TOSHIBA Power Transistor Module Silicon NPN Epitaxial Type (Darlington power transistor 4 in 1)

# **MP4013**

High Power Switching Applications.

Hammer Drive, Pulse Motor Drive and Inductive Load Switching.

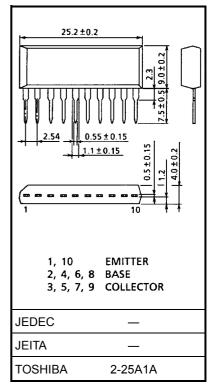
- Small package by full molding (SIP 10 pin)
- High collector power dissipation (4 devices operation) :  $P_T = 4 \text{ W (Ta} = 25^{\circ}\text{C)}$
- High collector current:  $I_{C(DC)} = 2 A (max)$
- High DC current gain:  $h_{FE} = 2000$  (min) ( $V_{CE} = 2 \text{ V}$ ,  $I_{C} = 1 \text{ A}$ )
- Zener diode included between collector and base.

#### **Maximum Ratings (Ta = 25°C)**

Characteristics		Symbol	Rating	Unit	
Collector-base voltage		$V_{CBO}$	80 ± 10	V	
Collector-emitter voltage		V <sub>CEO</sub>	80 ± 10	V	
Emitter-base voltage		V <sub>EBO</sub>	8	V	
Collector current	DC	Ic	2	Α	
	Pulse	I <sub>CP</sub>	3		
Continuous base current		ΙΒ	0.5	Α	
Collector power dissipation (1 device operation)		P <sub>C</sub>	2.0	W	
Collector power dissipation (4 devices operation)		P <sub>T</sub>	4.0	W	
Junction temperature		Tj	150	°C	
Storage temperature range		T <sub>stg</sub>	−55 to 150	°C	

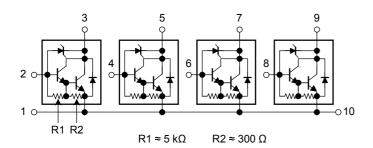
#### **Industrial Applications**

Unit: mm



Weight: 2.1 g (typ.)

#### **Array Configuration**



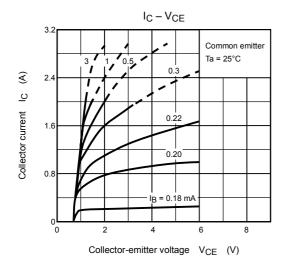
### **Thermal Characteristics**

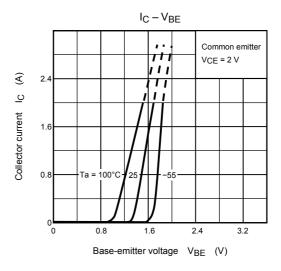
Characteristics	Symbol	Max	Unit	
Thermal resistance of junction to ambient  (4 devices operation, Ta = 25°C)	ΣR <sub>th (j-a)</sub>	31.3	°C/W	
Maximum lead temperature for soldering purposes (3.2 mm from case for 10 s)	TL	260	°C	

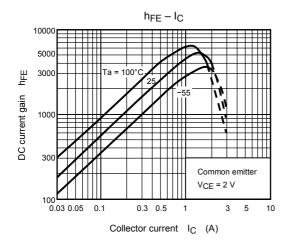
## Electrical Characteristics (Ta = 25°C)

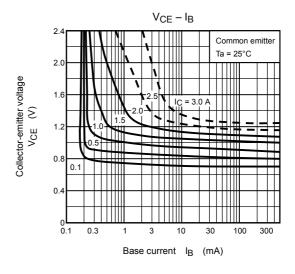
Charac	teristics	Symbol	Test Condition	Min	Тур.	Max	Unit
Collector cut-off current		I <sub>CBO</sub>	V <sub>CB</sub> = 60 V, I <sub>E</sub> = 0 A	_	_	10	μΑ
Collector cut-off current		I <sub>CEO</sub>	V <sub>CE</sub> = 60 V, I <sub>B</sub> = 0 A	_	_	10	μΑ
Emitter cut-off current		I <sub>EBO</sub>	V <sub>EB</sub> = 8 V, I <sub>C</sub> = 0 A	0.8	_	4.0	mA
Collector-base breakdown voltage		V (BR) CBO	I <sub>C</sub> = 100 μA, I <sub>E</sub> = 0 A	70	80	90	V
Collector-emitter breakdown voltage		V (BR) CEO	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0 A	70	80	90	V
DC current gain		h <sub>FE (1)</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 1 A	2000	_	_	_
Saturation voltage	Collector-emitter	V <sub>CE (sat)</sub>	I <sub>C</sub> = 1 A, I <sub>B</sub> = 1 mA	_	_	1.5	V
	Base-emitter	V <sub>BE (sat)</sub>	I <sub>C</sub> = 1 A, I <sub>B</sub> = 1 mA	_	_	2.0	
Transition frequency		f <sub>T</sub>	V <sub>CE</sub> = 2 V, I <sub>C</sub> = 0.5 A	_	100	_	MHz
Collector output capacitance		C <sub>ob</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0 A, f = 1MHz	_	20	_	pF
Switching time	Turn-on time	t <sub>on</sub>	Output  Input $B1$ $CC$ $C$	_	0.4	_	μs
	Storage time	t <sub>stg</sub>		ı	4.0	1	
	Fall time	t <sub>f</sub>		_	0.6	_	

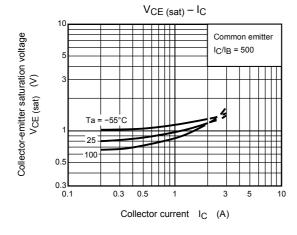
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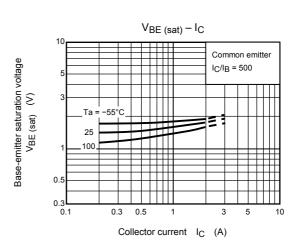


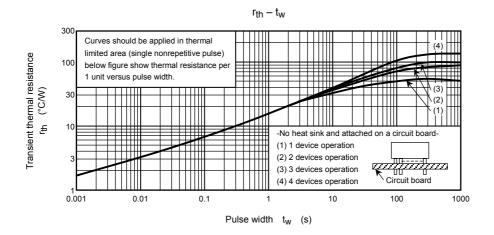


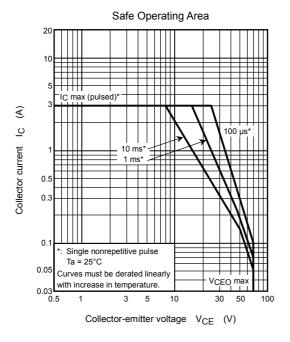


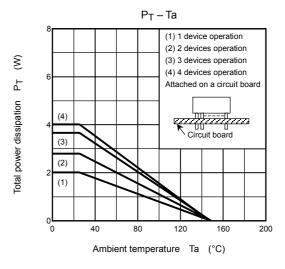


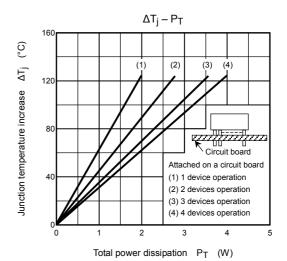












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