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

MP4009

HIGH POWER SWITCHING APPLICATIONS.

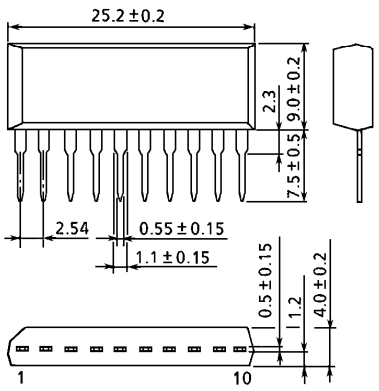
HAMMER DRIVE, PULSE MOTOR DRIVE.

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 : $I_{C\,(DC)} = -5A$ (Max.)
- High DC Current Gain : $h_{FE} = 1000$ (Min.)
  ($V_{CE} = -3V$, $I_C = -3A$)
- Complementary to MP4003

Unit in mm



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

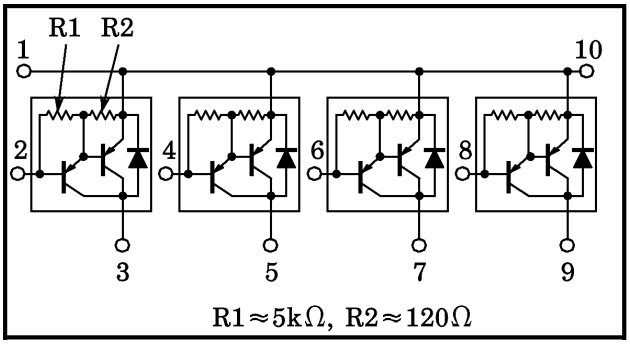
JEDEC	—
EIAJ	—
TOSHIBA	2-25A1A

Weight : 2.1g

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CBO}	−100	V
Collector-Emitter Voltage		V_{CEO}	−100	V
Emitter-Base Voltage		V_{EBO}	−5	V
Collector Current	DC	I_C	−5	A
	Pulse	I_{CP}	−8	
Continuous Base Current		I_B	−0.1	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



R1 ≈ 5kΩ, R2 ≈ 120Ω

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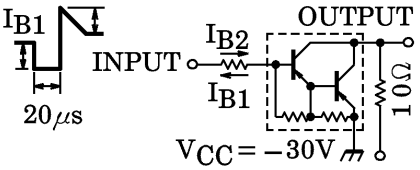
THERMAL CHARACTERISTICS

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}	$V_{CB} = -100V$, $I_E = 0$	—	—	−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}	$V_{CB} = 50V$, $I_E = 0A$, f = 1MHz	—	40	—	pF
Switching Time	Turn-on Time	t_{on}	 $-I_{B1} = I_{B2} = 12mA$, DUTY CYCLE ≦ 1%	—	0.5	—	μs
	Storage Time	t_{stg}		—	3.0	—	
	Fall Time	t_f		—	2.0	—	

