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

MP4101

HIGH POWER SWITCHING APPLICATIONS.

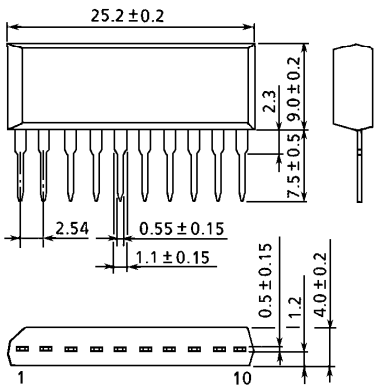
HAMMER DRIVE, PULSE MOTOR DRIVE.

INDUCTIVE LOAD SWITCHING.

INDUSTRIAL APPLICATIONS

- Small Package by Full Molding (SIP 10 Pin)
- High Collector Power Dissipation (4 Devices Operation)
  : $P_T = 4W$ (Ta = 25°C)
- High Collector Current : $I_{C\,(DC)} = 4A$ (Max.)
- High DC Current Gain : $h_{FE} = 2000$ (Min.) ($V_{CE} = 2V$, $I_C = 1A$)
- Zener Diode Included Between Collector and Base.

Unit in mm



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

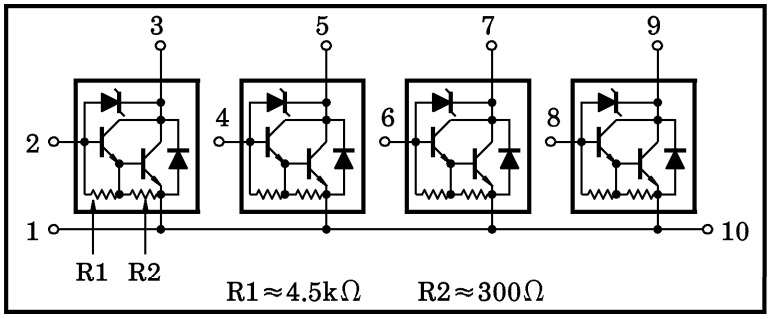
JEDEC	—
EIAJ	—
TOSHIBA	2-25A1A

Weight : 2.1g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CBO}	60±10	V
Collector-Emitter Voltage		V_{CEO}	60±10	V
Emitter-Base Voltage		V_{EBO}	6	V
Collector Current	DC	I_C	4	A
	Pulse	I_{CP}	6	
Continuous Base Current		I_B	0.5	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	°C
Storage Temperature Range		T_{stg}	−55~150	°C

ARRAY CONFIGURATION



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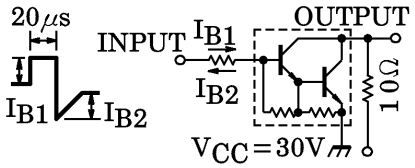
THERMAL CHARACTERISTICS

CHARACTERISTIC	SYMBOL	MAX.	UNIT
Thermal Resistance of Junction to Ambient (4 Devices Operation, Ta = 25°C)	$\Sigma R_{th\ (j\text{-}a)}$	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)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		I_{CBO}	V_{CB} = 45V, I_E = 0	—	—	10	μA
Collector Cut-off Current		I_{CEO}	V_{CE} = 45V, I_B = 0	—	—	10	μA
Emitter Cut-off Current		I_{EBO}	V_{EB} = 6V, I_C = 0	0.6	—	20	mA
Collector-Base Breakdown Voltage		$V_{(BR)\ CBO}$	I_C = 10mA, I_E = 0	50	60	70	V
Collector-Emitter Breakdown Voltage		$V_{(BR)\ CEO}$	I_C = 10mA, I_B = 0	50	60	70	V
DC Current Gain		$h_{FE\ (1)}$	V_{CE} = 2V, I_C = 1A	2000	—	15000	
		$h_{FE\ (2)}$	V_{CE} = 2V, I_C = 3A	1000	—	—	
Saturation Voltage	Collector-Emitter	$V_{CE\ (sat)}$	I_C = 3A, I_B = 10mA	—	—	1.5	V
	Base-Emitter	$V_{BE\ (sat)}$	I_C = 3A, I_B = 10mA	—	—	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 = 0A, f = 1MHz	—	30	—	pF
Switching Time	Turn-on Time	t_{on}	 $I_{B1} = -I_{B2}$ = 10mA, DUTY CYCLE ≦ 1%	—	0.2	—	μs
	Storage Time	t_{stg}		—	3.0	—	
	Fall Time	t_f		—	0.5	—	

