General purpose transistor

QSZ1

A 2SB1690 and a 2SD2653 are housed independently in a TSMT5 package.

●Applications

DC / DC converter
Motor driver

●Features

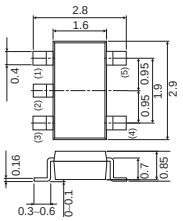
1) Low V_{CE}(sat)
2) Small package

●Structure

Silicon epitaxial planar transistor

●External dimensions (Unit : mm)

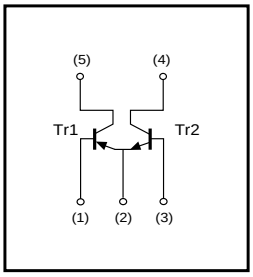
QSZ1
SOT-25T



ROHM : TSMT5 Each lead has same dimensions

Abbreviated symbol : Z01

●Equivalent circuit



●Packaging specifications

Type	QSZ1
Package	TSMT5
Marking	Z01
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}	−15	V
Collector-emitter voltage	V_{CEO}	−12	V
Emitter-base voltage	V_{EBO}	−6	V
Collector current	I_C	−2	A
	I_{CP}	−4	A ∗1
Collector power dissipation	P_C	500	mW/Total ∗2
		1.25	W/Total ∗3
		0.9	W/Element ∗3
Junction temperature	Tj	150	°C
Storage temperature	Tstg	−55 to +150	°C

∗1 Single pulse Pw=1ms.
∗2 Each terminal mounted on a recommended land.
∗3 Mounted on a 25mm× 25mm× t0.8mm ceramic substrate.

Tr2

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	15	V
Collector-emitter voltage	V_{CEO}	12	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	2	A
	I_{CP}	4	A ∗1
Power dissipation	P_C	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 25mm× 25mm× t0.8mm ceramic substrate.

●Electrical characteristics (Ta=25°C)

Tr1

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	−15	–	–	V	I_C=−10μA
Collector-emitter breakdown viltage	BV_{CEO}	−12	–	–	V	I_C=−1mA
Emitter-base breakdown voltage	BV_{EBO}	−6	–	–	V	I_E=−10μA
Collector cutoff current	I_{CBO}	–	–	−100	nA	V_{CB}=−15V
Emitter cutoff current	I_{EBO}	–	–	−100	nA	V_{EB}=−6V
Collerctor-emitter saturation voltage	$V_{CE(sat)}$	–	−120	−180	mV	I_C=−1mA, I_B=−50mA
DC current transfer ratio	h_{FE}	270	–	680	–	V_{CE}=−2V, I_C=−200mA*
Transition frequency	f_T	–	360	–	MHz	V_{CE}=−2V, I_E=200mA, f=100MHz*
Output capacitance	Cob	–	15	–	pF	V_{CB}=−10V, I_E=0mA, f=1MHz

∗ Pulsed

Tr2

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	15	–	–	V	I_C=10μA
Collector-emitter breakdown voltage	BV_{CEO}	12	–	–	V	I_C=1mA
Emitter-base breakdown voltage	BV_{EBO}	6	–	–	V	I_E=10μA
Collector cutoff current	I_{CBO}	–	–	100	nA	V_{CB}=15V
Emitter cutoff current	I_{EBO}	–	–	100	nA	V_{EB}=6V
Collector-emitter saturation voltage	$V_{CE(sat)}$	–	90	180	mV	I_C=1A, I_B=50mA
DC current gain	h_{FE}	270	–	680	–	V_{CE}=2V, I_C=200mA*
Transition frequency	f_T	–	360	–	MHz	V_{CE}=2V, I_E=−200mA, f=100MHz*
Corrector output capacitance	Cob	–	20	–	pF	V_{CB}=10V, I_E=0A, f=1MHz

∗ Pulsed

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●Electrical characteristic curves

Tr1

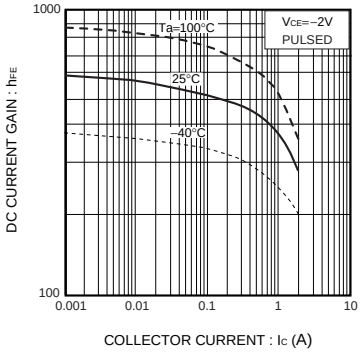


Fig.1 DC current gain vs. collector current

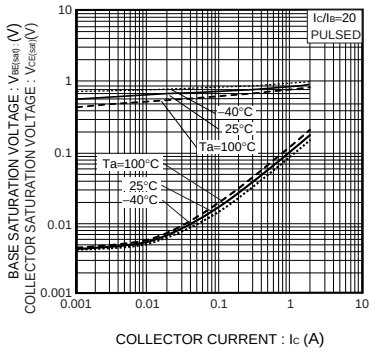


Fig.2 Collector-emitter saturation voltage base-emitter saturation voltage vs.collector current

