

Medium Power Transistor (60V, 3A)

MP6X3

●Application

Low frequency amplifier
High speed switching

●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) Contain two 2SC5824-dies in a package.

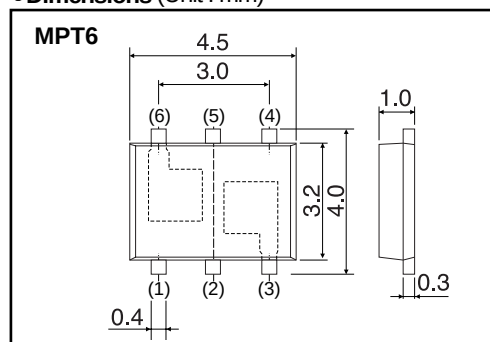
●Structure

NPN silicon epitaxial planar transistor

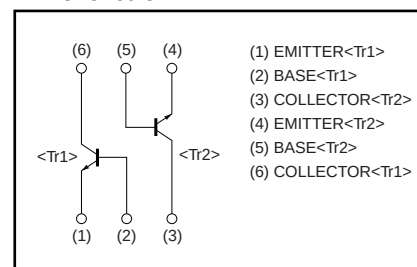
●Packaging specifications

Type	Package	Taping
	Code	TR
	Basic ordering unit (pieces)	1000
MP6X3		○

●Dimensions (Unit : mm)



●Inner circuit



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

<Tr1, Tr2>

Parameter		Symbol	Limits	Unit
Collector-base voltage		V_{CBO}	60	V
Collector-emitter voltage		V_{CEO}	60	V
Emitter-base voltage		V_{EBO}	6	V
Collector current	Continuous	I_c	3	A
	Pulsed	I_{CP}^{*1}	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 $P_w=10ms$ 1Pulse

*2 Mounted on a ceramic board

Transistors

●Electrical characteristics (Ta=25°C)

<Tr1, Tr2>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-Emitter breakdown voltage	BV_{CEO}	60	–	–	V	$I_C = 1\text{mA}$
Collector-base breakdown voltage	BV_{CBO}	60	–	–	V	$I_C = 100\mu\text{A}$
Emitter-base breakdown voltage	BV_{EBO}	6	–	–	V	$I_E = 100\mu\text{A}$
Collector cut off current	I_{CBO}	–	–	1.0	μA	$V_{CB} = 40\text{V}$
Emitter cut off current	I_{EBO}	–	–	1.0	μA	$V_{EB} = 4\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}^{*1}$	–	200	500	mV	$I_C/I_B = 2.0\text{A}/200\text{mA}$
DC current gain	h_{FE}	120	–	390	–	$V_{CE} = 2\text{V}$, $I_C = 100\text{mA}$
Transition frequency	f_T^{*1}	–	200	–	MHz	$V_{CE} = 10\text{V}$, $I_E = -100\text{mA}$, $f = 10\text{MHz}$
Collector output capacitance	C_{ob}	–	20	–	pF	$V_{CB} = 10\text{V}$, $I_E = 0\text{A}$, $f = 1\text{MHz}$
Turn-on time	t_{on}^{*2}	–	50	–	ns	$I_C = 3\text{V}$ $I_{B1} = 300\text{mA}$ $I_{B2} = -300\text{mA}$ $V_{CC} \approx -25\text{V}$
Storage time	t_{stg}^{*2}	–	150	–	ns	
Fall time	t_f^{*2}	–	30	–	ns	

