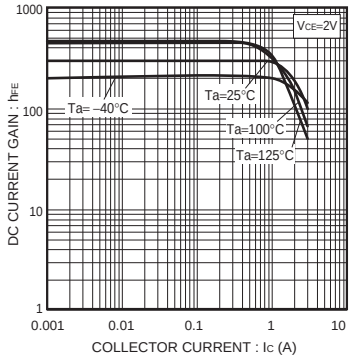


Fig.4 DC current gain vs. collector current (II)

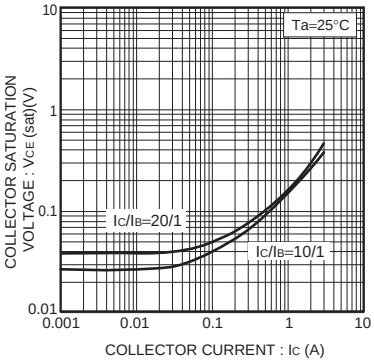


Fig.5 Collector-emitter saturation voltage vs. collector current (I)

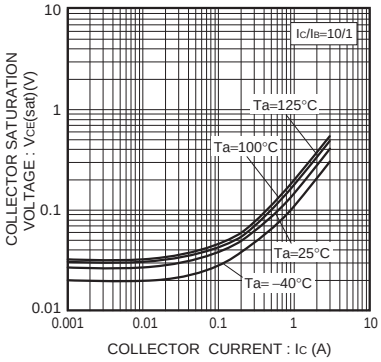


Fig.6 Collector-emitter saturation voltage vs. Collector Current (II)

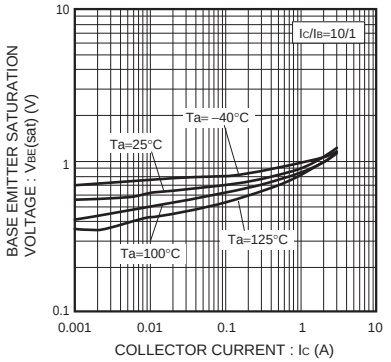


Fig.7 Base-emitter saturation voltage vs. collector current

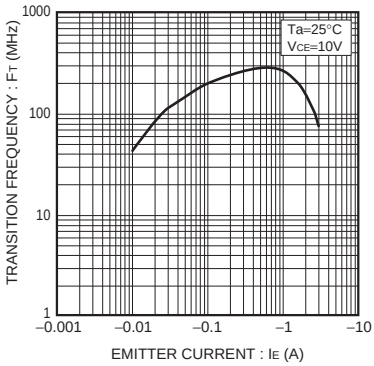


Fig.8 Transition frequency

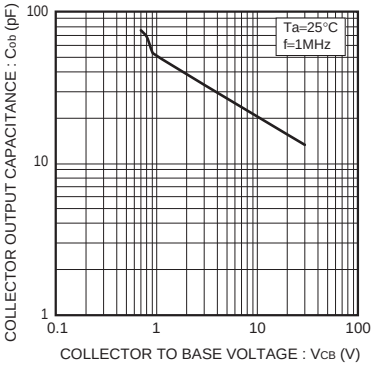


Fig.9 Collector output capacitance

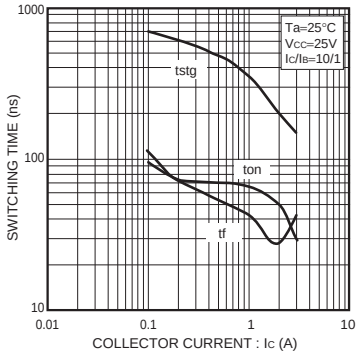


Fig.10 Switching Time

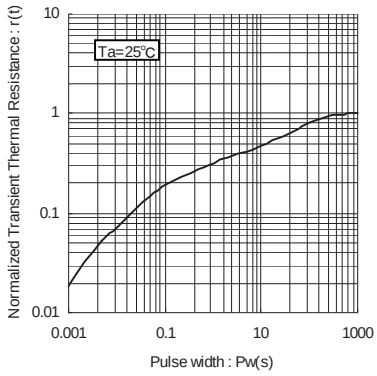


Fig.11 Normalized Thermal Resistance (Element)

