

TOSHIBA**MP4501**

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

MP4501

HIGH POWER SWITCHING APPLICATIONS.

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE LOAD SWITCHING.

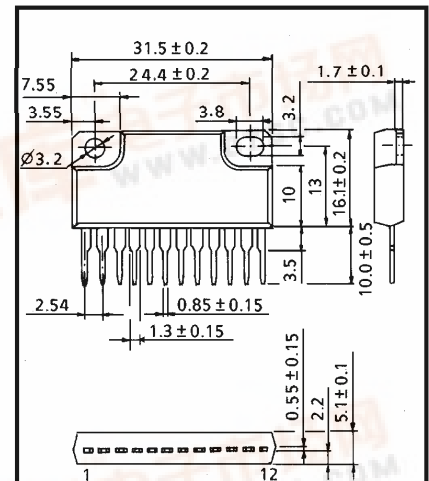
INDUSTRIAL APPLICATIONS

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.) ($V_{CE} = 2V$, $I_C = 1.5A$)
- Diode Included for Absorbing Fly-Back Voltage.

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	A
	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	W
	$T_c = 25^\circ C$		25	
Isolation Voltage		V_{Isol}	1000	$^\circ C$
Junction Temperature		T_j	150	$^\circ C$
Storage Temperature Range		T_{stg}	-55~150	$^\circ C$



TRANSISTOR PART DIODE PART
 1, 5, 8, 12 BASE 2, 4, 9, 11 ANODE
 2, 4, 9, 11 COLLECTOR 3, 10 CATHODE
 6, 7 EMITTER

JEDEC

EIAJ

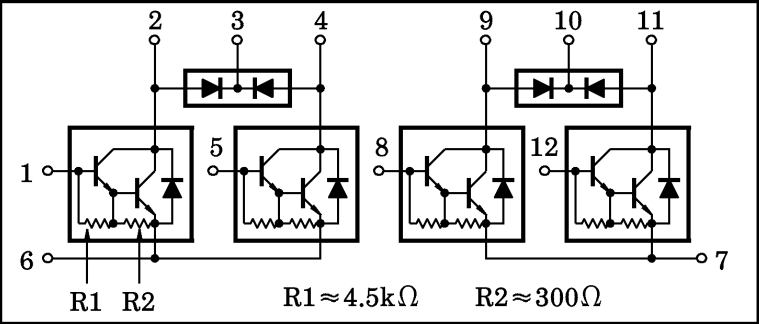
TOSHIBA 2-32B1A

Weight : 6.0g

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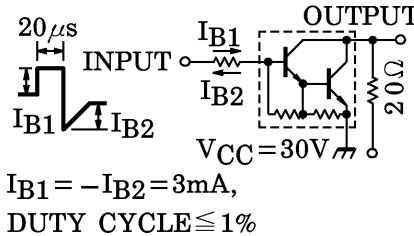
ARRAY CONFIGURATION



THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Junction 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 Junction 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		—	0.4	—	

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Maximum 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

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

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Maximum Forward Current	I_{FM}	—	—	—	3	A
Reverse Current	I_R	$V_R = 120\text{V}$	—	—	0.4	μA
Reverse Voltage	V_R	$I_R = 100\mu\text{A}$	120	—	—	V
Forward Voltage	V_F	$I_F = 0.5\text{A}$	—	—	1.8	V

