

TOSHIBA

MP4507

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

MP4507

HIGH POWER SWITCHING APPLICATIONS.

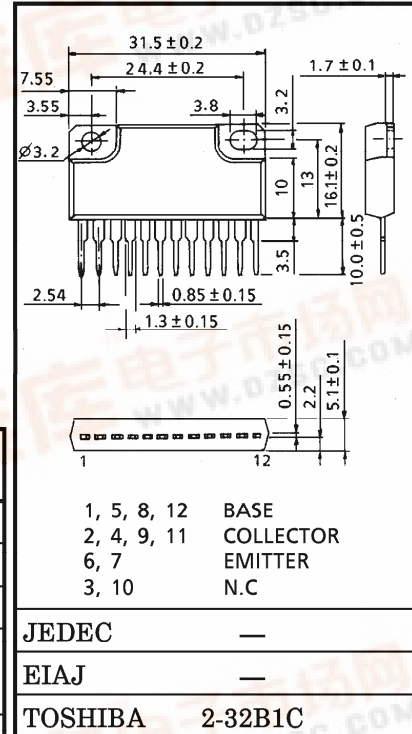
HAMMER DRIVE, PULSE MOTOR DRIVE AND INDUCTIVE.

LOAD SWITCHING

- 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) = $\pm 5A$ (Max.)
- High DC Current Gain : $h_{FE} = 1000$ (Min.)
($V_{CE} = \pm 3V, I_C = \pm 3A$)

INDUSTRIAL APPLICATIONS

Unit in mm



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

CHARACTERISTIC	SYMBOL	RATING		UNIT	
		NPN	PNP		
Collector-Base Voltage	V_{CB0}	100	-100	V	
Collector-Emitter Voltage	V_{CE0}	100	-100	V	
Emitter-Base Voltage	V_{EB0}	5	-5	V	
Collector Current	DC	I_C	5	-5	A
	Pulse	I_{CP}	8	-8	
Continuous Base Current	I_B	0.1	-0.1	A	
Collector Power Dissipation (1 Device Operation)	P_C	3.0		W	
Collector Power Dissipation (4 Devices Operation)	$T_a = 25^\circ C$	P_C		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		$^\circ C$	

Weight : 6.0g

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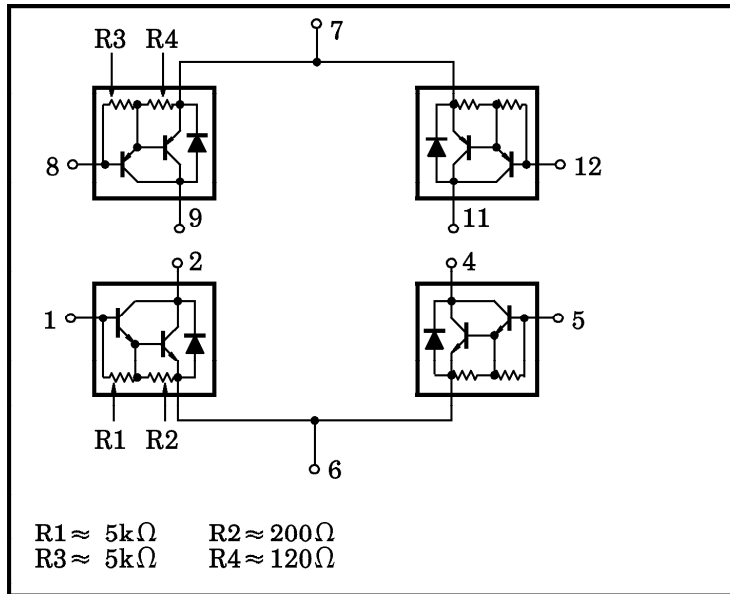
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ARRAY CONFIGURATION



