

QSZ1

●Applications

Motor driver

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

Silicon epitaxial planar transistor

The diagram shows a differential amplifier circuit. It consists of two input transistors, Tr1 and Tr2, whose gates are connected to a common bias point. The sources of Tr1 and Tr2 are connected to a common source node, labeled (2). The drains of Tr1 and Tr2 are connected to two output nodes, labeled (1) and (3) respectively. The gates of Tr1 and Tr2 are connected to two input nodes, labeled (4) and (5) respectively. The gates of Tr1 and Tr2 are also connected to a common bias point, which is connected to a common source node, labeled (2).

QSZ1

The drawing shows the mechanical specifications of the QSZ1 package. The top view indicates a square body with a width of 2.8 and a height of 2.3. The distance between the centers of the leads is 1.6. The lead pitch is 0.95, and the lead width is 0.95. The lead height is 0.4. The bottom view shows the lead thickness as 0.16, the lead width as 0.3-0.6, and the lead height as 0.1. The package is labeled with (1) through (6) to indicate specific features.

ROHM : TSMT5

Each lead has same dimensions

Abbreviated symbol : Z01

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

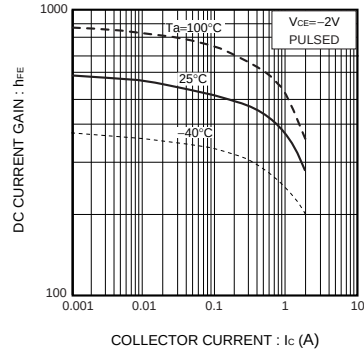


Fig.1 DC current gain
vs. collector current

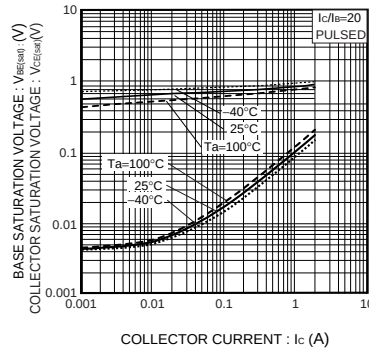


Fig.2 Collector-emitter saturation voltage
base-emitter saturation voltage
vs. collector current

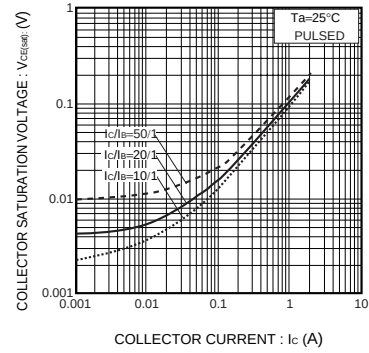


Fig.3 Collector-emitter saturation voltage
vs. collector current

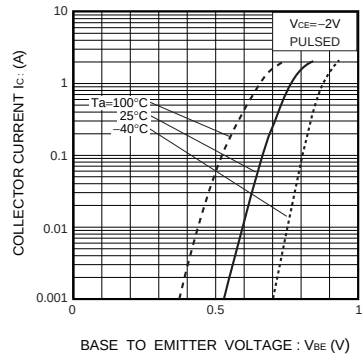


Fig.4 Grounded emitter propagation
characteristics

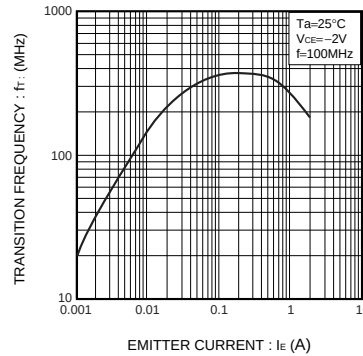


Fig.5 Gain bandwidth product
vs. emitter current

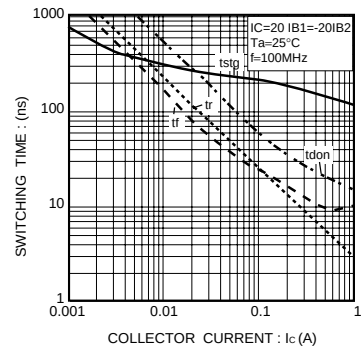


Fig.6 Switching time

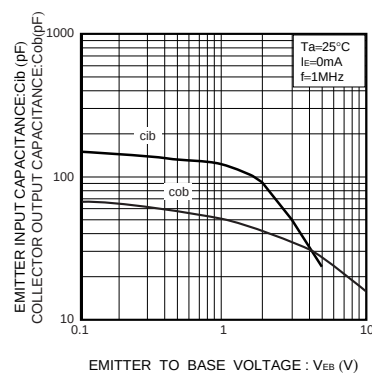


Fig.7 Collector output capacitance
vs. collector-base voltage
Emitter input capacitance
vs. emitter-base voltage