*1 Pulsed

*2 See switching time test circuit

●Electrical characteristics curves

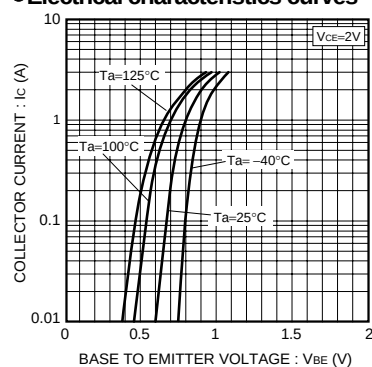


Fig.1 Ground emitter propagation characteristics

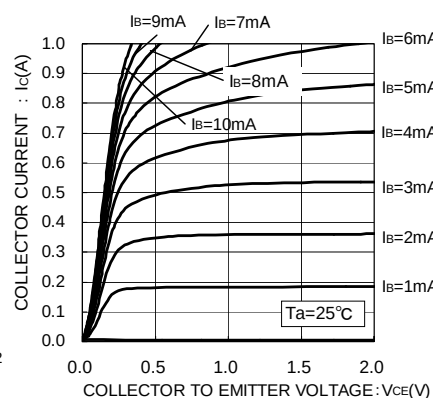


Fig.2 Grounded emitter output characteristics

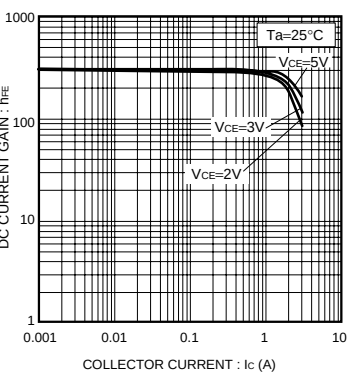


Fig.3 DC current gain vs. collector current

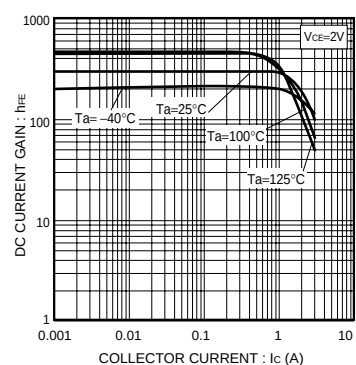


Fig.4 DC current gain vs. collector current

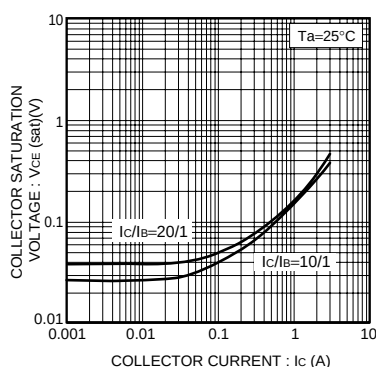


Fig.5 Collector-emitter saturation voltage vs. collector current

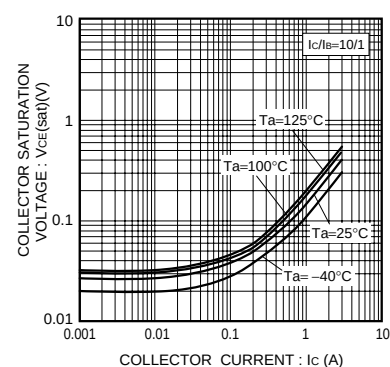


Fig.6 Collector-emitter saturation voltage vs. Collector Current