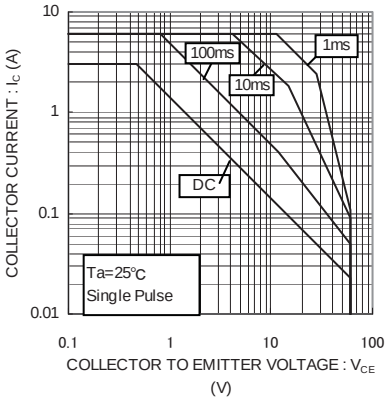
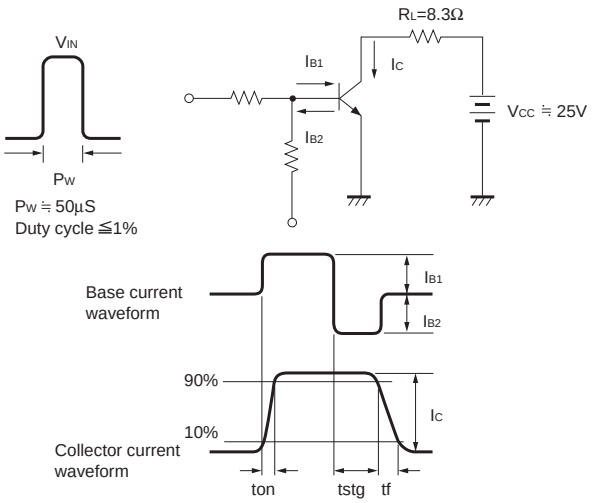


Fig.12 Safe Operating Area

●Switching characteristics measurement circuits

<Tr1>



●**Electrical characteristics curves**

〈Tr2〉

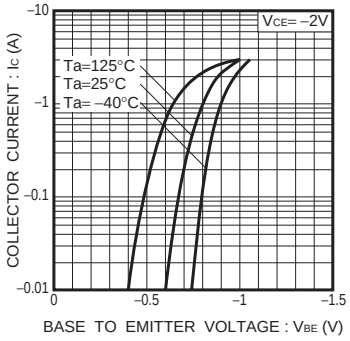


Fig.1 Grounded Emitter Propagation Characteristics

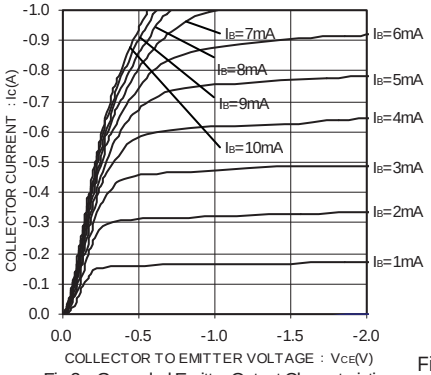


Fig.2 Grounded Emitter Output Characteristics

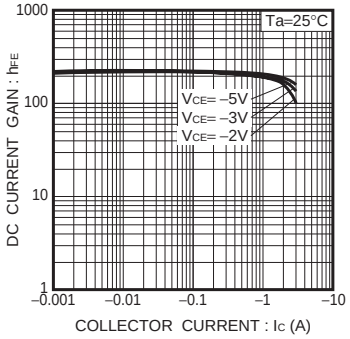


Fig.3 DC Current Gain vs. Collector Current (I)

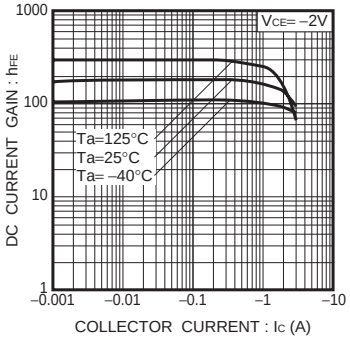


Fig.4 DC Current Gain vs. Collector Current (II)

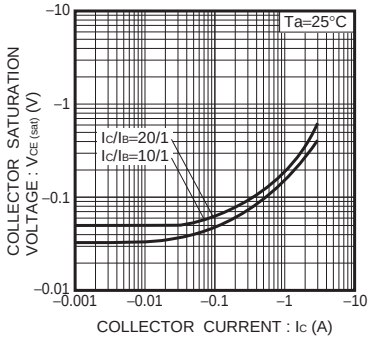


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (I)

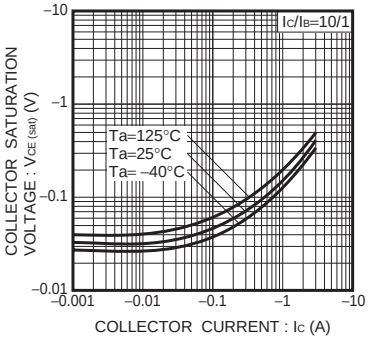


Fig.6 Collector-Emitter Saturation Voltage vs. Collector Current (II)