Transistors

Tr2

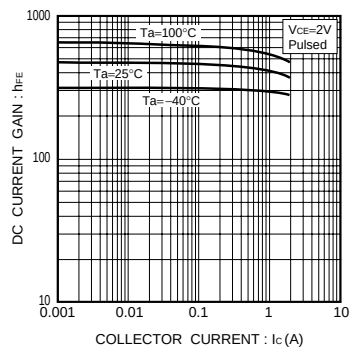


Fig.8 DC current gain vs. collector current

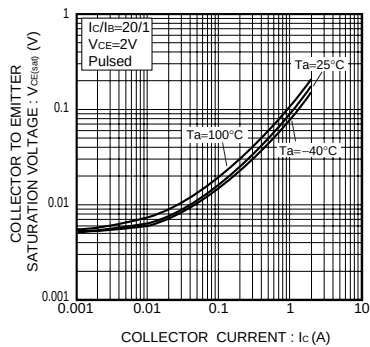


Fig.9 Base-emitter saturation voltage vs. collector current

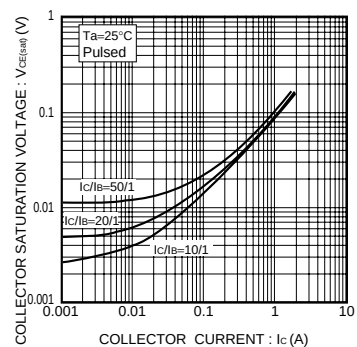


Fig.10 Collector-emitter saturation voltage vs. collector current

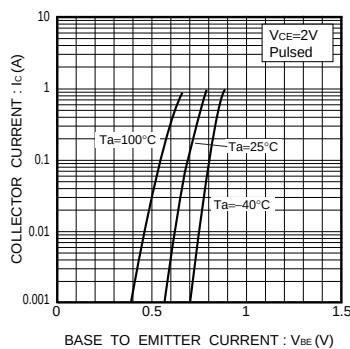


Fig.11 Grounded emitter propagation characteristics

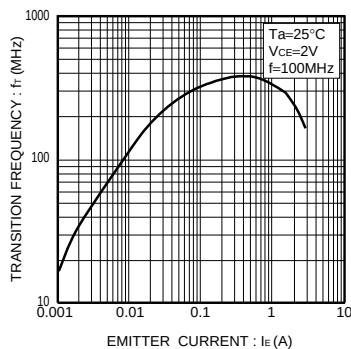


Fig.12 Gain bandwidth product vs. emitter current

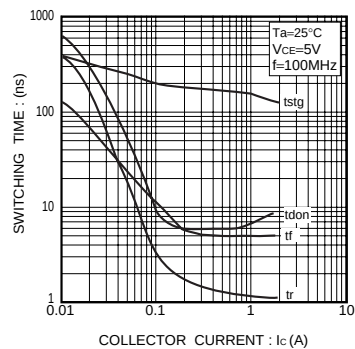


Fig.13 Switching time

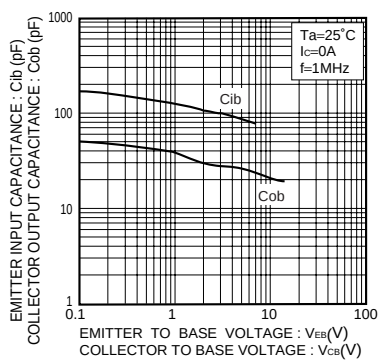


Fig.14 Collector output capacitance vs. collector-base voltage
Emitter input capacitance vs. emitter-base voltage

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