General purpose transistor (isolated transistor and diode)

QSZ4

A 2SB1706 and a 2SD2671 are housed independently in a TSMT5 package.

●Applications

DC / DC converter
Motor driver

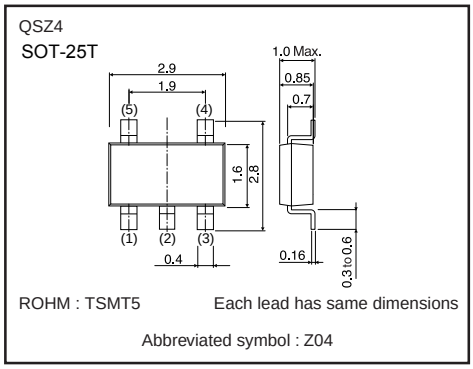
●Features

1) Low V_{CE}(sat)
2) Small package

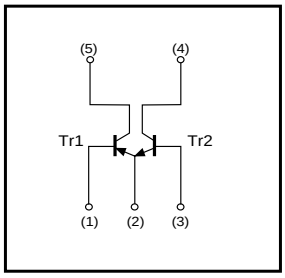
●Structure

Silicon epitaxial planar transistor

●Dimensions (Unit : mm)



●Equivalent circuit



●Packaging specifications

Type	QSZ4
Package	TSMT5
Marking	Z04
Code	TR
Basic ordering unit(pieces)	3000

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●Absolute maximum ratings (Ta=25°C)

Tr1

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	–30	V
Collector-emitter voltage	V_{CEO}	–30	V
Emitter-base voltage	V_{EBO}	–6	V
Collector current	I_C	–2	A
	I_{CP}	–4	A *1
Power dissipation	Pc	500	mW/Total *2
		1.25	W/Total *3
		0.9	W/Element *3
Junction temperature	Tj	150	°C
Range of storage temperature	Tstg	–55 to +150	°C

*1 Single pulse, Pw=1ms.
*2 Each terminal mounted on a recommended land.
*3 Mounted on a 25×25×t 0.8mm ceramic substrate.

Tr 2

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	30	V
Collector-emitter voltage	V_{CEO}	30	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	2	A
	I_{CP}	4	A *1
Power dissipation	Pc	500	mW/Total *2
		1.25	W/Total *3
		0.9	W/Element *3
Junction temperature	Tj	150	°C
Range of storage temperature	Tstg	–55 to +150	°C

*1 Single pulse, Pw=1ms.
*2 Each terminal mounted on a recommended land.
*3 Mounted on a 25×25×t 0.8mm ceramic substrate.

●Electrical characteristics (Ta=25°C)

Tr1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	–30	–	–	V	I_C= –10μA
Collector-emitter breakdown voltage	BV_{CEO}	–30	–	–	V	I_C= –1mA
Emitter-base breakdown voltage	BV_{EBO}	–6	–	–	V	I_E= –10μA
Collector cutoff current	I_{CBO}	–	–	–100	nA	V_{CB}= –30V
Emitter cutoff current	I_{EBO}	–	–	–100	nA	V_{EB}= –6V
Collector-emitter saturation voltage	$V_{CE(sat)}$	–	–180	–370	mV	I_C= –1.5A, I_B= –75mA
DC current gain	h_{FE}	270	–	680	–	V_{CE}= –2V, I_C= –200mA*
Transition frequency	f_T	–	280	–	MHz	V_{CE}= –2V, I_E=200mA, f=100MHz*
Collector output capacitance	Cob	–	20	–	pF	V_{CB}= –10V, I_E=0A, f=1MHz

* Pulsed

Tr 2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	30	–	–	V	I_C=10μA
Collector-emitter breakdown voltage	BV_{CEO}	30	–	–	V	I_C=1mA
Emitter-base breakdown voltage	BV_{EBO}	6	–	–	V	I_E=10μA
Collector cutoff current	I_{CBO}	–	–	100	nA	V_{CB}=30V
Emitter cutoff current	I_{EBO}	–	–	100	nA	V_{EB}=6V
Collector-emitter saturation voltage	$V_{CE(sat)}$	–	180	370	mV	I_C=1.5A, I_B=75mA
DC current gain	h_{FE}	270	–	680	–	V_{CE}=2V, I_C=200mA*
Transition frequency	f_T	–	280	–	MHz	V_{CE}=2V, I_E= –200mA, f=100MHz*
Collector output capacitance	Cob	–	20	–	pF	V_{CB}=10V, I_E=0A, f=1MHz

* Pulsed

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●Electrical characteristic curves

Tr1(PNP)

