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Dual digital transistors

QSH29

●Features

In addition to the standard features of digital transistor, this transistor has:

- 1) Low collector saturation voltage, typically
 $V_{CE(sat)} = 100\text{mV}$ for $I_C / I_B = 100\text{mA} / 1\text{mA}$ (Typ.)
- 2) High current gain, minimum
 $h_{FE} = 500\text{mA}$ for $V_{CE} = 5\text{V}$, $I_C = 200\text{mA}$.
- 3) Built in Zener diode for protection against surges when connected to inductive load.

●Structure

NPN silicon epitaxial planar transistor

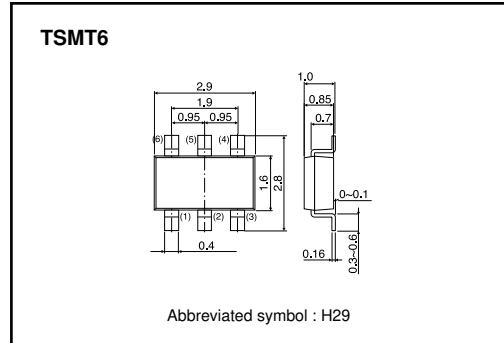
●Applications

Driver

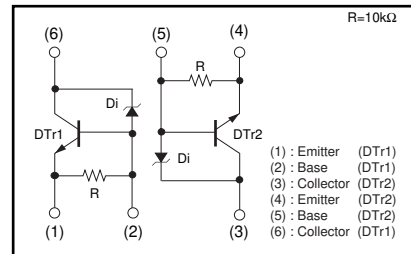
●Packaging specifications and h_{FE}

Type	Package	TSMT6
	Packaging type	Taping
	Code	TR
	Basic ordering unit (pieces)	3000
QSH29		○

●Dimensions (Unit : mm)



●Equivalent circuit



●Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

<< DTr1 >> << DTr2 >>

Parameter	Symbol	Limits	Unit
Collector-base voltage	V_{CBO}	60 ± 10	V
Collector-emitter voltage	V_{CEO}	60 ± 10	V
Emitter-base voltage	V_{EBO}	5	V
Collector current	Continuous	I_C	500 mA
	Pulsed	I_{CP}	1 A *1
Power dissipation	P_D		1.25 W/TOTAL *2
			0.9 W/1 ELEMENT *2
Junction temperature	T_j	150	$^\circ\text{C}$
Range of storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

*1 $P_w = 10\text{ms}$ 1 Pulse

*2 Each terminal mounted on a ceramic board

Transistor

●Electrical characteristics (Ta=25°C)

<<DTr1>> <<DTr2>>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-emitter breakdown voltage	BV _{CEO}	50	–	70	V	I _C =50μA
Collector-base breakdown voltage	BV _{CBO}	50	–	70	V	I _C =50μA
Emitter-base breakdown voltage	BV _{EBO}	5.0	–	–	V	I _E =720μA
Collector cut-off current	I _{CBO}	–	–	0.5	μA	V _{CB} =40V
Emitter cut-off current	I _{EBO}	300	–	580	μA	V _{EB} =4V
Collector-emitter saturation voltage	V _{CE (sat)}	–	100	300	mV	I _C =100mA, I _B =1mA
DC current gain	h _{FE}	500	–	–	–	V _{CE} =5V, I _C =200mA
Emitter-base resistance	R	7	10	13	kΩ	–

Transistor

●Electrical characteristic curves

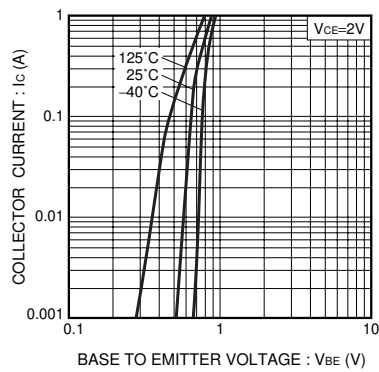


Fig.1 Grounded Emitter Propagation Characteristics

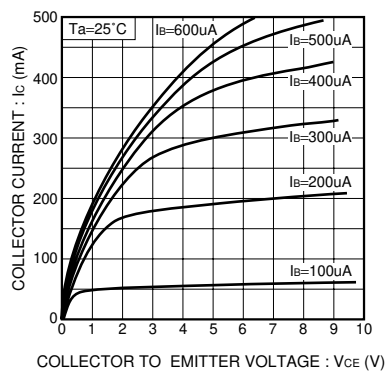


Fig.2 Typical Output Characteristics

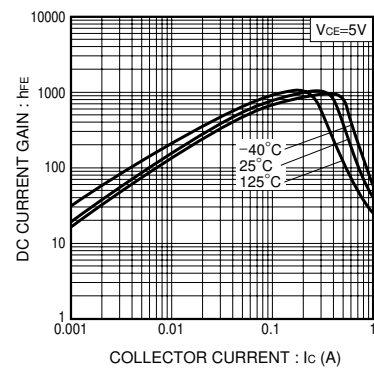


Fig.3 DC Current Gain vs. Collector Current

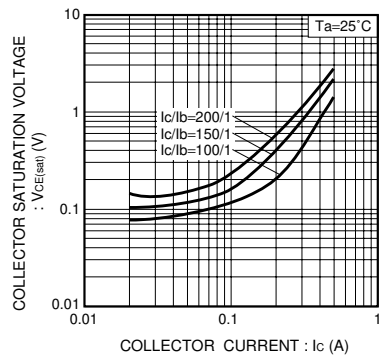


Fig.4 Collector-Emitter Saturation Voltage vs. Collector Current (I)

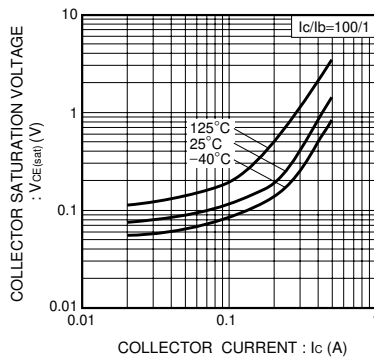


Fig.5 Collector-Emitter Saturation Voltage vs. Collector Current (II)

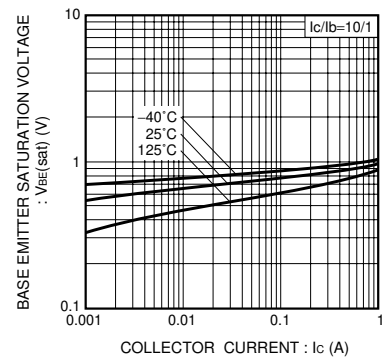


Fig.6 Base-emitter Saturation Voltage vs. Collector Current

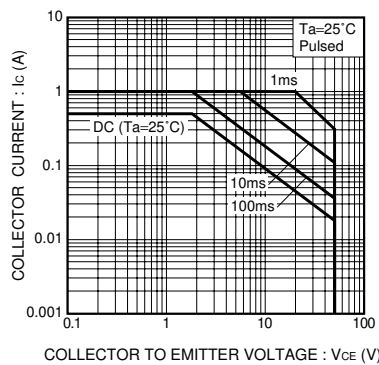


Fig.7 Safe Operating Area

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