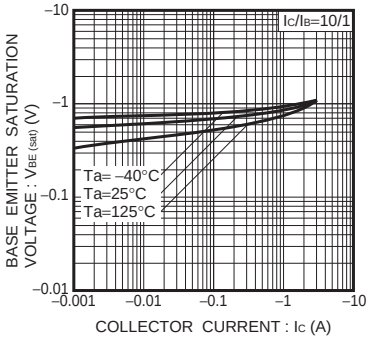


Fig.7 Base-Emitter Saturation Voltage vs. Collecter Current

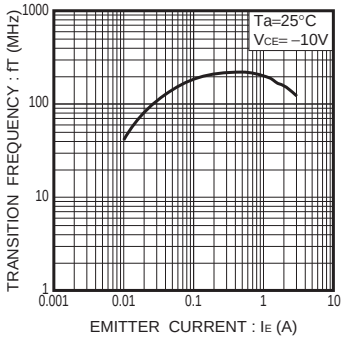


Fig.8 Transition Frequency

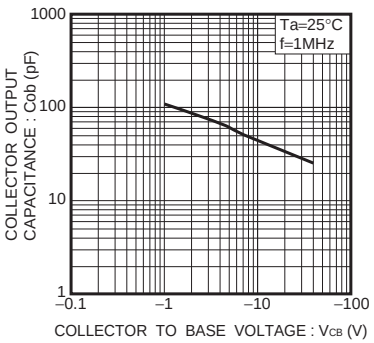


Fig.9 Collector Output Capacitance

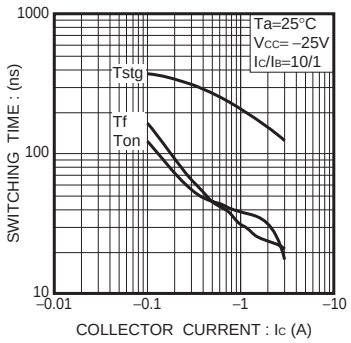


Fig.10 Switching Time

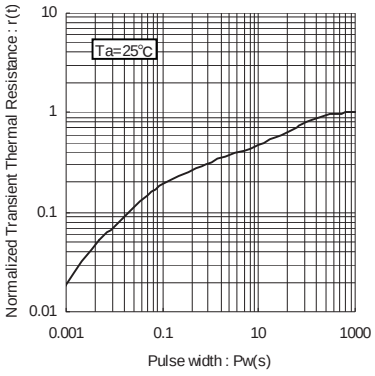


Fig.11 Normalized Thermal Resistance (Element)

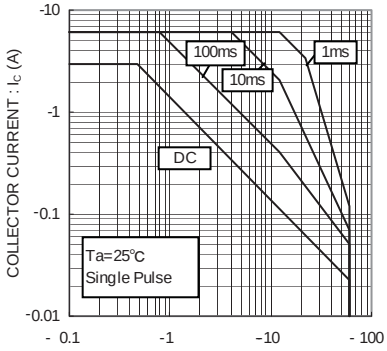
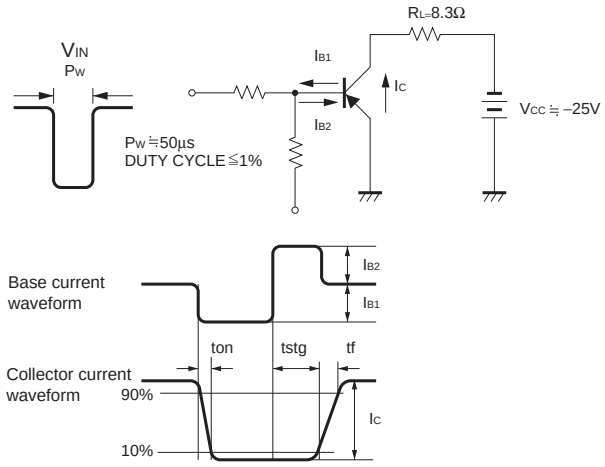


Fig.12 Safe Operating Area

●Switching characteristics measurement circuits
<Tr2>



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www.rohm.com

Contact us : webmaster@rohm.co.jp

ROHM CO., LTD. 21 Saiin Mizosaki-cho, Ukyo-ku, Kyoto 615-8585, Japan
TEL : +81-75-311-2121
FAX : +81-75-315-0172