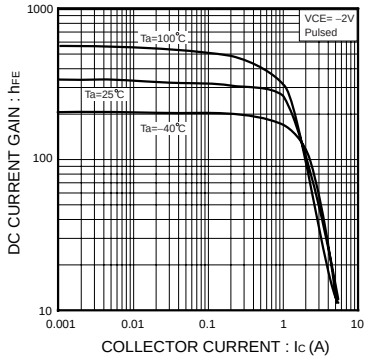


Fig.1 DV current gain vs. collector current

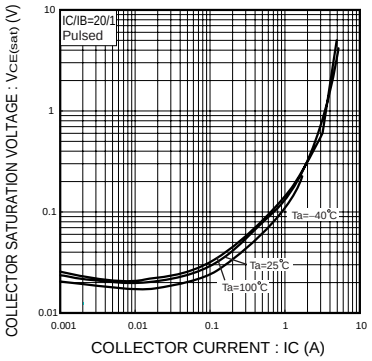


Fig.2 Collector-emitter saturation voltage vs. collector current

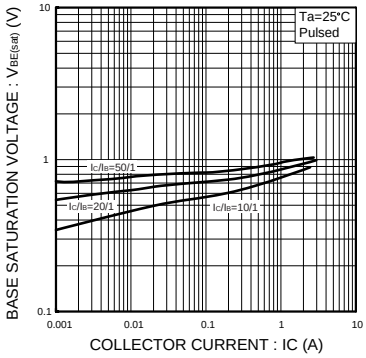


Fig.3 Base-emitter saturation voltage vs. collectir current

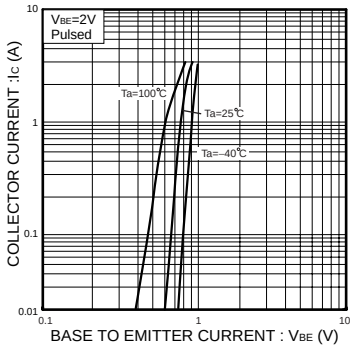


Fig.4 Grounded emitter propagation characteristics

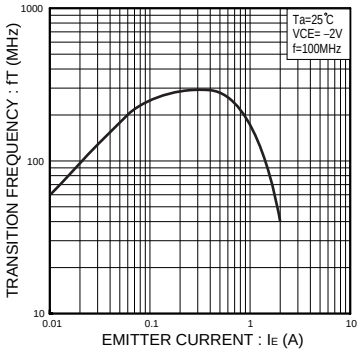


Fig.5 Gain bandwidth product vs. emitter curent

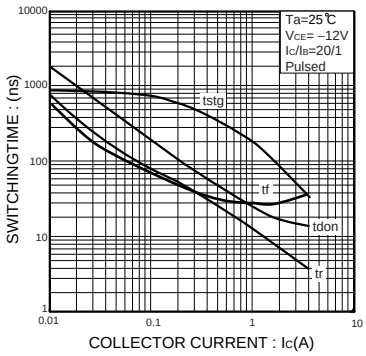


Fig.6 Switching time

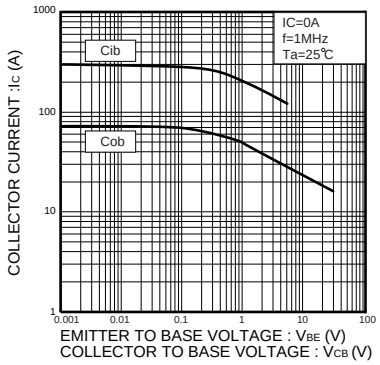


Fig.7 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

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Tr2(NPN)

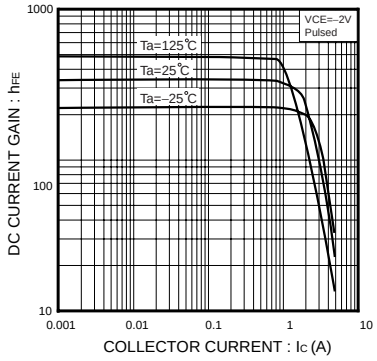


Fig.8 DC current gain
vs. collector current

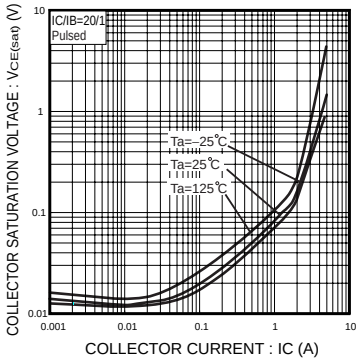


Fig.9 Collector-emitter saturation voltage
base-emitter saturation voltage
vs. collector current

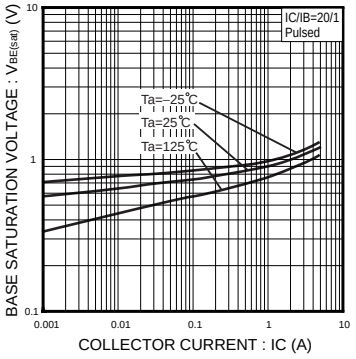


Fig.10 Base-emitter saturation voltage
vs. collector current

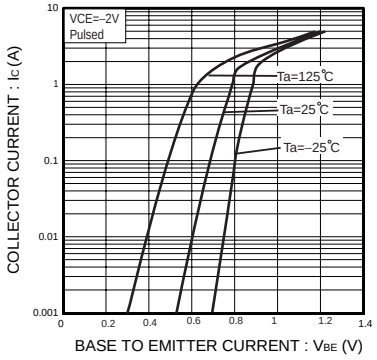


Fig.11 Grounded emitter propagation
characteristics

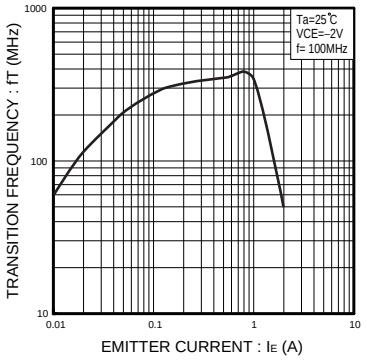


Fig.12 Gain bandwidth product
vs. emitter current

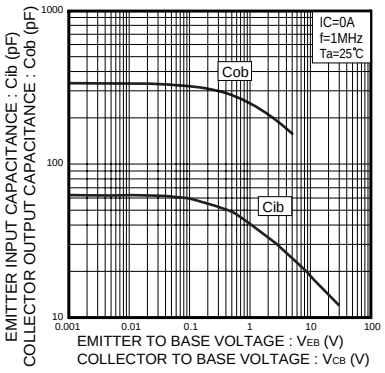


Fig.13 Collector output chapacitance
vs. collector-base voltage
Emitter input capacitance
vs. emitter-base voltage

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