

TOSHIBA POWER TRANSISTOR MODULE SILICON NPN & PNP EPITAXIAL TYPE (DARLINGTON POWER TRANSISTOR 4 IN 1)

MP4005

HIGH POWER SWITCHING APPLICATIONS.
HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE
LOAD SWITCHING.

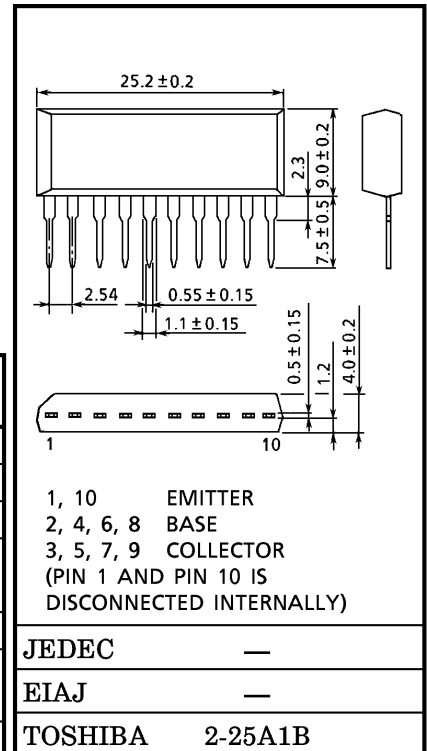
- Small Package by Full Molding (SIP 10 Pin)
- High Collector Power Dissipation (4 Devices Operation)
: $P_T = 4W$ ($T_a = 25^\circ C$)
- High Collector Current : I_C (DC) = $\pm 4A$ (Max.)
- High DC Current Gain : $h_{FE} = 2000$ (Min.)
($V_{CE} = \pm 2V$, $I_C = \pm 1A$)

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

CHARACTERISTIC	SYMBOL	RATING		UNIT
		NPN	PNP	
Collector-Base Voltage	V_{CBO}	100	-100	V
Collector-Emitter Voltage	V_{CEO}	80	-80	V
Emitter-Base Voltage	V_{EBO}	5	-5	V
Collector Current	DC	I_C	4	A
	Pulse	I_{CP}	6	
Continuous Base Current	I_B	0.4	-0.4	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}	-55~150		$^\circ C$

