

General purpose transistor

QSZ1

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

●Applications

DC / DC converter
Motor driver

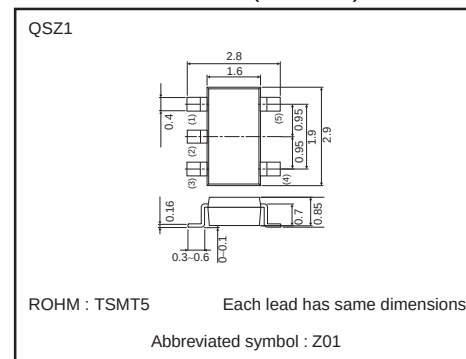
●Features

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

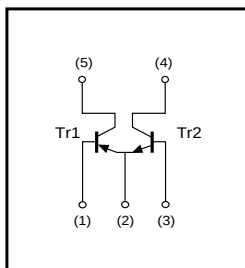
●Structure

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

Transistors

●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	T _J	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

*1 Single pulse Pw=1ms.

*2 Each terminal mounted on a recommended land.

*3 Mounted on a 25mm×25mm×0.8mm 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	T _J	150	°C
Range of storage temperature	T _{stg}	-55 to +150	°C

*1 Single pulse Pw=1ms.

*2 Each terminal mounted on a recommended land.

*3 Mounted on a 25mm×25mm×0.8mm 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 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)}	—	-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	C _{ob}	—	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 *
Collector output capacitance	C _{ob}	—	20	—	pF	V _{CB} =10V, I _E =0A, f=1MHz

* Pulsed

Transistors

●Electrical characteristic curves

Tr1

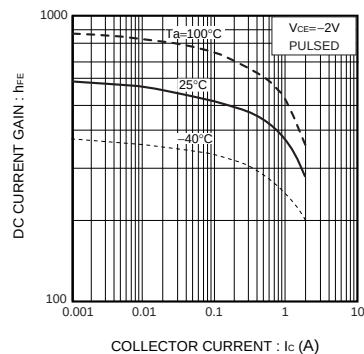


Fig.1 DC current gain
vs. collector current

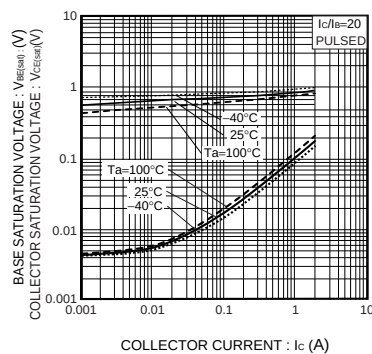


Fig.2 Collector-emitter saturation voltage
base-emitter saturation voltage
vs. collector current

