General purpose transistor

QSZ1

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

●Applications

DC / DC converter
Motor driver

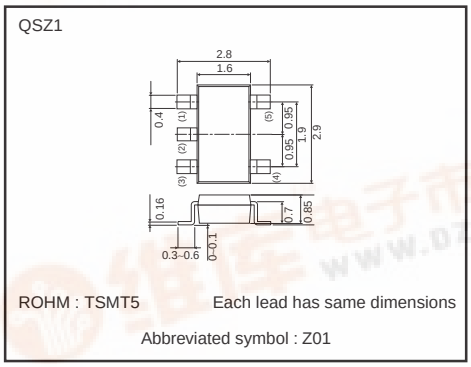
●Features

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

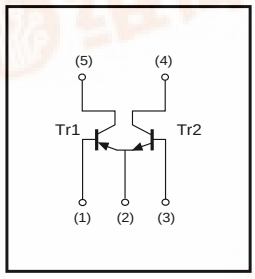
●Structure

Silicon epitaxial planar transistor

●External dimensions (Unit : mm)



●Equivalent circuit



●Packaging specifications

Type	QSZ1
Package	TSMT5
Marking	Z01
Code	TR
Basic ordering unit(pieces)	3000

●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

●Electrical characteristic curves

Tr1

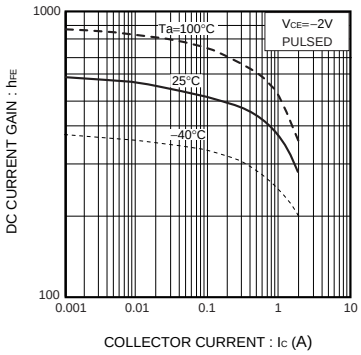


Fig.1 DC current gain vs. collector current

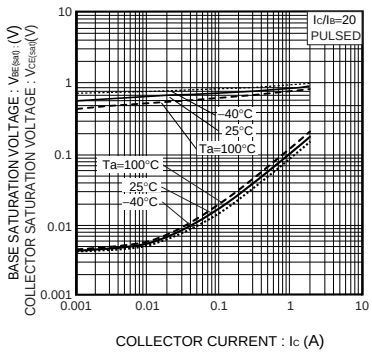


Fig.2 Collector-emitter saturation voltage base-emitter saturation voltage vs.collector current

