

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

MP4502

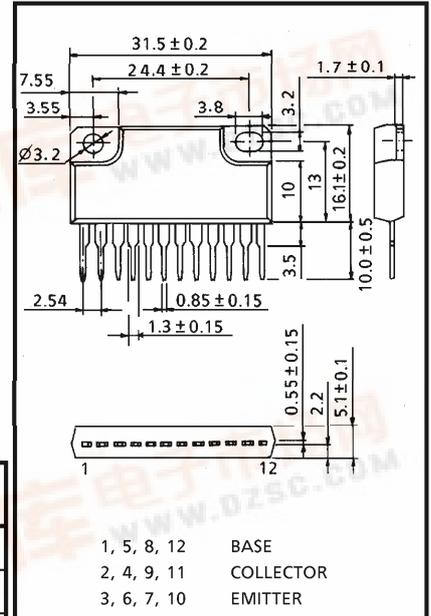
HIGH POWER SWITCHING APPLICATIONS.

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE LOAD SWITCHING.

INDUSTRIAL APPLICATIONS

Unit in mm

- Package with Heat Sink Isolated to Lead (SIP 12 Pin)
- High Collector Power Dissipation (4 Devices Operation)
: $P_T = 5W$ ($T_a = 25^\circ C$)
- High Collector Current : $I_C(DC) = 3A$ (Max.)
- High DC Current Gain : $h_{FE} = 2000$ (Min.) ($V_{CE} = 2V, I_C = 1.5A$)



JEDEC	—
EIAJ	—
TOSHIBA	2-32B1B

Weight : 6.0g

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

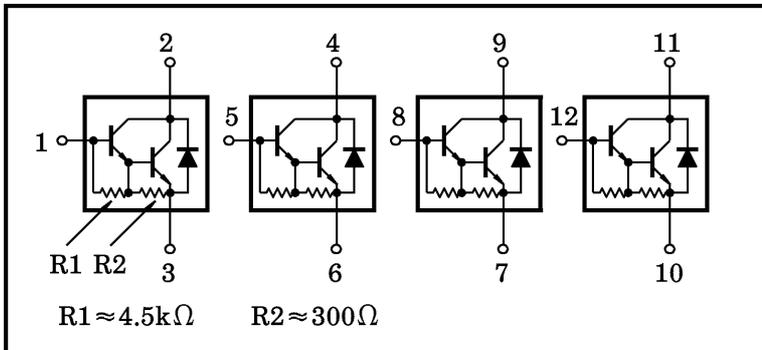
CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	120	V
Collector-Emitter Voltage	V_{CEO}	100	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	DC	I_C	3
	Pulse	I_{CP}	6
Continuous Base Current	I_B	0.5	A
Collector Power Dissipation (1 Device Operation)	P_C	3.0	W
Collector Power Dissipation (4 Devices Operation)	$T_a = 25^\circ C$	P_T	5.0
	$T_c = 25^\circ C$		25
Isolation Voltage	V_{Isol}	1000	V
Junction Temperature	T_j	150	$^\circ C$
Storage Temperature Range	T_{stg}	-55~150	$^\circ C$

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ARRAY CONFIGURATION



THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Channel to Ambient (4 Devices Operation, $T_a = 25^\circ\text{C}$)	$\Sigma R_{th(j-a)}$	25	$^\circ\text{C} / \text{W}$
Thermal Resistance of Channel to Case (4 Devices Operation, $T_c = 25^\circ\text{C}$)	$\Sigma R_{th(j-c)}$	5.0	$^\circ\text{C} / \text{W}$
Maximum Lead Temperature for Soldering Purposes (3.2mm from Case for 10s)	T_L	260	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I_{CBO}	$V_{CB} = 120\text{V}, I_E = 0$	—	—	10	μA
Collector Cut-off Current		I_{CEO}	$V_{CE} = 100\text{V}, I_B = 0$	—	—	10	μA
Emitter Cut-off Current		I_{EBO}	$V_{EB} = 6\text{V}, I_C = 0$	0.5	—	2.5	mA
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	$I_C = 1\text{mA}, I_E = 0$	120	—	—	V
Collector-Emitter Breakdown Voltage		$V_{(BR)CEO}$	$I_C = 10\text{mA}, I_B = 0$	100	—	—	V
DC Current Gain		$h_{FE(1)}$	$V_{CE} = 2\text{V}, I_C = 1.5\text{A}$	2000	—	15000	
		$h_{FE(2)}$	$V_{CE} = 2\text{V}, I_C = 3\text{A}$	1000	—	—	
Saturation Voltage	Collector-Emitter	$V_{CE(sat)}$	$I_C = 1.5\text{A}, I_B = 3\text{mA}$	—	—	1.5	V
	Base-Emitter	$V_{BE(sat)}$	$I_C = 1.5\text{A}, I_B = 3\text{mA}$	—	—	2.0	
Transition Frequency		f_T	$V_{CE} = 2\text{V}, I_C = 0.5\text{A}$	—	60	—	MHz
Collector Output Capacitance		C_{ob}	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	—	30	—	pF
Switching Time	Turn-on Time	t_{on}		—	0.3	—	μs
	Storage Time	t_{stg}		—	2.0	—	
	Fall Time	t_f		$I_{B1} = -I_{B2} = 3\text{mA}$, DUTY CYCLE $\leq 1\%$	—	0.4	

EMITTER-COLLECTOR DIODE RATINGS AND CHARACTERISTICS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Forward Current	I_{FM}	—	—	—	3	A
Surge Current	I_{FSM}	$t = 1\text{s}, 1 \text{ shot}$	—	—	6	A
Forward Voltage	V_F	$I_F = 1\text{A}, I_B = 0$	—	1.2	1.8	V
Reverse Recovery Time	t_{rr}	$I_F = 3\text{A}, V_{BE} = -3\text{V},$ $dI_F / dt = -50\text{A} / \mu\text{s}$	—	1.0	—	μs
Reverse Recovery Charge	Q_{rr}		—	5	—	μC

