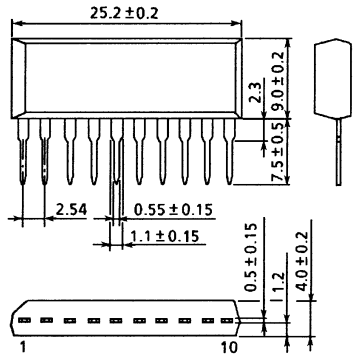
TOSHIBA Power Transistor Module
Silicon PNP Triple Diffused Type (Four Darlington Power Transistors in One)

MP4009

High Power Switching Applications
Hammer Drive, Pulse Motor Drive
Inductive Load Switching

Industrial Applications

Unit: mm



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

JEDEC	—
JEITA	—
TOSHIBA	2-25A1A

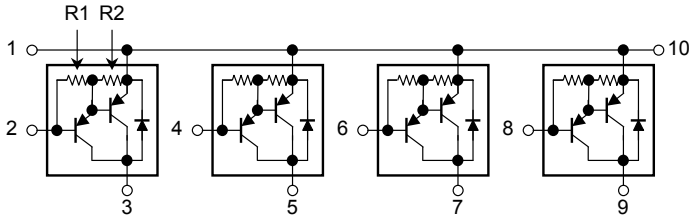
Weight: 2.1 g (typ.)

- Small package by full molding (SIP 10 pins)
- High collector power dissipation (4-device operation)
  : P_T = 4 W (Ta = 25°C)
- High collector current: $I_{C\ (DC)}$ = −5 A (max)
- High DC current gain: h_{FE} = 1000 (min) (V_{CE} = −3 V, I_C = −3 A)
- Complementary to MP4003

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Collector-base voltage		V_{CBO}	−100	V
Collector-emitter voltage		V_{CEO}	−100	V
Emitter-base voltage		V_{EBO}	−5	V
Collector current	DC	I_C	−5	A
	Pulse	I_{CP}	−8	
Continuous base current		I_B	−0.1	A
Collector power dissipation (1 device operation)		P_C	2.0	W
Collector power dissipation (4 devices operation)		P_T	4.0	W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	−55 to 150	°C

Array Configuration

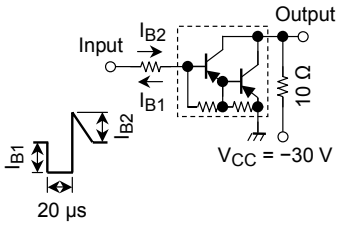


R1 ≈ 5 kΩ, R2 ≈ 120 Ω

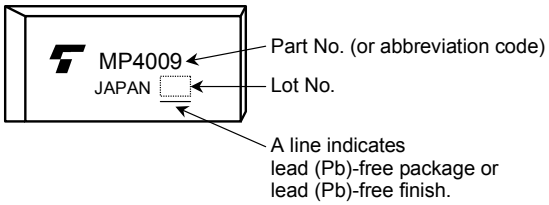
Thermal Characteristics

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

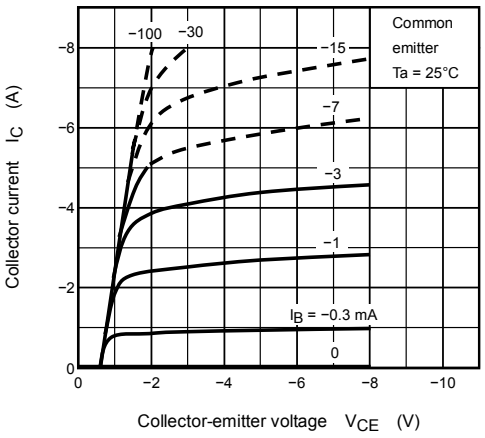
Electrical Characteristics (Ta = 25°C)

