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

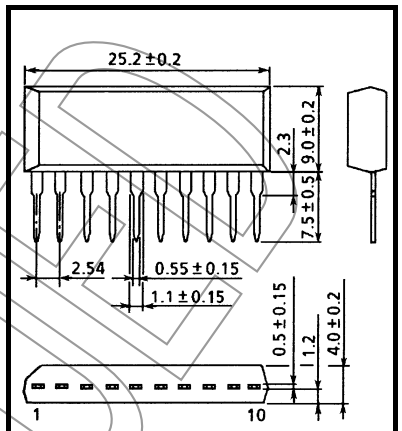
MP4024

Industrial Applications

High Power Switching Applications

Hammer Drive, Pulse Motor Drive and Inductive Load Switching

Unit: mm



1, 10 EMITTER
2, 4, 6, 8 BASE
3, 5, 7, 9 COLLECTOR

JEDEC	—
JEITA	—
TOSHIBA	2-25A1A

Weight: 2.1 g (typ.)

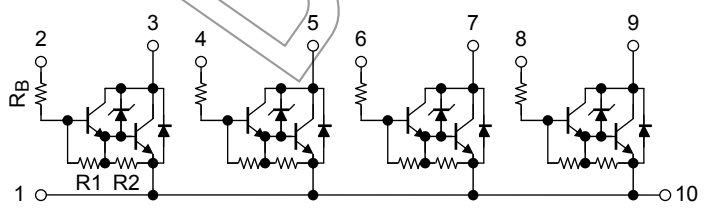
- Small package by full molding (SIP 10 pins)
- Built-in resistance (R_B).
- Surge voltage is clamped by zener diode (C-B).
- Low $V_{CE\ (sat)}$: $V_{CE\ (sat)}$ = 1.5 V (max) (I_C = 1 A, V_{BH} = 4.2 V)
- High DC current gain: h_{FE} = 2000 (min) (V_{CE} = 2 V, I_C = 1 A)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	85	V
Collector-emitter voltage		V_{CEO}	100 ± 15	V
Emitter-base voltage		V_{EBO}	6	V
Input voltage		V_B	20	V
Collector current	DC	I_C	3	A
	Pulse	I_{CP}	4	
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	°C
Storage temperature range		T_{stg}	−55 to 150	°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).

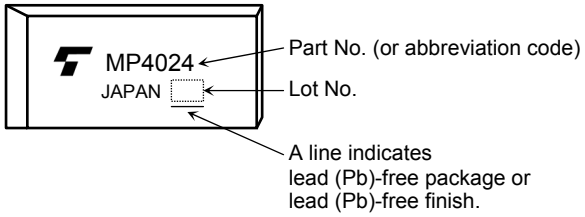
Array Configuration



R_B ≈ 3.6 kΩ

R1 ≈ 5 kΩ R2 ≈ 300 Ω

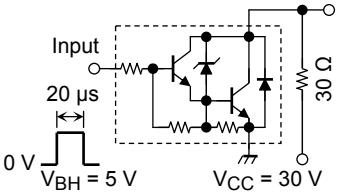
Marking



Thermal Characteristics

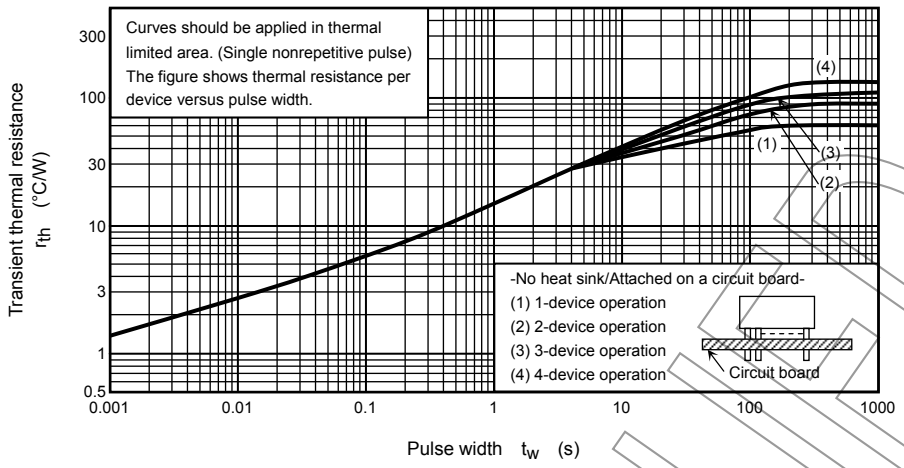
Characteristics	Symbol	Max	Unit
Thermal resistance from junction to ambient (4-device operation, Ta = 25°C)	$\Sigma R_{th\ (j\text{-}a)}$	31.3	°C/W
Maximum lead temperature for soldering purposes (3.2 mm from case for 10 s)	T_L	260	°C