Transistors

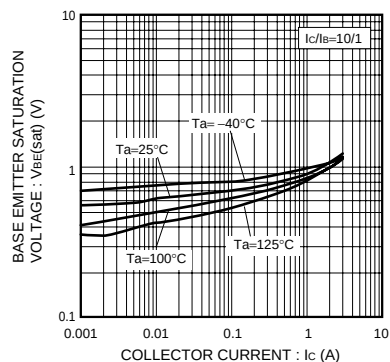


Fig.7 Base-emitter saturation voltage vs. collector current

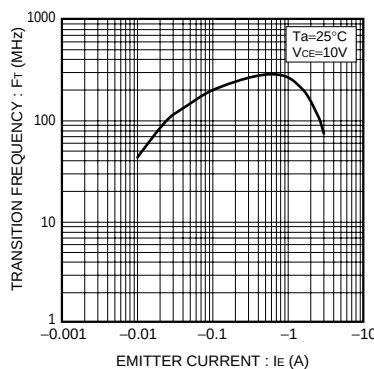


Fig.8 Transition frequency

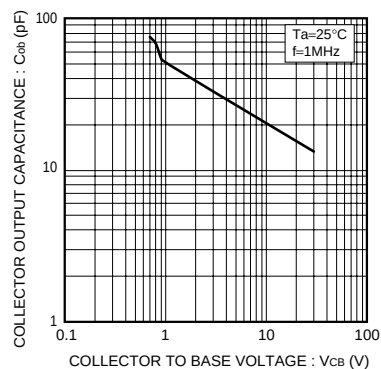


Fig.9 Collector output capacitance

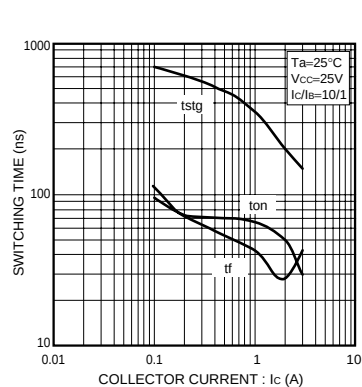


Fig.10 Switching Time

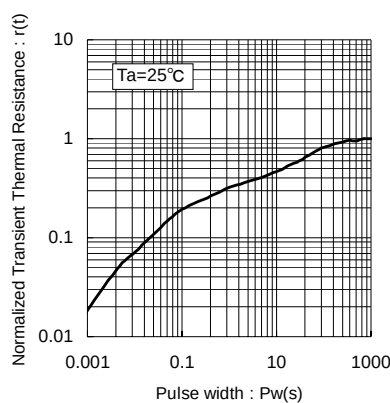


Fig.11 Normalized thermal resistance (Element)

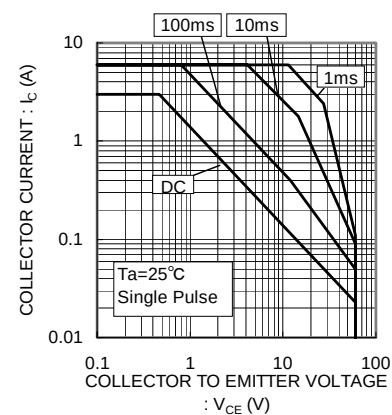
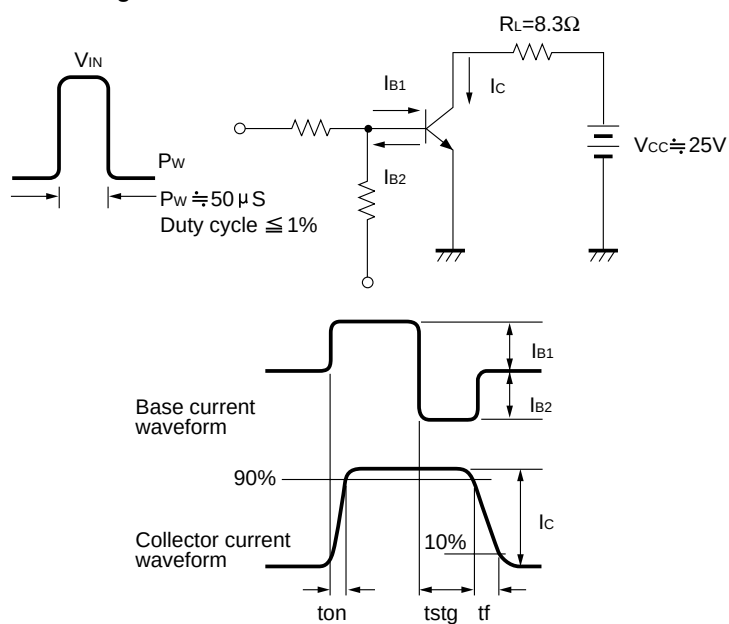


Fig.12 Safe operating area (Tr1&Tr2)

●Switching characteristics measurement circuits



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