

TOSHIBA POWER TRANSISTOR MODULE SILICON NPN TRIPLE DIFFUSED TYPE (DARLINGTON POWER TRANSISTOR 4 IN 1)

MP4015

HIGH POWER SWITCHING APPLICATIONS.

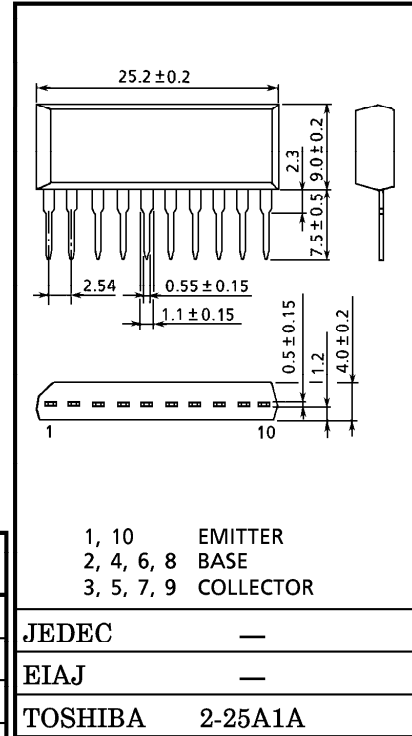
HAMMER DRIVE, PULSE MOTOR DRIVE.

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 : $I_C (DC) = 5A$ (Max.)
- High DC Current Gain : $h_{FE} = 1000$ (Min.) ($V_{CE} = 4V, I_C = 3A$)
- Zener Diode Included Between Collector and Base.
- Unclamped Inductive Load Energy : $E_{S/B} = 100mJ$ (Min.)

INDUSTRIAL APPLICATIONS

Unit in mm

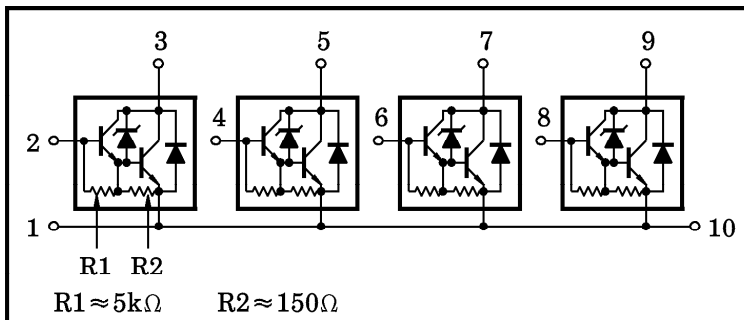


Weight : 2.1g

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

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	55	V
Collector-Emitter Voltage	V_{CEO}	60 ± 10	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	DC	I_C	5
	Pulse	I_{CP}	8
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}	$-55 \sim 150$	$^\circ C$

ARRAY CONFIGURATION



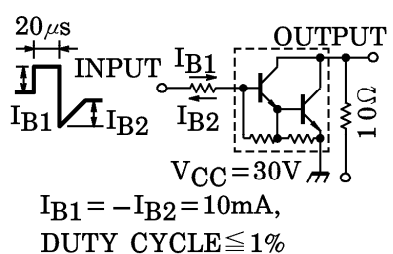
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THERMAL CHARACTERISTICS

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 _L	260	°C

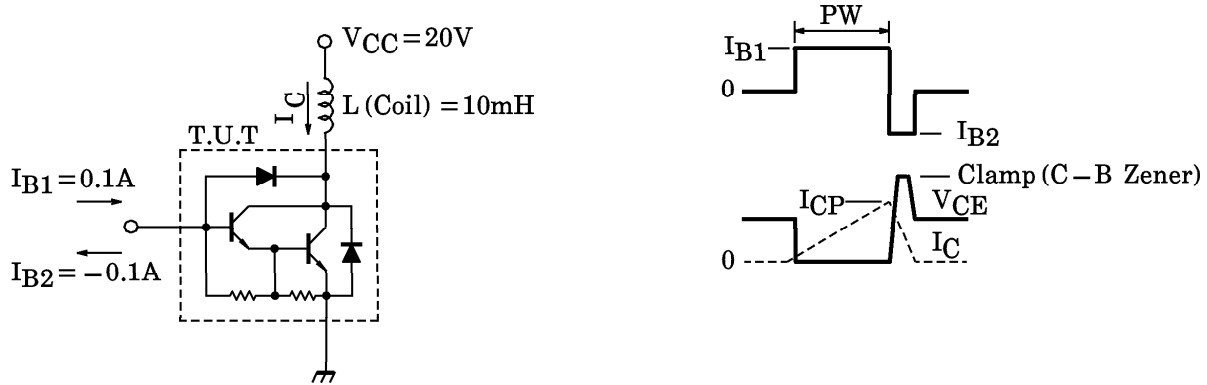
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I _{CBO}	V _{CB} = 45V, I _E = 0	—	—	10	μA
Collector Cut-off Current		I _{CEO}	V _{CE} = 45V, I _B = 0	—	—	10	μA
Emitter Cut-off Current		I _{EBO}	V _{EB} = 6V, I _C = 0	0.3	—	10	mA
Collector-Base Breakdown Voltage		V (BR) CBO	I _C = 10mA, I _E = 0	50	—	70	V
DC Current Gain		h _{FE} (1)	V _{CE} = 4V, I _C = 1A	1000	—	—	
		h _{FE} (2)	V _{CE} = 4V, I _C = 3A	1000	—	—	
Saturation Voltage	Collector-Emitter	V _{CE} (sat) (1)	I _C = 1A, I _B = 4mA	—	0.9	1.4	V
		V _{BE} (sat) (2)	I _C = 3A, I _B = 10mA	—	1.3	2.0	
	Base-Emitter	V _{BE} (sat)	I _C = 1A, I _B = 4mA	—	1.6	2.0	
Base-Emitter Voltage		V _{BE}	V _{CE} = 4V, I _B = 3A	—	1.8	2.5	V
Transition Frequency		f _T	V _{CE} = 3V, I _C = 0.5A	—	7	—	MHz
Collector Output Capacitance		C _{ob}	V _{CB} = 10V, I _E = 0A, f = 1MHz	—	44	—	pF
Switching Time	Turn-on Time	t _{on}	 <p>20μs INPUT I_{B1} I_{B2} OUTPUT 100Ω V_{CC} = 30V</p> <p>I_{B1} = -I_{B2} = 10mA, DUTY CYCLE ≤ 1%</p>	—	0.6	—	μs
	Storage Time	t _{stg}		—	4.2	—	
	Fall Time	t _f		—	2.3	—	
Unclamped Inductive Load Energy		E _{S/B}	Refer to Fig.1	100	—	—	mJ

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Fig.1 : Measurement Circuit of Unclamped Inductive Load Energy E_S / B



Note : 1. Pulse width Adjusted for Desired I_{CP} ($I_{CP} = 4.48A$ MIN.)

$$2. E_S / B = \frac{1}{2} L \cdot I_{CP}^2$$