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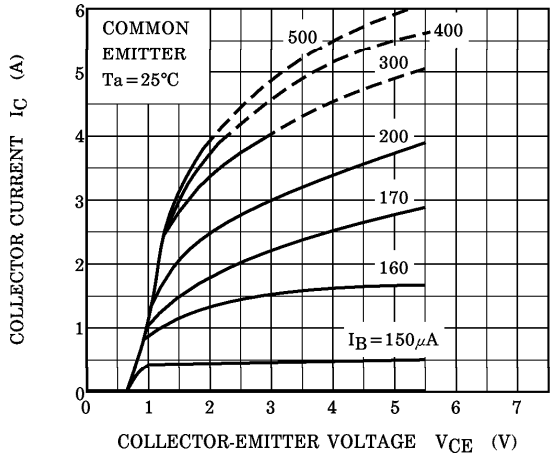
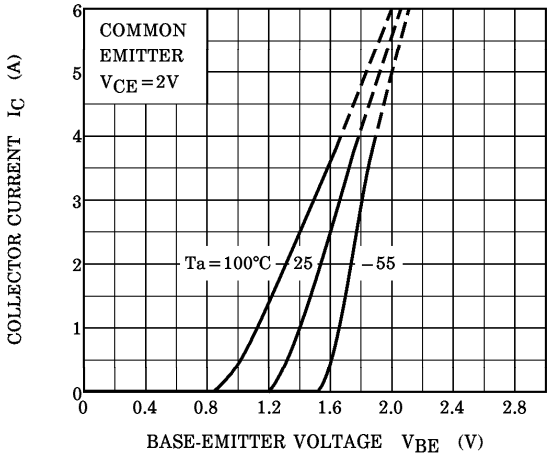
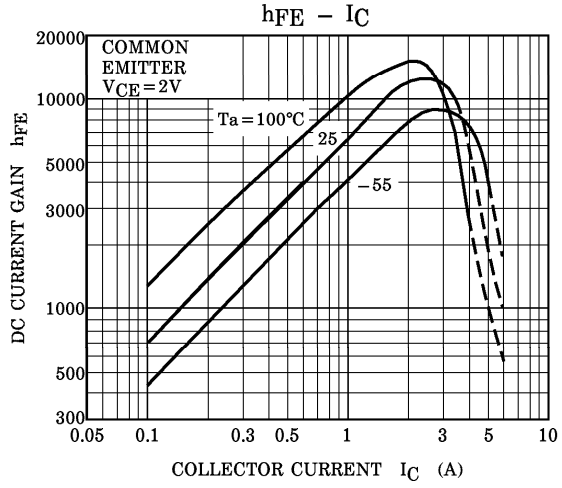
I_C – V_{CE}



