

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

MP4504

HIGH POWER SWITCHING APPLICATIONS.

HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE
LOAD SWITCHING.

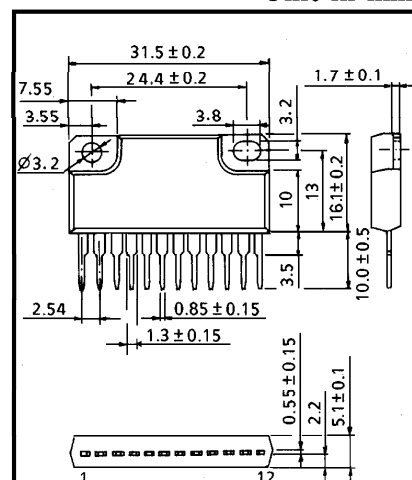
INDUSTRIAL APPLICATIONS

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) = $-5A$ (Max.)
- High DC Current Gain : $h_{FE} = 2000$ (Min.)
($V_{CE} = -5V$, $I_C = -3A$)

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

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CBO}	-100	V
Collector-Emitter Voltage		V_{CEO}	-100	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	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	V
Junction Temperature		T_j	150	$^\circ C$
Storage Temperature Range		T_{stg}	-55~150	$^\circ C$



1, 5, 8, 12 BASE
2, 4, 9, 11 COLLECTOR
3, 6, 7, 10 EMITTER

JEDEC —

EIAJ —

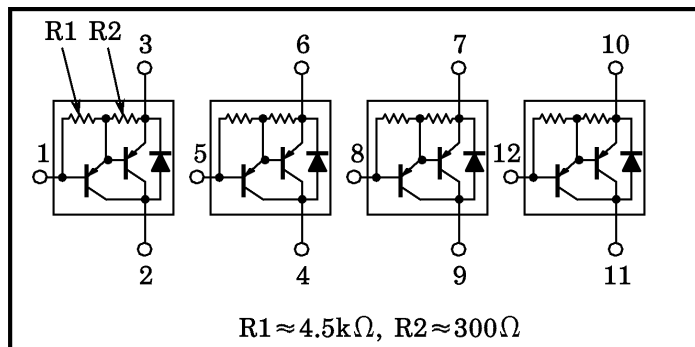
TOSHIBA 2-32B1B

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	$^\circ\text{C/W}$
Thermal Resistance of Junction to Case (4 Devices Operation, $T_c = 25^\circ\text{C}$)	$\Sigma R_{th(j-c)}$	5.0	$^\circ\text{C/W}$
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}	$V_{CB} = -100\text{V}$, $I_E = 0$	—	—	-10	μA
Collector Cut-off Current	I_{CEO}	$V_{CE} = -100\text{V}$, $I_B = 0$	—	—	-10	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = -6\text{V}$, $I_C = 0$	-0.6	—	-2.0	mA
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C = -1\text{mA}$, $I_E = 0$	-100	—	—	V
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C = -10\text{mA}$, $I_B = 0$	-100	—	—	V
DC Current Gain	$h_{FE(1)}$	$V_{CE} = -5\text{V}$, $I_C = -3\text{A}$	2000	—	15000	
	$h_{FE(2)}$	$V_{CE} = -5\text{V}$, $I_C = -5\text{A}$	1000	—	—	
Saturation Voltage	Collector-Emitter	$V_{CE(sat)}$	$I_C = -3\text{A}$, $I_B = -6\text{mA}$	—	-1.5	V
	Base-Emitter	$V_{BE(sat)}$	$I_C = -3\text{A}$, $I_B = -6\text{mA}$	—	-2.0	
Transition Frequency	f_T	$V_{CE} = -2\text{V}$, $I_C = -0.5\text{A}$	—	40	—	MHz
Collector Output Capacitance	C_{ob}	$V_{CB} = -10\text{V}$, $I_E = 0$, $f = 1\text{MHz}$	—	55	—	pF
Switching Time	Turn-on Time	t_{on}	<p style="text-align: center;">$V_{CC} = -30\text{V}$ DUTY CYCLE $\leq 1\%$</p>			μs
	Storage Time	t_{stg}				
	Fall Time	t_f				

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 shot	—	—	6	A
Forward Voltage	V_F	$I_F = 1\text{A}$, $I_B = 0$	—	—	2.0	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}		—	8	—	μC