Electrical Characteristics (Ta = 25°C)

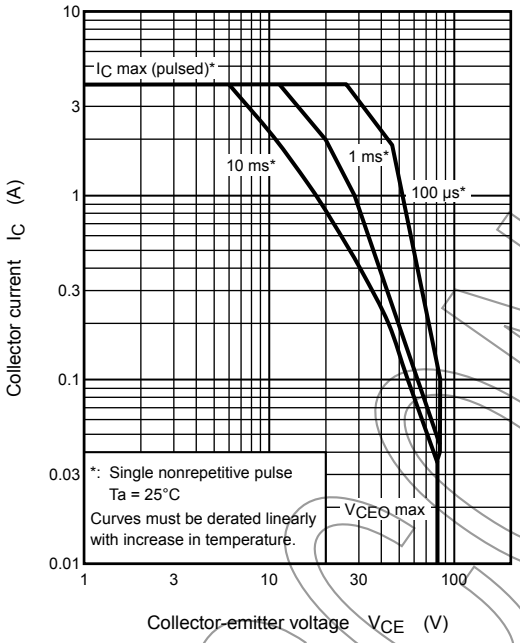
Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = 80 V, I_E = 0 A	—	—	10	μA
Collector cut-off current		I_{CEO}	V_{CE} = 80 V, I_B = 0 A	—	—	10	μA
Emitter cut-off current		I_{EBO}	V_{EB} = 6 V, I_C = 0 A	0.3	—	1.5	mA
Collector- emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = 10 mA, I_B = 0 A	85	100	115	V
Resistance		R_B	—	2.5	3.6	4.7	kΩ
DC current gain		$h_{FE\ (1)}$	V_{CE} = 2 V, I_C = 1 A	2000	—	—	—
		$h_{FE\ (2)}$	V_{CE} = 2 V, I_C = 2 A	1000	—	—	
Collector-emitter saturation voltage		$V_{CE\ (sat)\ (1)}$	I_C = 1 A, V_{BH} = 4.2 V	—	—	1.5	V
		$V_{CE\ (sat)\ (2)}$	I_C = 1.5 A, V_{BH} = 9 V	—	—	1.5	
Input voltage (low)		V_{BL}	V_{CE} = 50 V, I_C = 100 μA	—	—	0.7	V
Switching time	Turn-on time	t_{on}		—	0.3	—	μs
	Storage time	t_{stg}		—	4.0	—	
	Fall time	t_f		—	0.6	—	

Duty cycle ≤ 1%

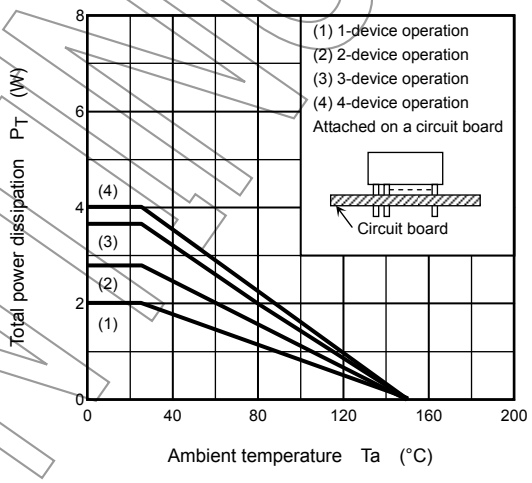
$r_{th} - t_w$



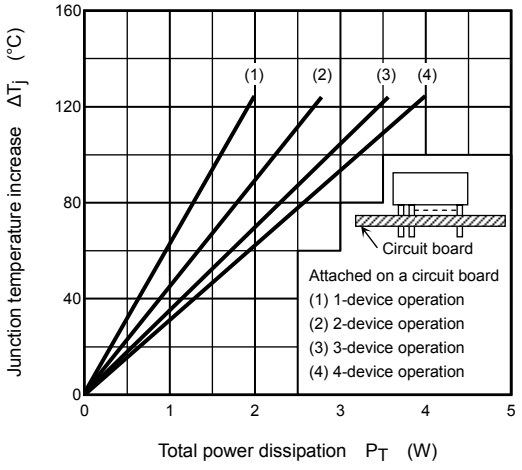
Safe Operating Area



P_T – Ta



$\Delta T_j - P_T$



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