

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.

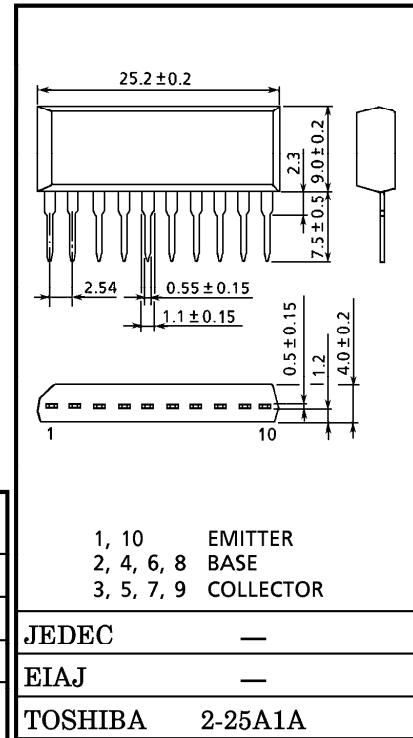
- Small Package by Full Molding (SIP 10 Pin)
- High Collector Power Dissipation (4 Devices Operation)  
:  $P_T=4W$  ( $T_a=25^\circ C$ )
- High Collector Current :  $I_C$  (DC)=2A (Max.)
- High DC Current Gain :  $h_{FE}=2000$  (Min.) ( $V_{CE}=2V$ ,  $I_C=1A$ )
- Zener Diode Included Between Collector and Base.

MAXIMUM RATINGS ( $T_a = 25^\circ C$ )

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		$V_{CB0}$	$80 \pm 10$	V
Collector-Emitter Voltage		$V_{CE0}$	$80 \pm 10$	V
Emitter-Base Voltage		$V_{EB0}$	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 Devices Operation)		$P_T$	4.0	W
Junction Temperature		$T_j$	150	$^\circ C$
Storage Temperature Range		$T_{stg}$	$-55 \sim 150$	$^\circ C$

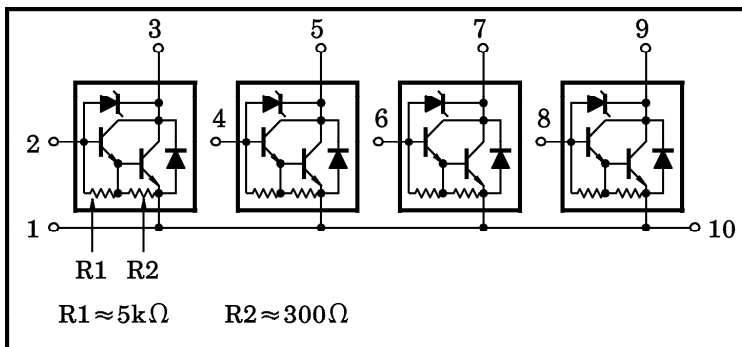
INDUSTRIAL APPLICATIONS

Unit in mm



Weight : 2.1g

ARRAY CONFIGURATION



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**THERMAL CHARACTERISTICS**

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Junction to Ambient (4 Devices Operation, Ta=25°C)	$\Sigma R_{th(j-a)}$	31.3	°C / W
Maximum Lead Temperature for Soldering Purposes (3.2mm from Case for 10s)	T <sub>L</sub>	260	°C

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT				
Collector Cut-off Current	I <sub>CBO</sub>	V <sub>CB</sub> = 60V, I <sub>E</sub> = 0	—	—	10	μA				
Collector Cut-off Current	I <sub>CEO</sub>	V <sub>CE</sub> = 60V, I <sub>B</sub> = 0	—	—	10	μA				
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 8V, I <sub>C</sub> = 0	0.8	—	4.0	mA				
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> = 100μA, I <sub>E</sub> = 0	70	80	90	V				
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0	70	80	90	V				
DC Current Gain	h <sub>FE(1)</sub>	V <sub>CE</sub> = 2V, I <sub>C</sub> = 1A	2000	—	—					
Saturation Voltage	Collector-Emitter	V <sub>CE(sat)</sub>	I <sub>C</sub> = 1A, I <sub>B</sub> = 1mA	—	—	1.5	V			
	Base-Emitter	V <sub>BE(sat)</sub>	I <sub>C</sub> = 1A, I <sub>B</sub> = 1mA	—	—	2.0				
Transition Frequency	f <sub>T</sub>	V <sub>CE</sub> = 2V, I <sub>C</sub> = 0.5A	—	100	—	MHz				
Collector Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz	—	20	—	pF				
Switching Time	Turn-on Time	t <sub>on</sub>					—	0.4	—	μs
	Storage Time	t <sub>stg</sub>					—	4.0	—	
	Fall Time	t <sub>f</sub>					I <sub>B1</sub> = -I <sub>B2</sub> = 1mA DUTY CYCLE ≤ 1%	—	0.6	

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