

TOSHIBA Power Transistor Module Silicon NPN Epitaxial Type  
(Four Darlingtons Power Transistors in One)

## MP4021

### High Power Switching Applications

Hammer Drive, Pulse Motor Drive and Inductive Load Switching

- Small package by full molding (SIP 10 pins)
- High collector power dissipation (4-device operation)  
:  $P_T = 4 \text{ W}$  ( $T_a = 25^\circ\text{C}$ )
- 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.

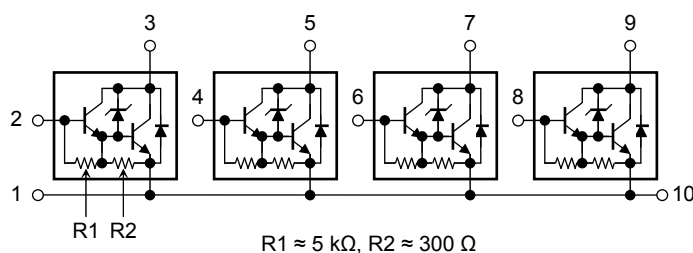
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics		Symbol	Rating	Unit
Collector-base voltage		$V_{CBO}$	85	V
Collector-emitter voltage		$V_{CEO}$	$100 \pm 15$	V
Emitter-base voltage		$V_{EBO}$	8	V
Collector current	DC	$I_C$	2	A
	Pulse	$I_{CP}$	3	
Continuous base current		$I_B$	0.5	A
Collector power dissipation (1-device operation)		$P_C$	2.0	W
Collector power dissipation (4-device operation)		$P_T$	4.0	W
Junction temperature		$T_j$	150	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	-55 to 150	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

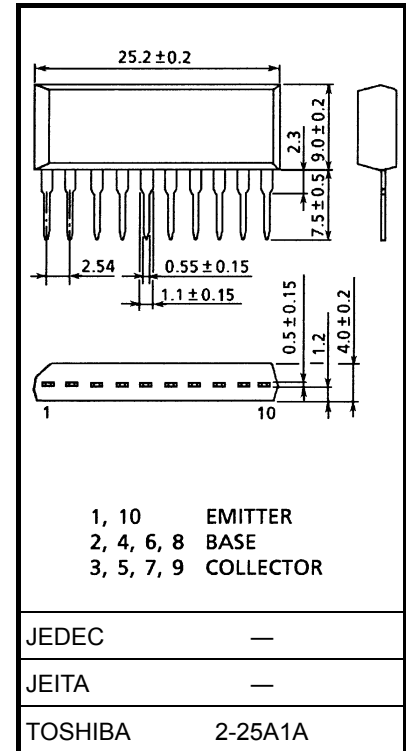
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/Derating Concept and Methods) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

### Array Configuration



Industrial Applications

Unit: mm

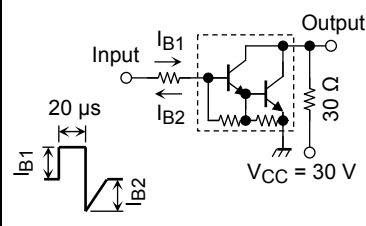


Weight: 2.1 g (typ.)

