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

MP4015

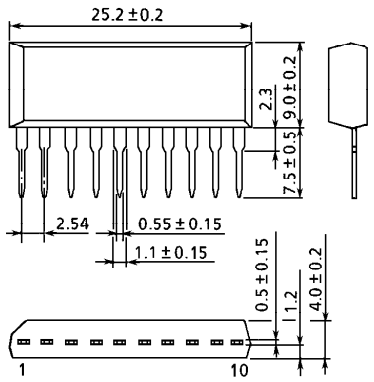
HIGH POWER SWITCHING APPLICATIONS.

HAMMER DRIVE, PULSE MOTOR DRIVE.

INDUCTIVE LOAD SWITCHING.

INDUSTRIAL APPLICATIONS

Unit in mm



- Small Package by Full Molding (SIP 10 Pin)
- High Collector Power Dissipation (4 Devices Operation)
  : $P_T = 4W$ (Ta = 25°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.)

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

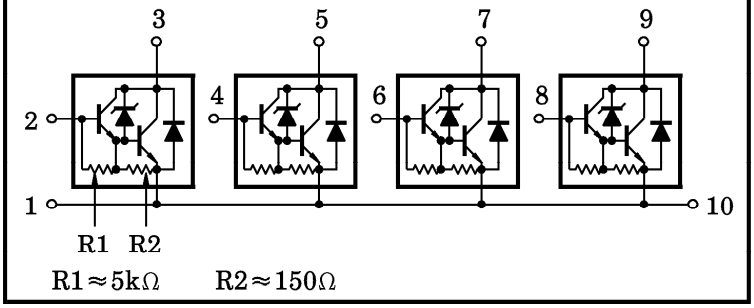
JEDEC	—
EIAJ	—
TOSHIBA	2-25A1A

Weight : 2.1g

MAXIMUM RATINGS (Ta = 25°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	A
	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	°C
Storage Temperature Range		T_{stg}	−55~150	°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)	$\Sigma R_{th\,(j\text{-}a)}$	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)

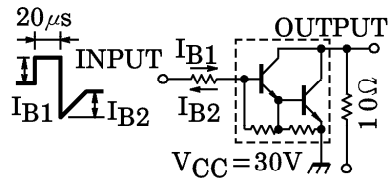
CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I_{CBO}	V_{CB} = 45V, I_E = 0	—	—	10	μA
Collector Cut-off Current		I_{CEO}	V_{CE} = 45V, I_B = 0	—	—	10	μA
Emitter Cut-off Current		I_{EBO}	V_{EB} = 6V, I_C = 0	0.3	—	10	mA
Collector-Base Breakdown Voltage		$V_{(BR)\,CBO}$	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}	 $I_{B1} = -I_{B2}$ = 10mA, DUTY CYCLE ≦ 1%	—	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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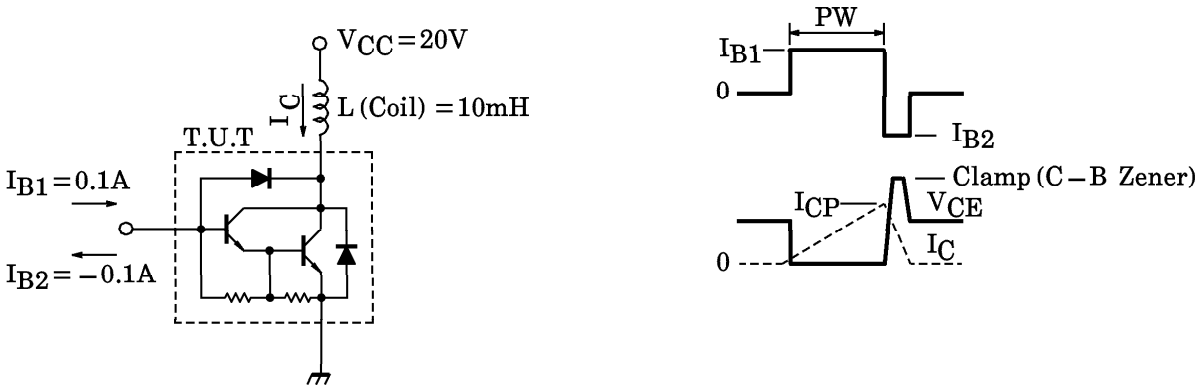
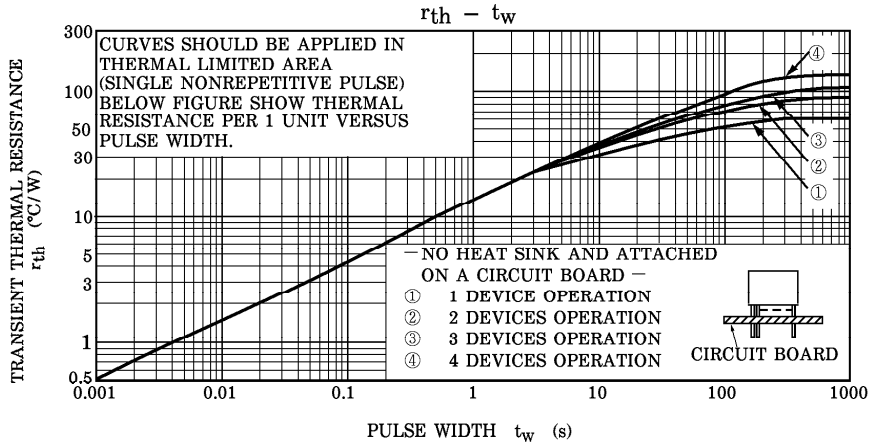
Fig.1 : Measurement Circuit of Unclamped Inductive Load Energy $E_{S/B}$