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 (Ta = 25°C) (NPN TRANSISTOR)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I_{CBO}	$V_{CB}=100V, I_E=0$	—	—	10	μA
Collector Cut-off Current		I_{CEO}	$V_{CE}=100V, I_B=0$	—	—	10	μA
Emitter Cut-off Current		I_{EBO}	$V_{EB}=5V, I_C=0$	0.3	—	2.0	mA
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	$I_C=1mA, I_E=0$	100	—	—	V
Collector-Emitter Breakdown Voltage		$V_{(BR)CEO}$	$I_C=30mA, I_B=0$	100	—	—	V
DC Current Gain		$h_{FE(1)}$	$V_{CE}=3V, I_C=0.5A$	1000	—	—	
		$h_{FE(2)}$	$V_{CE}=3V, I_C=3A$	1000	—	—	
Saturation Voltage	Collector-Emitter	$V_{CE(sat)}$	$I_C=3A, I_B=12mA$	—	—	2.0	V
	Base-Emitter	$V_{BE(sat)}$	$I_C=3A, I_B=12mA$	—	—	2.5	
Transition Frequency		f_T	$V_{CE}=3V, I_C=0.5A$	3	—	—	MHz
Collector Output Capacitance		C_{ob}	$V_{CB}=50V, I_E=0, f=1MHz$	—	40	—	pF
Switching Time	Turn-on Time	t_{on}	<p>$I_{B1} = -I_{B2} = 12mA$ DUTY CYCLE $\leq 1\%$</p>	—	0.5	—	μs
	Storage Time	t_{stg}		—	3.0	—	
	Fall Time	t_f		—	2.0	—	

EMITTER-COLLECTOR DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Forward Current	I_{FM}	—	—	—	5	A
Surge Current	I_{FSM}	$t=1s, 1 \text{ shot}$	—	—	8	A
Forward Voltage	V_F	$I_F=1A, I_B=0$	—	—	2.0	V
Reverse Recovery Time	t_{rr}	$I_F=5A, V_{BE}=-3V,$	—	1.0	—	μs
Reverse Recovery Charge	Q_{rr}	$dI_F/dt = -50A/\mu s$	—	8	—	μC