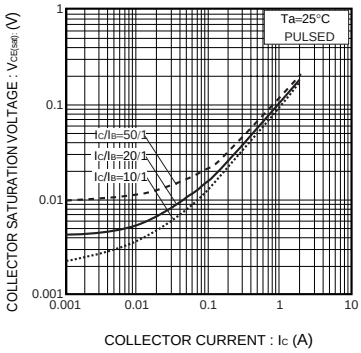


Fig.3 Collector-emitter saturation voltage vs. collector current

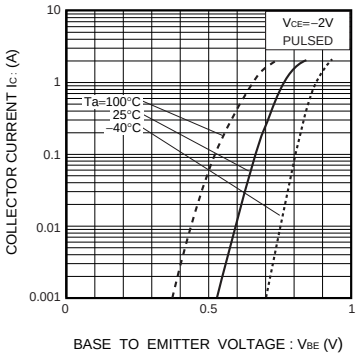


Fig.4 Grounded emitter propagation characteristics

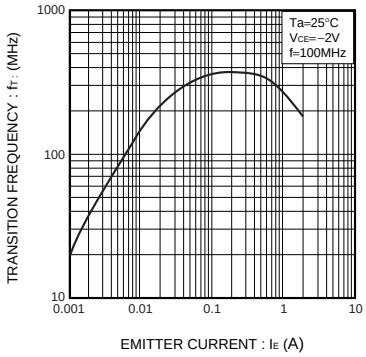


Fig.5 Gain bandwidth product vs. emitter current

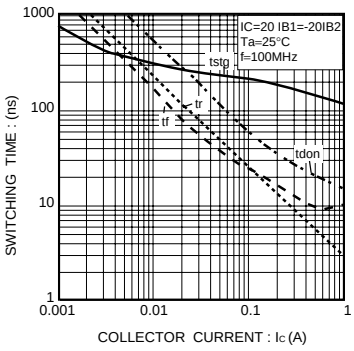


Fig.6 Switching time

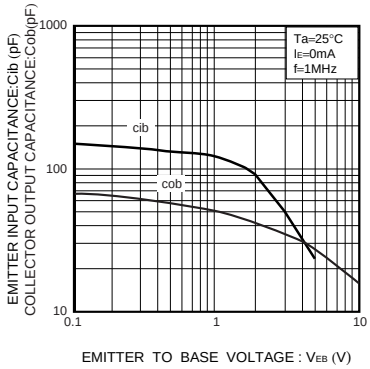


Fig.7 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

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Tr2

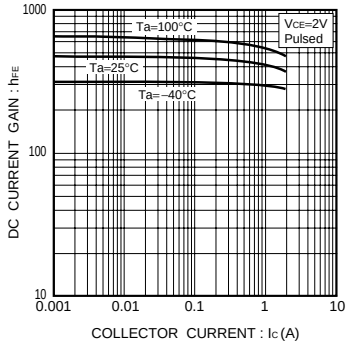


Fig.8 DC current gain vs. collector current

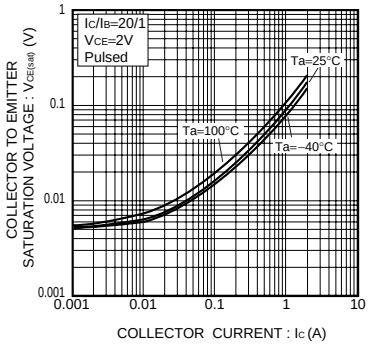


Fig.9 Base-emitter saturation voltage vs. collector current

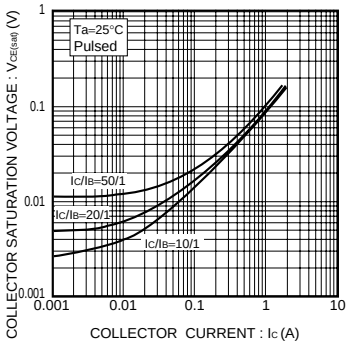


Fig.10 Collector-emitter saturation voltage vs. collector current

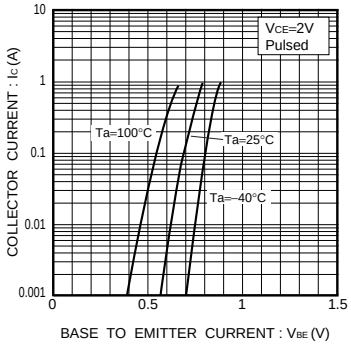


Fig.11 Grounded emitter propagation characteristics

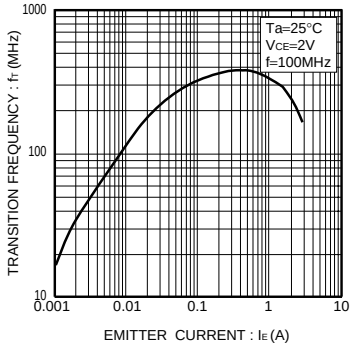


Fig.12 Gain bandwidth product vs. emitter current

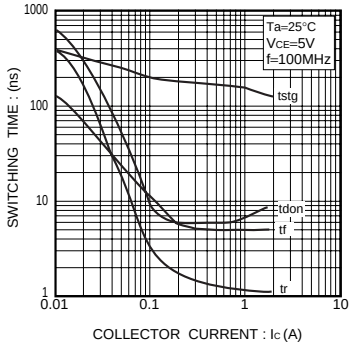


Fig.13 Switching time

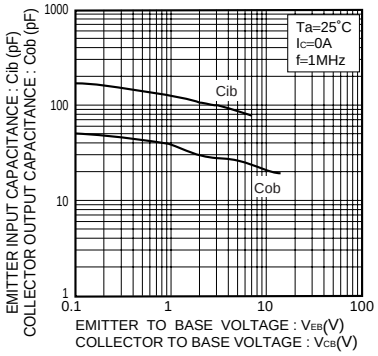


Fig.14 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

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