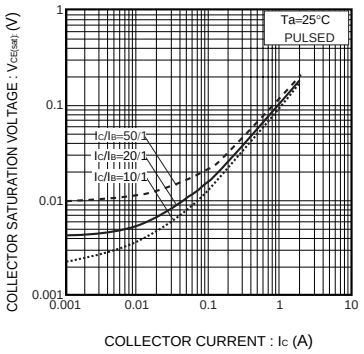


Fig.3 Collector-emitter saturation voltage vs. collector current

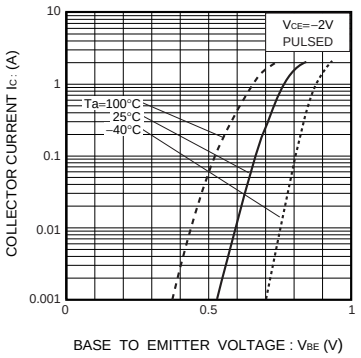


Fig.4 Grounded emitter propagation characteristics

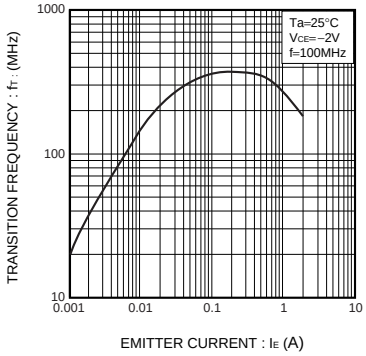


Fig.5 Gain bandwidth product vs. emitter current

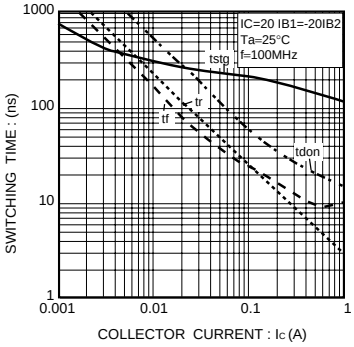


Fig.6 Switching time

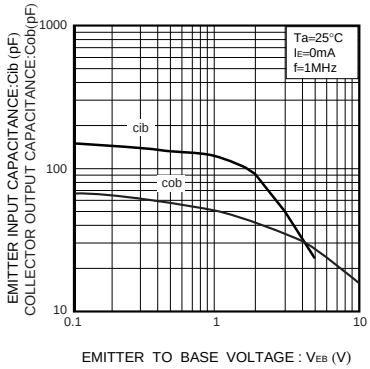


Fig.7 Collector output capacitance vs. collector-base voltage Emitter input capacitance vs. emitter-base voltage

Tr2

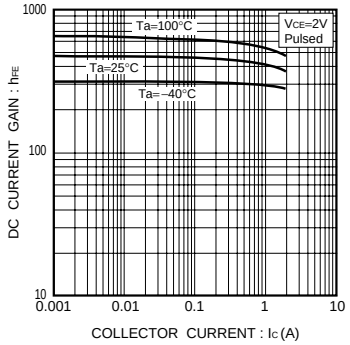


Fig.8 DC current gain vs. collector current

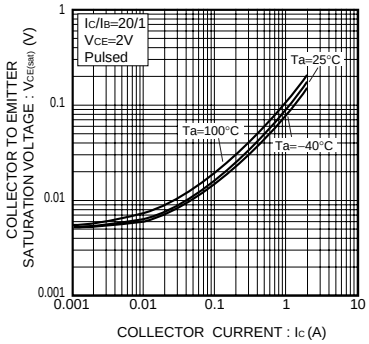


Fig.9 Base-emitter saturation voltage vs. collector current

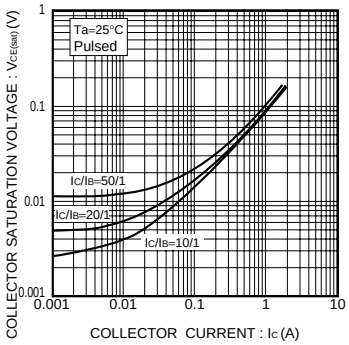


Fig.10 Collector-emitter saturation voltage vs. collector current

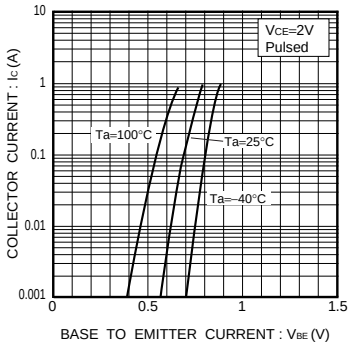


Fig.11 Grounded emitter propagation characteristics

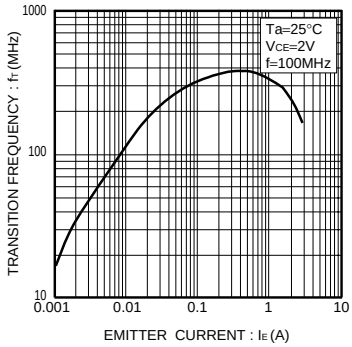


Fig.12 Gain bandwidth product vs. emitter current

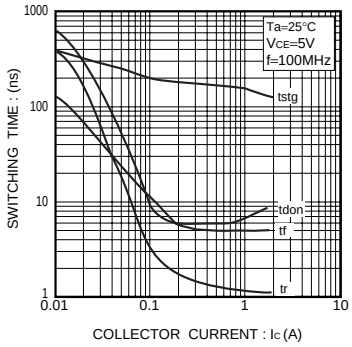


Fig.13 Switching time

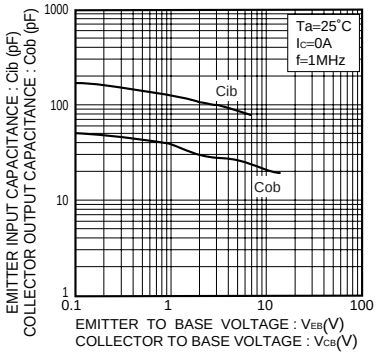


Fig.14 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).
Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of with would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.
In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.