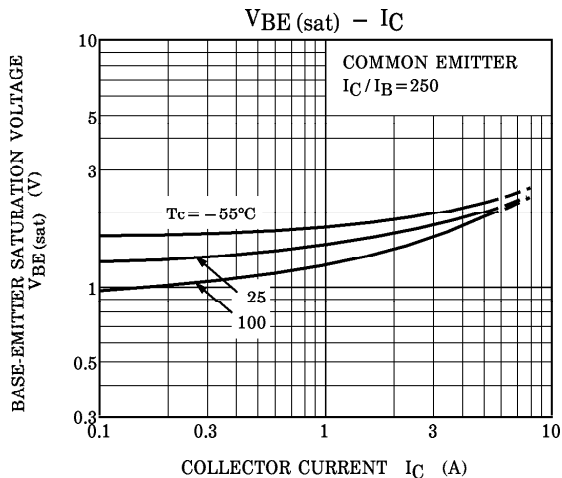
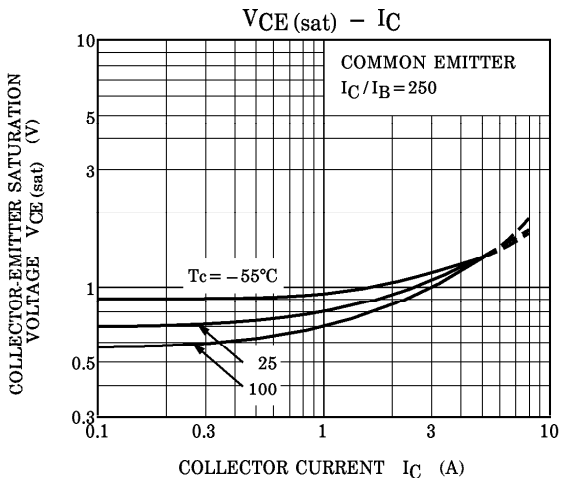
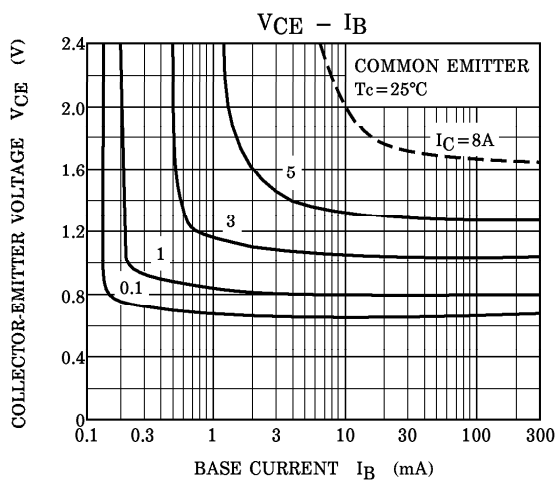
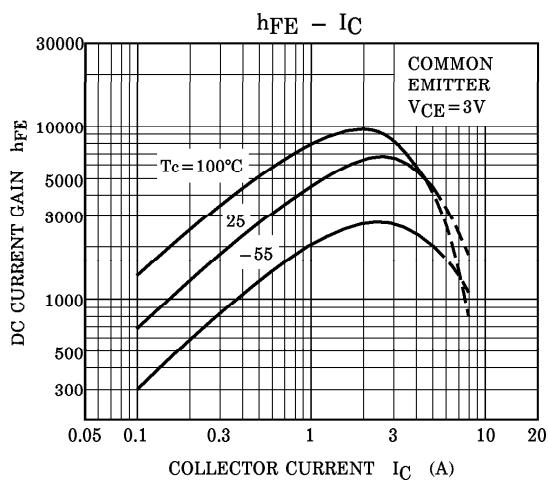
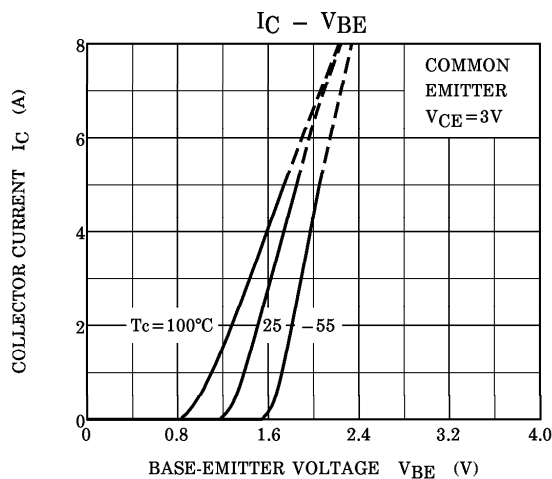
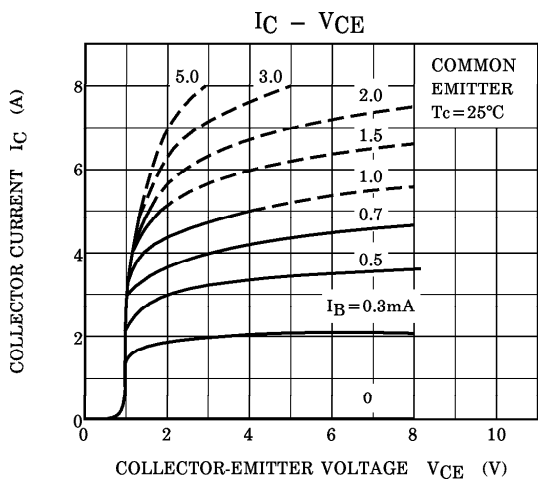
ELECTRICAL CHARACTERISTICS (Ta = 25°C) (PNP TRANSISTOR)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		ICBO	V _{CB} = -100V, I _E = 0	—	—	-10	μA
Collector Cut-off Current		ICEO	V _{CE} = -100V, I _B = 0	—	—	-10	μA
Emitter Cut-off Current		IEBO	V _{EB} = -5V, I _C = 0	-0.3	—	-2.0	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 = -30mA, I _B = 0	-100	—	—	V
DC Current Gain		h _{FE} (1)	V _{CE} = -3V, I _C = -0.5A	1000	—	—	
		h _{FE} (2)	V _{CE} = -3V, I _C = -3A	1000	—	—	
Saturation Voltage	Collector-Emitter	V _{CE} (sat)	I _C = -3A, I _B = -12mA	—	—	-2.0	V
	Base-Emitter	V _{BE} (sat)	I _C = -3A, I _B = -12mA	—	—	-2.5	
Transition Frequency		f _T	V _{CE} = -3V, I _C = -0.5A	3	—	—	MHz
Collector Output Capacitance		C _{ob}	V _{CB} = -50V, I _E = 0, f = 1MHz	—	40	—	pF
Switching Time	Turn-on Time	t _{on}	<p> $-I_{B1} = I_{B2} = 12\text{mA}$, DUTY CYCLE $\leq 1\%$ </p>	—	0.5	—	μs
	Storage Time	t _{stg}		—	3.0	—	
	Fall Time	t _f		—	2.0	—	

EMITTER-COLLECTOR DIODE RATINGS AND CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Forward Current	I _{FM}	—	—	—	5	A
Surge Current	I _{FSM}	t = 1s, 1 shot	—	—	8	A
Forward Voltage	V _F	I _F = 1A, I _B = 0	—	—	2.0	V
Reverse Recovery Time	t _{rr}	I _F = 5A, V _{BE} = 3V,	—	1.0	—	μs
Reverse Recovery Charge	Q _{rr}	dI _F / dt = -50A / μs	—	8	—	μC

(NPN TRANSISTOR)



(PNP TRANSISTOR)