Characteristics		Symbol	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current		I_{CBO}	V_{CB} = −100 V, I_E = 0 A	—	—	−10	μA
Collector cut-off current		I_{CEO}	V_{CE} = −100 V, I_B = 0 A	—	—	−10	μA
Emitter cut-off current		I_{EBO}	V_{EB} = −5 V, I_C = 0 A	−0.3	—	−2.0	mA
Collector-base breakdown voltage		$V_{(BR)\ CBO}$	I_C = −1 mA, I_E = 0 A	−100	—	—	V
Collector-emitter breakdown voltage		$V_{(BR)\ CEO}$	I_C = −30 mA, I_B = 0 A	−100	—	—	V
DC current gain		$h_{FE\ (1)}$	V_{CE} = −3 V, I_C = −0.5 A	1000	—	—	—
		$h_{FE\ (2)}$	V_{CE} = −3 V, I_C = −3 A	1000	—	—	
Saturation voltage	Collector-emitter	$V_{CE\ (sat)}$	I_C = −3 A, I_B = −12 mA	—	—	−2.0	V
	Base-emitter	$V_{BE\ (sat)}$	I_C = −3 A, I_B = −12 mA	—	—	−2.5	
Transition frequency		f_T	V_{CE} = −3 V, I_C = −0.5 A	3	—	—	MHz
Collector output capacitance		C_{ob}	V_{CB} = 50 V, I_E = 0 A, f = 1MHz	—	40	—	pF
Switching time	Turn-on time	t_{on}	 $-I_{B1} = I_{B2}$ = 12 mA, duty cycle ≤ 1%	—	0.5	—	μs
	Storage time	t_{stg}		—	3.0	—	
	Fall time	t_f		—	2.0	—	