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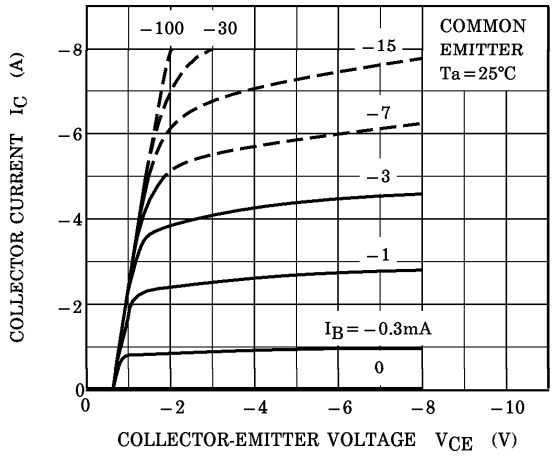
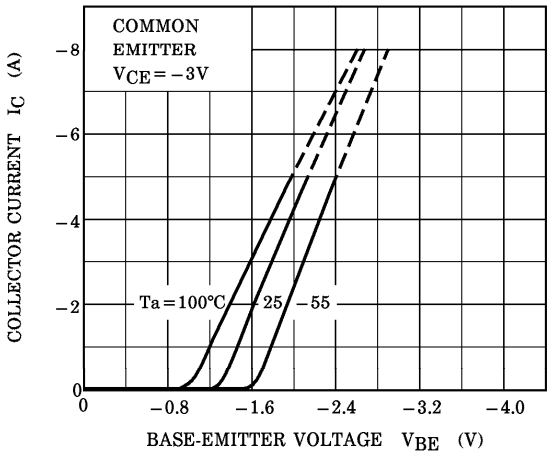
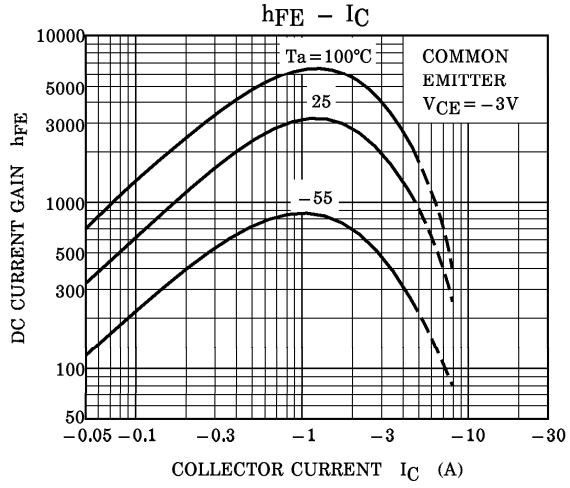
$I_C - V_{CE}$