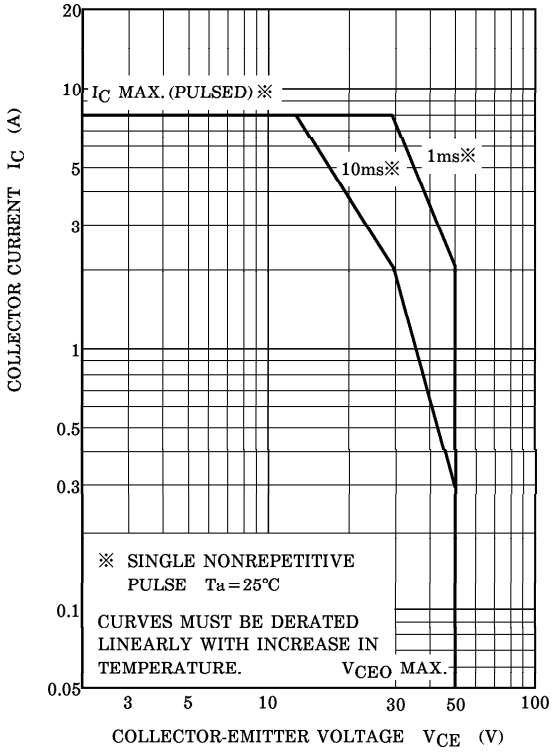
Note : 1. Pulse width Adjusted for Desired I_{CP} (I_{CP}=4.48A MIN.)

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

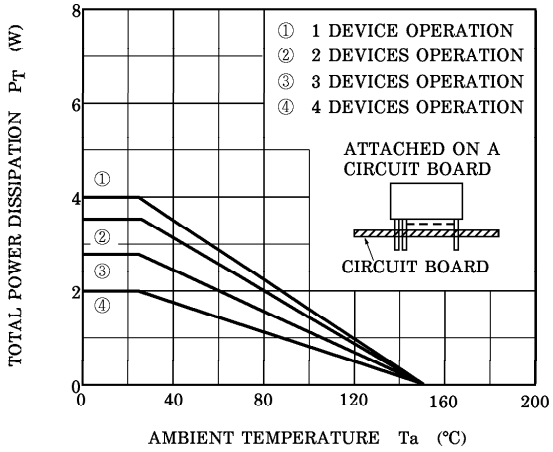
$r_{th} - t_w$



SAFE OPERATING AREA



$P_T - Ta$



$\Delta T_j - P_T$