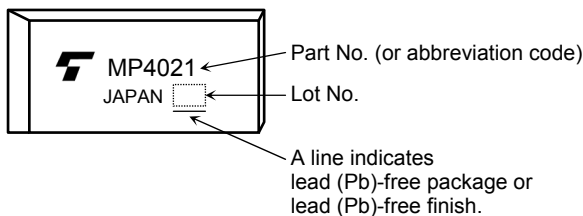
## Thermal Characteristics

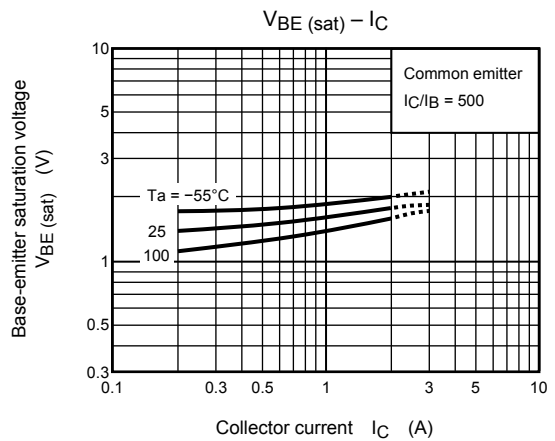
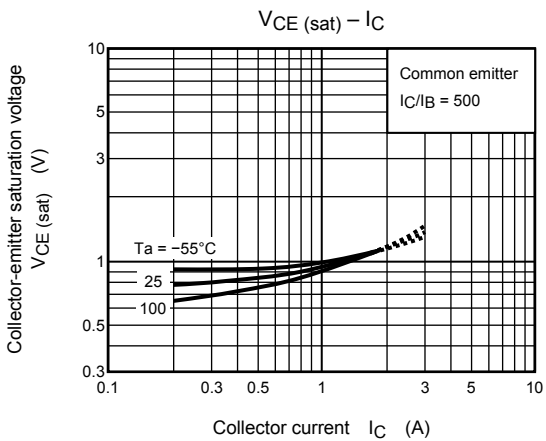
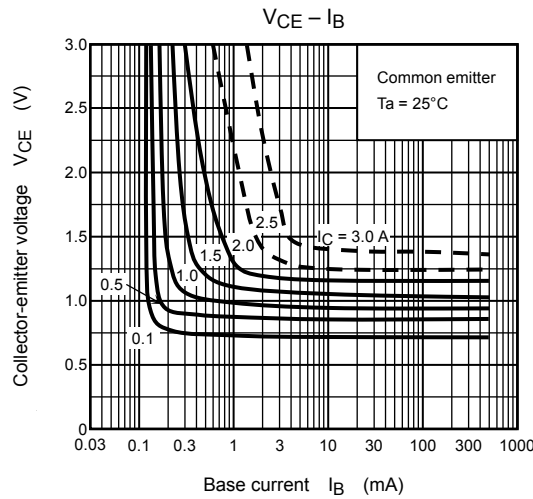
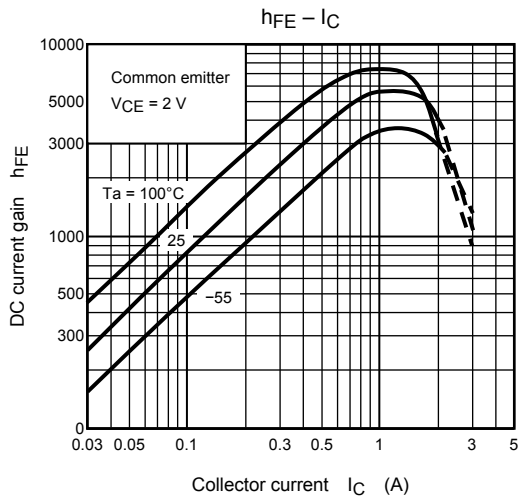
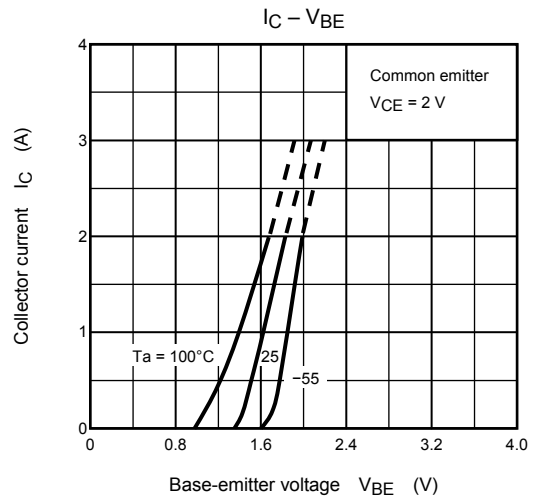
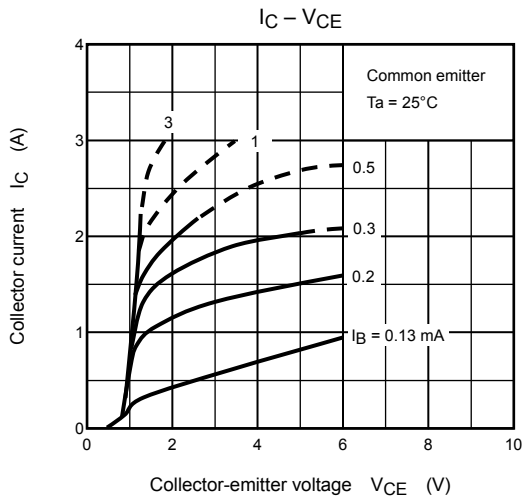
Characteristics	Symbol	Max	Unit
Thermal resistance from junction to ambient (4-device operation, Ta = 25°C)	$\Sigma R_{th(j-a)}$	31.3	°C/W
Maximum lead temperature for soldering purposes (3.2 mm from case for 10 s)	T <sub>L</sub>	260	°C