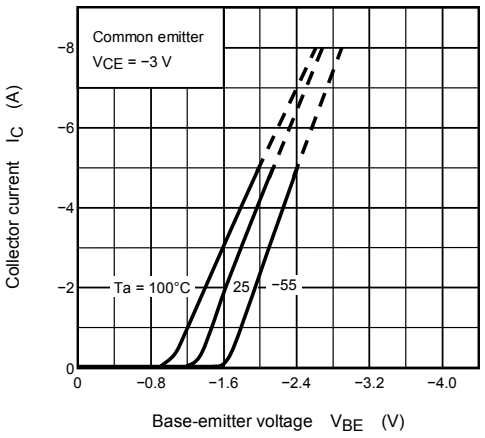
Marking



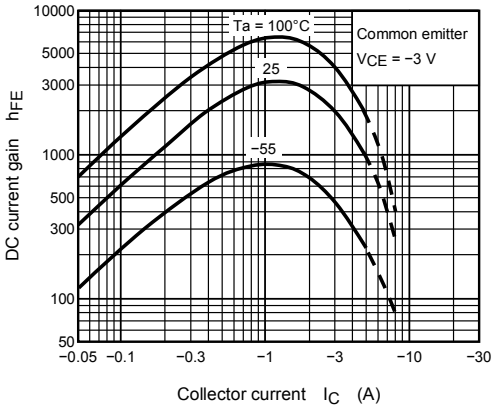
$I_C - V_{CE}$



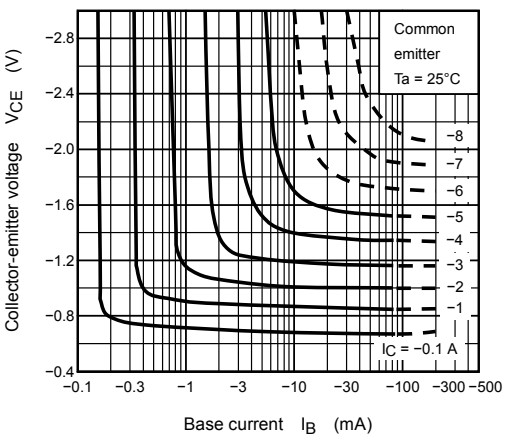
$I_C - V_{BE}$



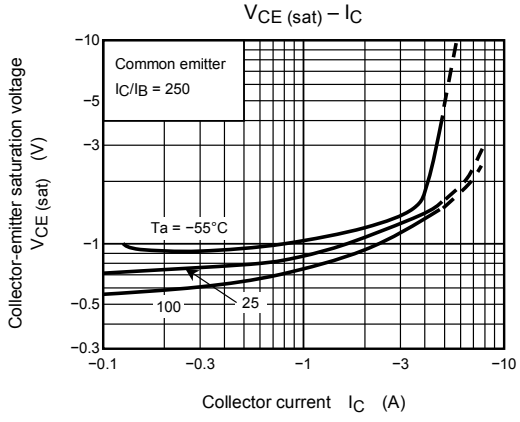
$h_{FE} - I_C$



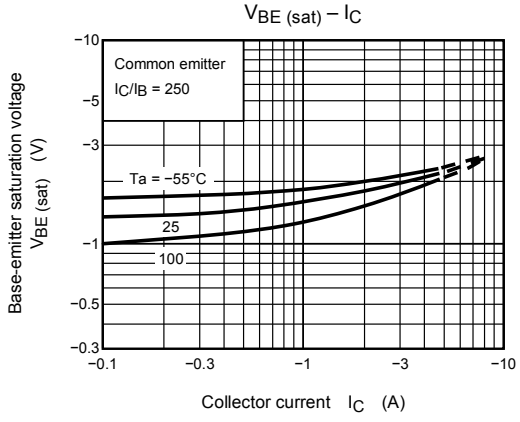
$V_{CE} - I_B$



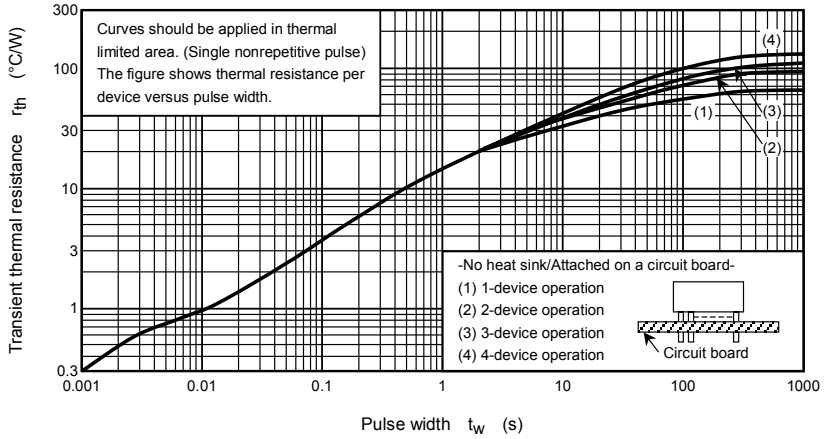
$V_{CE\ (sat)} - I_C$



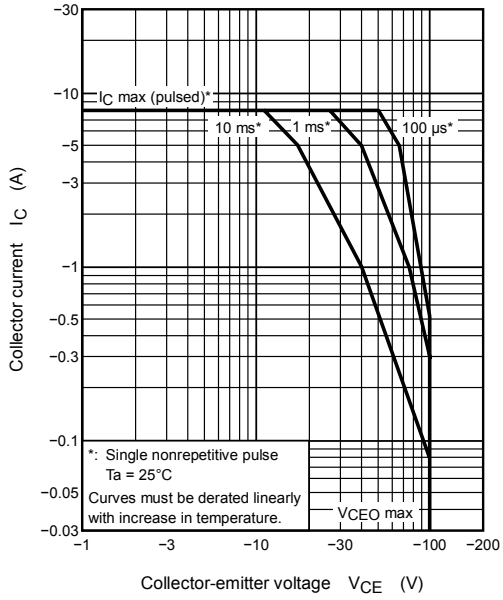
$V_{BE\ (sat)} - I_C$



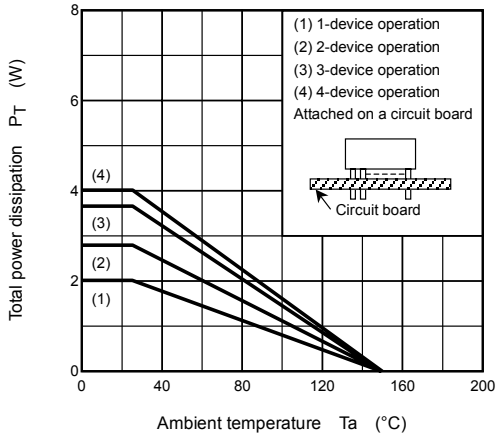
$r_{th} - t_w$



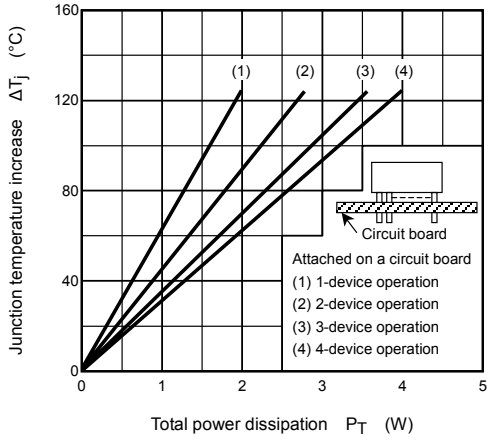
Safe Operating Area



P_T – Ta



$\Delta T_j - P_T$



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