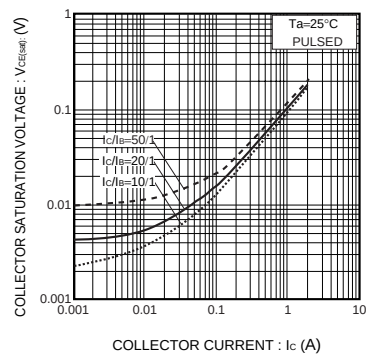


Fig.3 Collector-emitter saturation voltage
vs. collector current

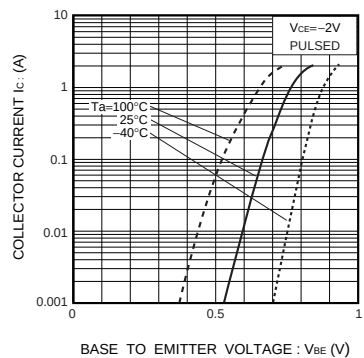


Fig.4 Grounded emitter propagation
characteristics

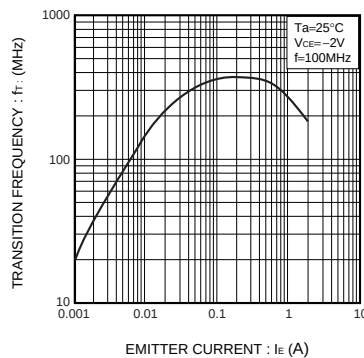


Fig.5 Gain bandwidth product
vs. emitter current

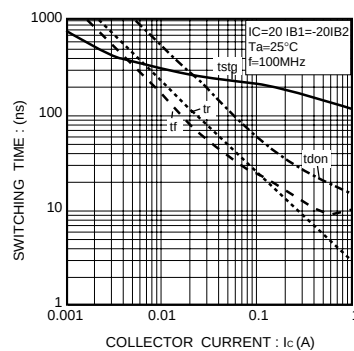


Fig.6 Switching time

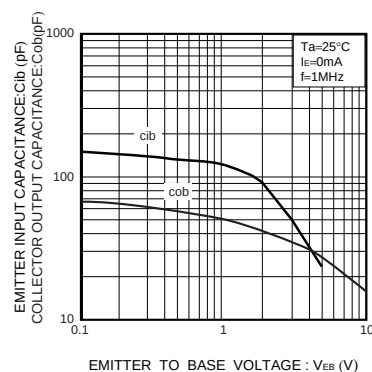


Fig.7 Collector output capacitance
vs. collector-base voltage
Emitter input capacitance
vs. emitter-base voltage

Transistors

Tr2

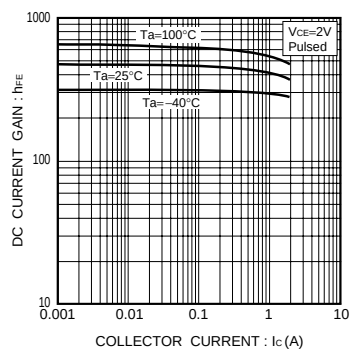


Fig.8 DC current gain vs. collector current

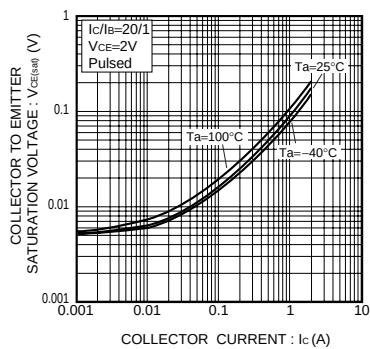


Fig.9 Base-emitter saturation voltage vs. collector current

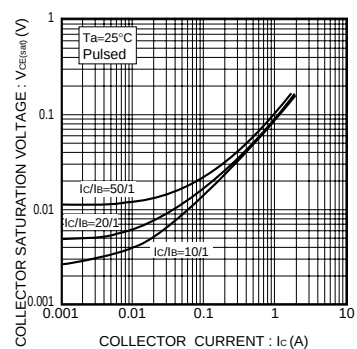


Fig.10 Collector-emitter saturation voltage vs. collector current

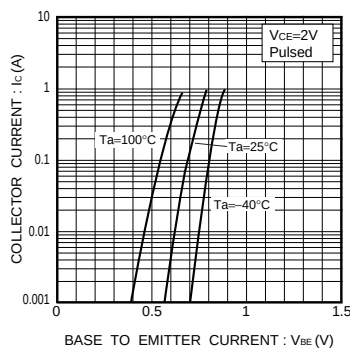


Fig.11 Grounded emitter propagation characteristics

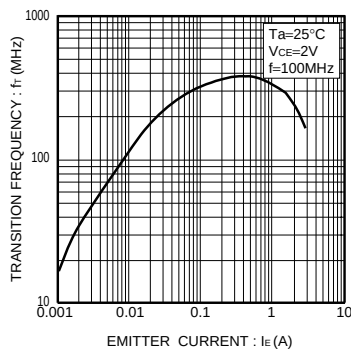


Fig.12 Gain bandwidth product vs. emitter current

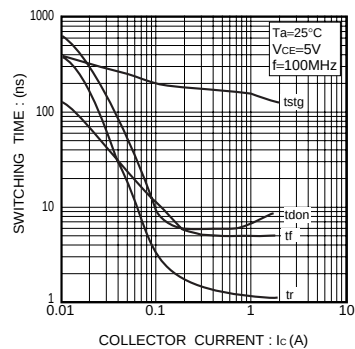


Fig.13 Switching time

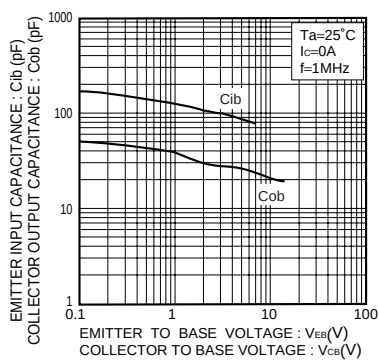


Fig.14 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

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