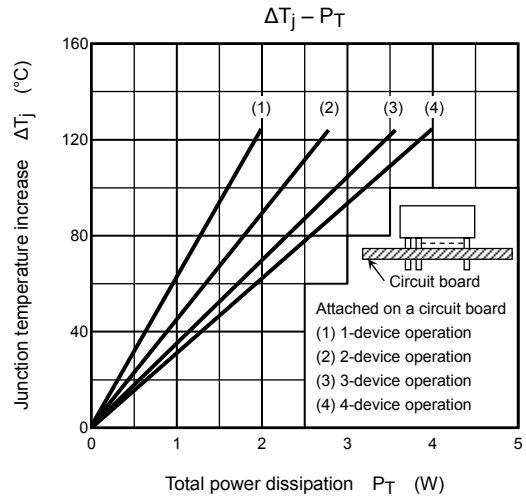
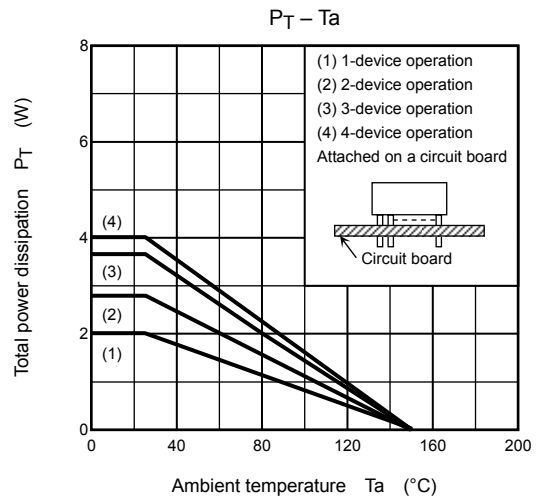
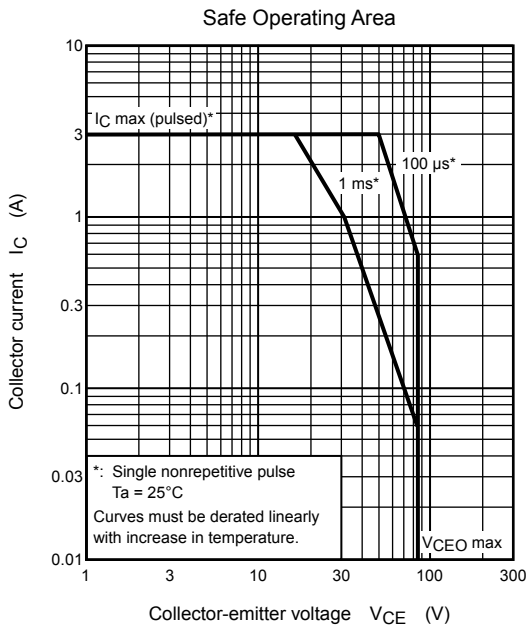
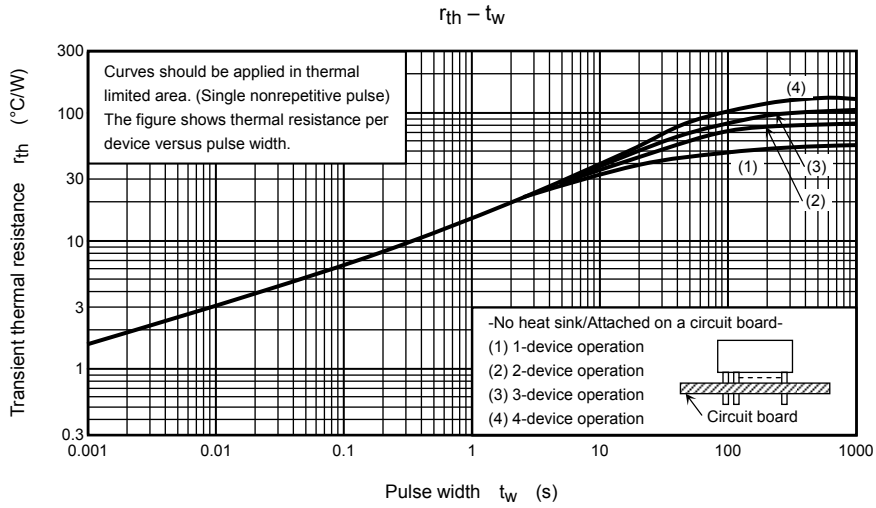
## Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I <sub>CBO</sub>	V <sub>CB</sub> = 80 V, I <sub>E</sub> = 0 A	—	—	10	μA
Collector cut-off current		I <sub>CEO</sub>	V <sub>CE</sub> = 80 V, I <sub>B</sub> = 0 A	—	—	10	μA
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-emitter breakdown voltage		V <sub>(BR)CEO</sub>	I <sub>C</sub> = 10 mA, I <sub>E</sub> = 0 A	85	100	115	V
DC current gain		h <sub>FE</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 = 1 MHz	—	20	—	pF
Switching time	Turn-on time	t <sub>on</sub>	 <p>Input I<sub>B1</sub> I<sub>B2</sub> Output 30 Ω V<sub>CC</sub> = 30 V</p> <p>20 μs</p> <p>I<sub>B1</sub> = -I<sub>B2</sub> = 1 mA, duty cycle ≤ 1%</p>	—	0.45	—	μs
	Storage time	t <sub>stg</sub>		—	2.0	—	
	Fall time	t <sub>f</sub>		—	0.4	—	

## Marking







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