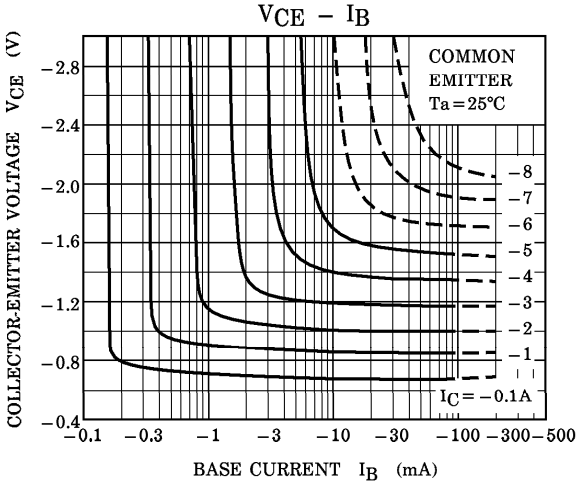
$I_C - V_{BE}$



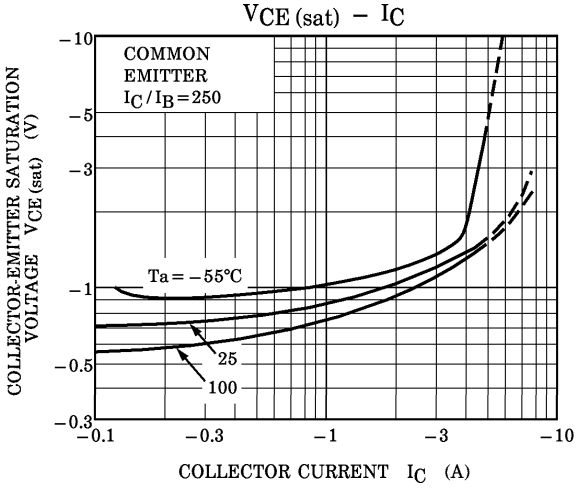
$h_{FE} - I_C$



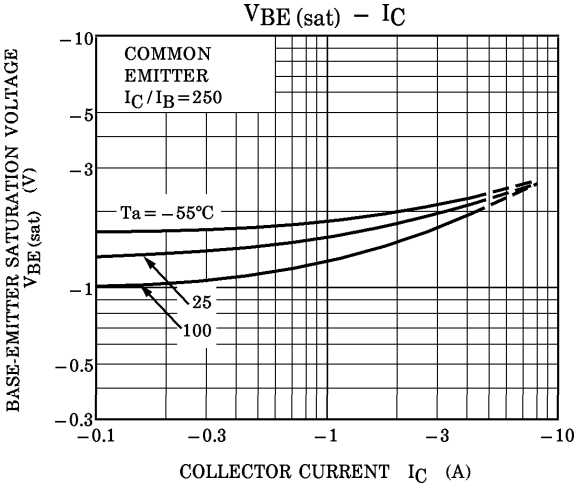
$V_{CE} - I_B$



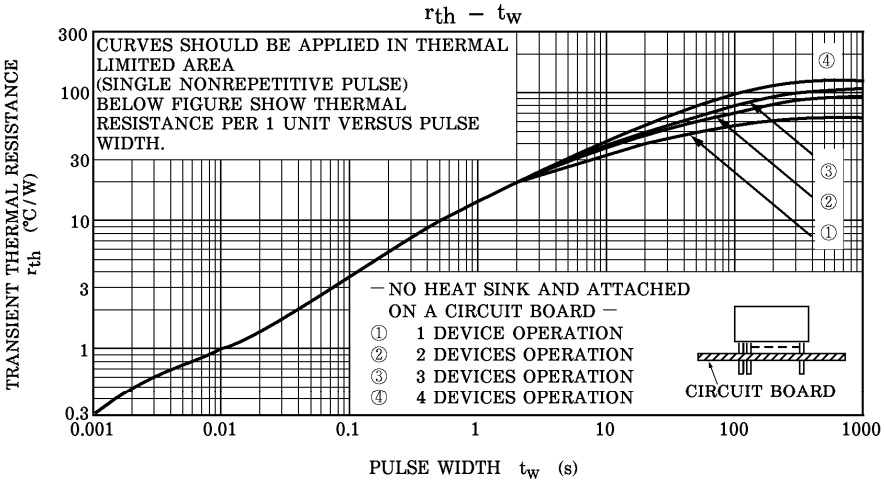
$V_{CE\,(sat)} - I_C$



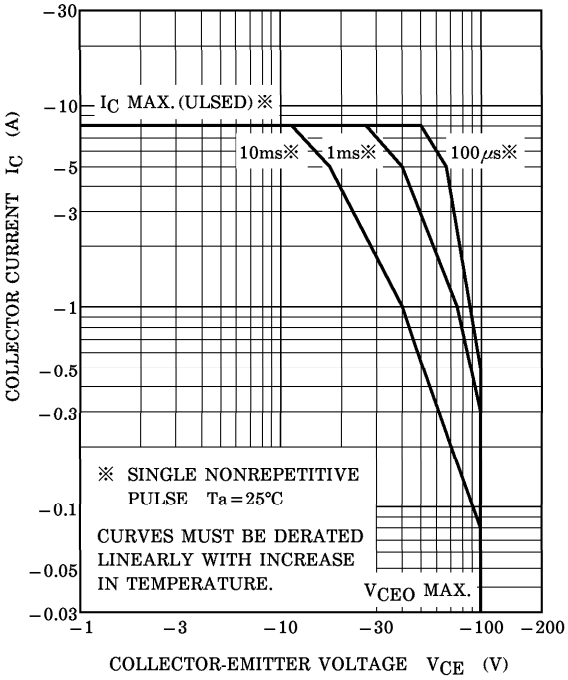
$V_{BE\,(sat)} - I_C$



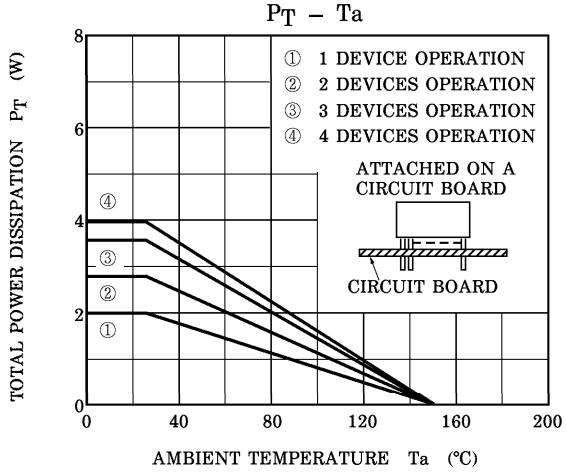
$r_{th} - t_w$



SAFE OPERATING AREA



$P_T - Ta$



$\Delta T_j - P_T$