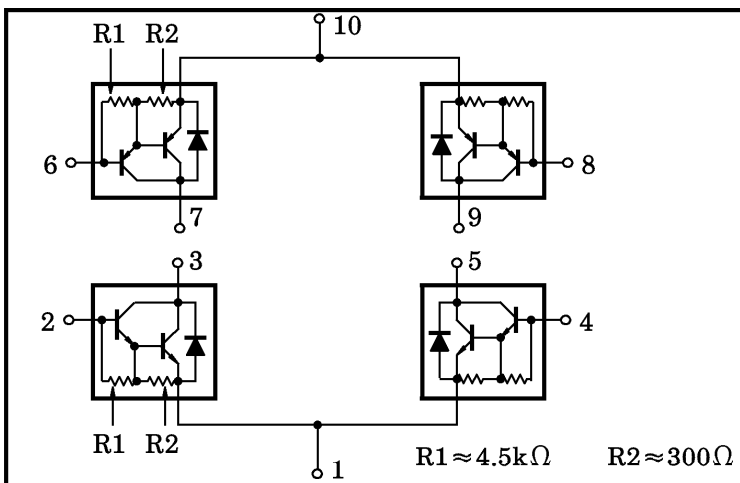
INDUSTRIAL APPLICATIONS

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 _L	260	°C

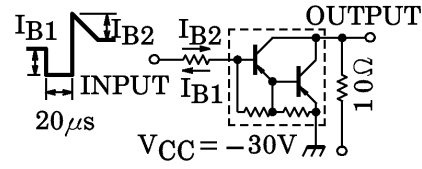
ELECTRICAL CHARACTERISTICS (Ta = 25°C) (NPN TRANSISTOR)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I _{CBO}	V _{CB} = 100V, I _E = 0	—	—	20	μA
Collector Cut-off Current		I _{CEO}	V _{CE} = 80V, I _B = 0	—	—	20	μA
Emitter Cut-off Current		I _{EBO}	V _{EB} = 5V, I _C = 0	0.5	—	2.5	mA
Collector-Base Breakdown Voltage		V _{(BR)CBO}	I _C = 1mA, I _E = 0	100	—	—	V
Collector-Emitter Breakdown Voltage		V _{(BR)CEO}	I _C = 10mA, I _B = 0	80	—	—	V
DC Current Gain		h _{FE} (1)	V _{CE} = 2V, I _C = 1A	2000	—	—	
		h _{FE} (2)	V _{CE} = 2V, I _C = 3A	1000	—	—	
Saturation Voltage	Collector-Emitter	V _{CE(sat)}	I _C = 3A, I _B = 6mA	—	—	1.5	V
	Base-Emitter	V _{BE(sat)}	I _C = 3A, I _B = 6mA	—	—	2.0	
Transition Frequency		f _T	V _{CE} = 2V, I _C = 0.5A	—	60	—	MHz
Collector Output Capacitance		C _{ob}	V _{CB} = 10V, I _E = 0, f = 1MHz	—	30	—	pF
Switching Time	Turn-on Time	t _{on}		—	0.2	—	μs
	Storage Time	t _{stg}		—	1.5	—	
	Fall Time	t _f		I _{B1} = -I _{B2} = 6mA DUTY CYCLE ≤ 1%	—	0.6	

