

TENTATIVE

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL TYPE

# 2SD2248

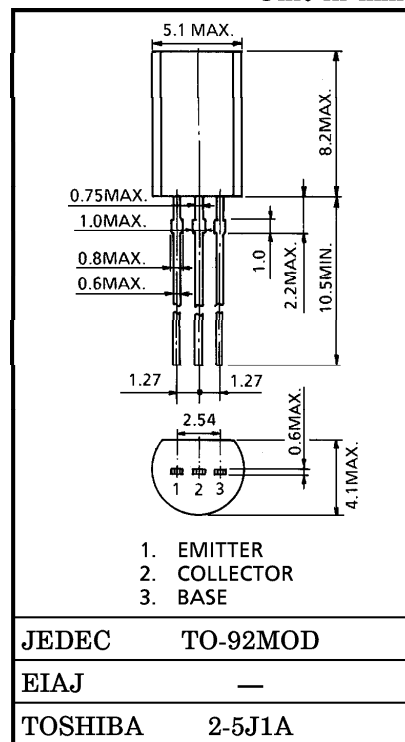
HAMMER DRIVE, PULSE MOTOR DRIVE APPLICATIONS  
FOR INDUCTIVE LOAD DRIVE

- High DC Current Gain  
:  $h_{FE} = 2000$  (Min.) ( $V_{CE} = 2V, I_C = 1A$ )
- Low Saturation Voltage  
:  $V_{CE(sat)} = 1.5V$  (Max.) ( $I_C = 1A, I_B = 1mA$ )
- Built-in Zener Diode between Collector and Base

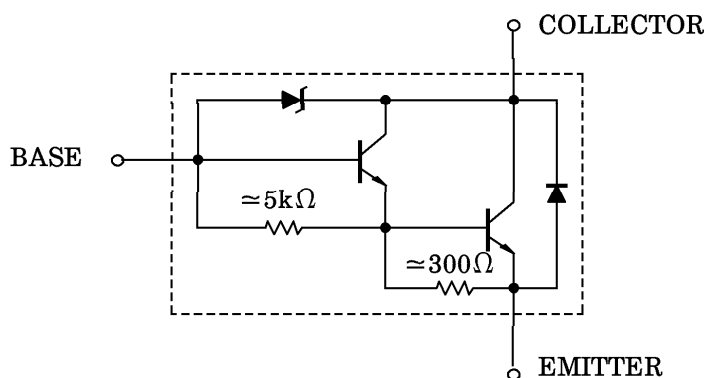
**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CBO}$	$80 \pm 10$	V
Collector-Emitter Voltage	$V_{CEO}$	$80 \pm 10$	V
Emitter-Base Voltage	$V_{EBO}$	8	V
Collector Current	DC	$I_C$	$\pm 2$
	Pulse	$I_{CP}$	$\pm 3$
Base Current	$I_B$	0.5	A
Collector Power Dissipation (Ta = 25°C)	$P_C$	0.9	W
Junction Temperature	$T_j$	150	°C
Storage Temperature Range	$T_{stg}$	-55~150	°C

Unit in mm



**EQUIVALENT CIRCUIT**



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ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current		$I_{CBO}$	$V_{CB} = 60V, I_E = 0$	—	—	10	$\mu A$
Emitter Cut-off Current		$I_{EBO}$	$V_{EB} = 8V, I_C = 0$	0.8	—	4.0	mA
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	$I_C = 100\mu A, I_E = 0$	70	80	90	V
Collector-Emitter Breakdown Voltage		$V_{(BR)CEO}$	$I_C = 10mA, I_E = 0$	70	80	90	V
DC Current Gain		$h_{FE}$	$V_{CE} = 2V, I_C = 1A$	2000	—	—	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	$I_C = 1A, I_B = 1mA$	—	—	1.5	V
Base-Emitter Saturation Voltage		$V_{BE(sat)}$	$I_C = 1A, I_B = 1mA$	—	—	2.0	V
Emitter-Collector Forward Voltage		$V_{ECF}$	$I_E = 1A, I_B = 0$	—	1.2	2.0	V
Transition Frequency		$f_T$	$V_{CE} = 2V, I_C = 0.5A$	—	100	—	MHz
Collector Output Capacitance		$C_{ob}$	$V_{CB} = 10V, I_E = 0, f = 1MHz$	—	20	—	pF
Unclamped Inductive Load Energy		$E_{S/B}$	$L = 10mH, I_C = 1.2A, I_B = \pm 50mA$	7.2	—	—	mJ
Switching Time	Turn-on Time	$t_{on}$	<p> <math>I_{B1} = -I_{B2} = 1mA,</math>  <math>DUTY\ CYCLE \leq 1\%</math> </p>	—	0.2	—	$\mu s$
	Storage Time	$t_{stg}$		—	4.0	—	
	Fall Time	$t_f$		—	—	0.6	