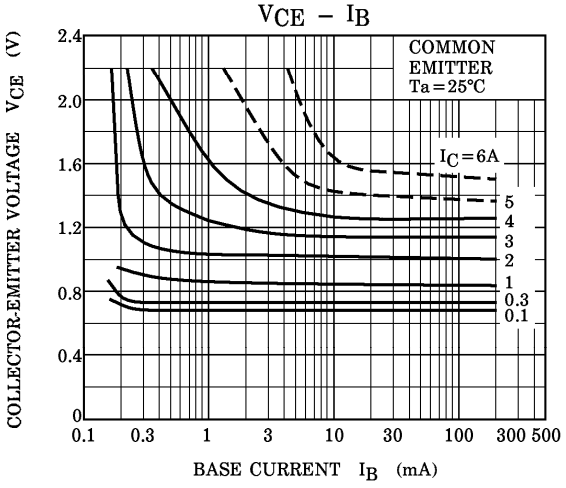
I_C – V_{BE}



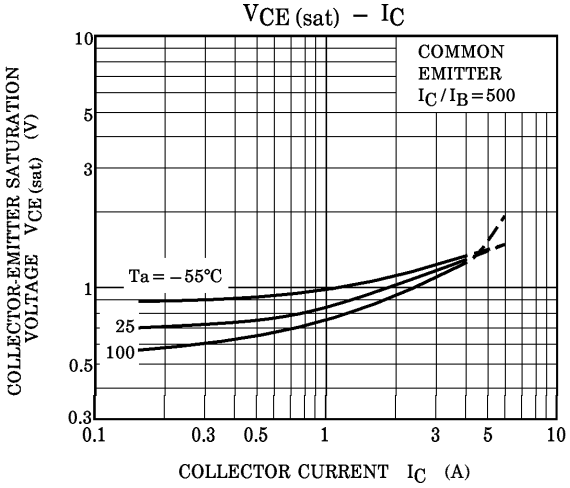
h_{FE} – I_C



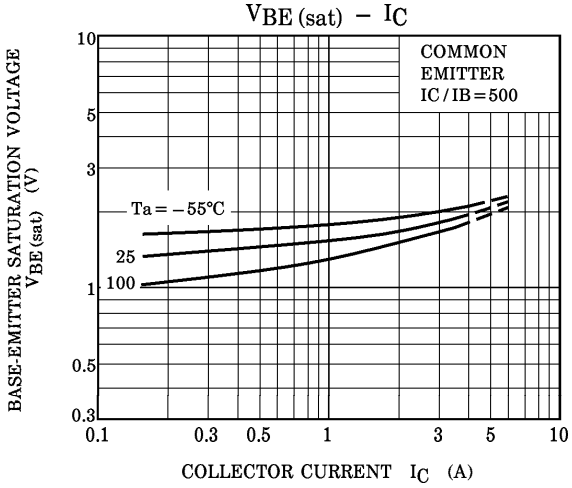
V_{CE} – I_B



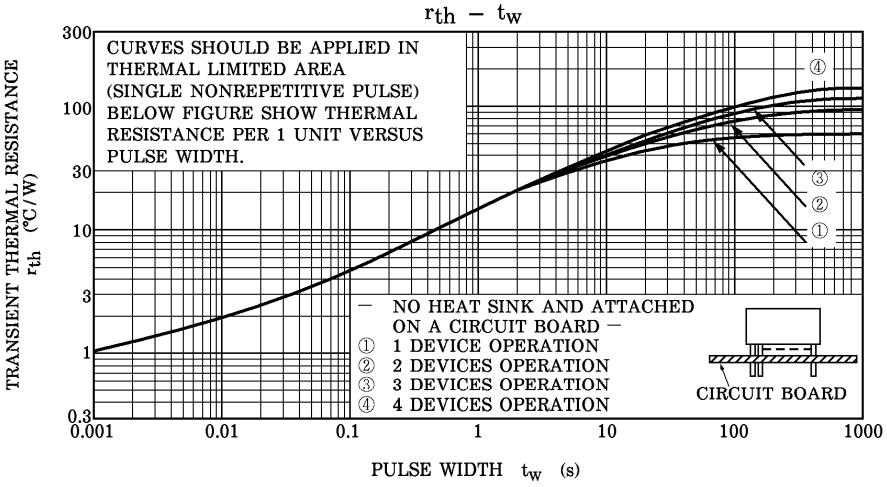
$V_{CE\,(sat)}$ – I_C



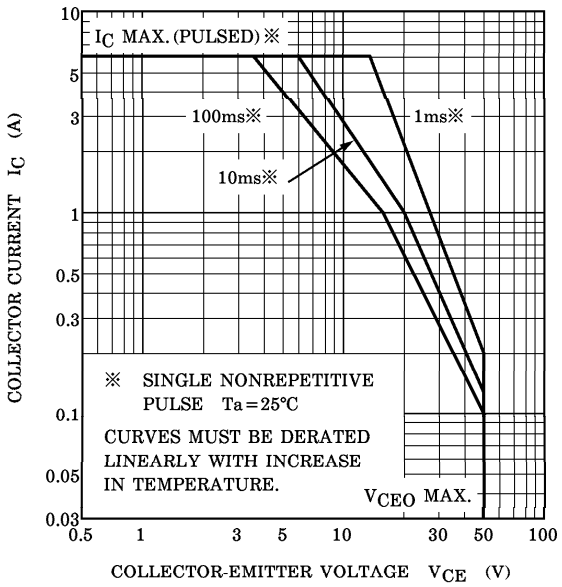
$V_{BE\,(sat)}$ – I_C



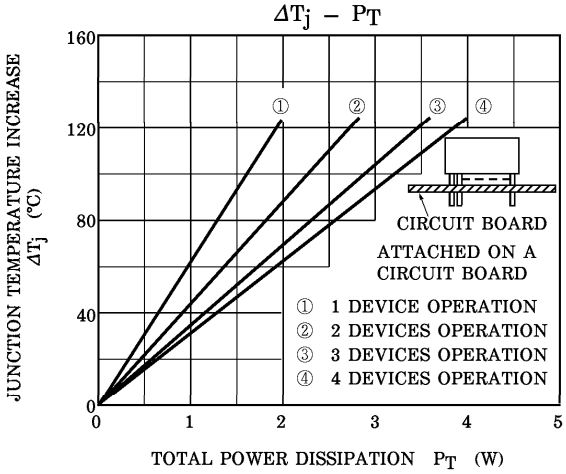
$r_{th} - t_w$



SAFE OPERATING AREA



$\Delta T_j - P_T$



$P_T - Ta$