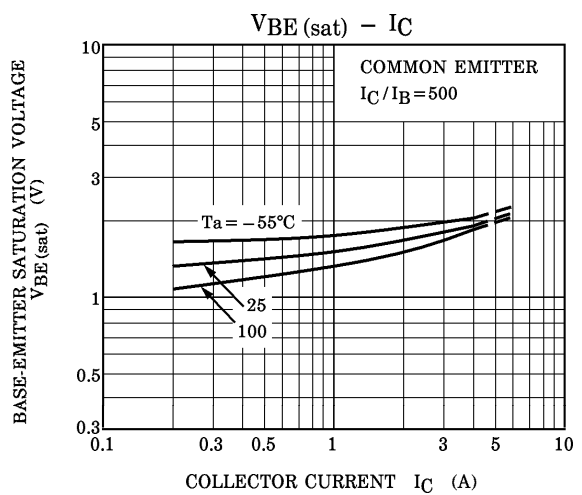
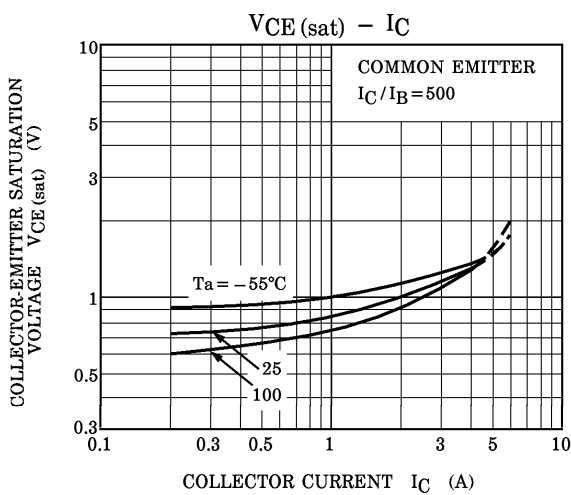
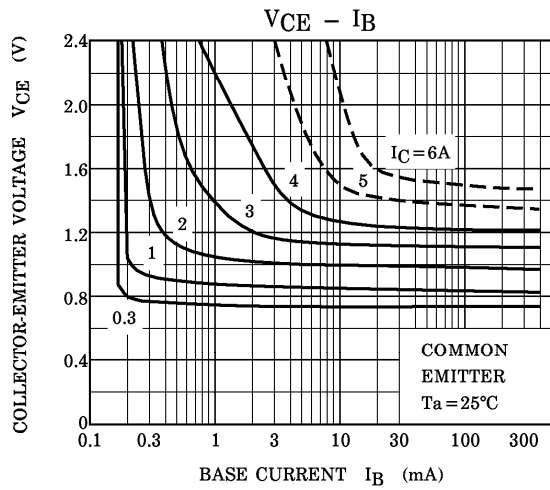
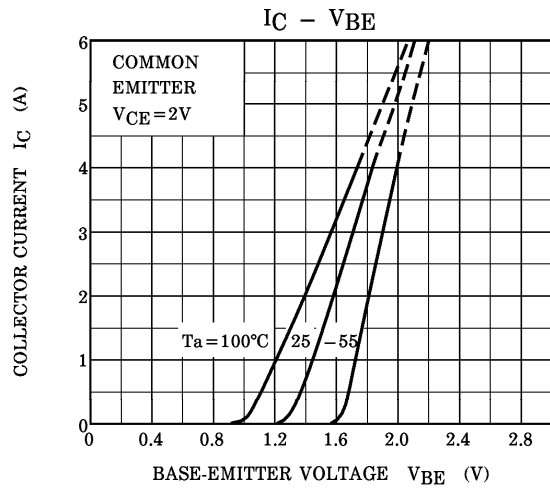
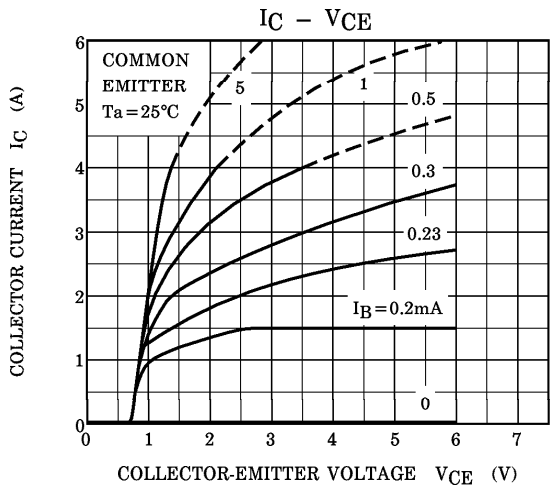
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ELECTRICAL CHARACTERISTICS (Ta = 25°C) (PNP TRANSISTOR)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		ICBO	V _{CB} = -100V, I _E = 0	—	—	-20	μA
Collector Cut-off Current		ICEO	V _{CE} = -80V, I _B = 0	—	—	-20	μA
Emitter Cut-off Current		IEBO	V _{EB} = -5V, I _C = 0	-0.5	—	-2.5	mA
Collector-Base Breakdown Voltage		V _{(BR)CBO}	I _C = -1mA, I _E = 0	-100	—	—	V
Collector-Emitter Breakdown Voltage		V _{(BR)CEO}	I _C = -10mA, I _B = 0	-80	—	—	V
DC Current Gain		h _{FE} (1)	V _{CE} = -2V, I _C = -1A	2000	—	—	
		h _{FE} (2)	V _{CE} = -2V, I _C = -3A	1000	—	—	
Saturation Voltage	Collector-Emitter	V _{CE(sat)}	I _C = -3A, I _B = -6mA	—	—	-1.5	V
	Base-Emitter	V _{BE(sat)}	I _C = -3A, I _B = -6mA	—	—	-2.0	
Transition Frequency		f _T	V _{CE} = -2V, I _C = -0.5A	—	40	—	MHz
Collector Output Capacitance		C _{ob}	V _{CB} = -10V, I _E = 0A, f = 1MHz	—	55	—	pF
Switching Time	Turn-on Time	t _{on}	 <p style="text-align: center;">-I_{B1} = I_{B2} = 6mA, DUTY CYCLE ≤ 1%</p>	—	0.15	—	μs
	Storage Time	t _{stg}		—	0.80	—	
	Fall Time	t _f		—	—	0.40	

(NPN TRANSISTOR)



(PNP TRANSISTOR)

