

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE

# 2SC2290A

2~30MHz SSB LINEAR POWER AMPLIFIER APPLICATIONS  
(LOW SUPPLY VOLTAGE USE)

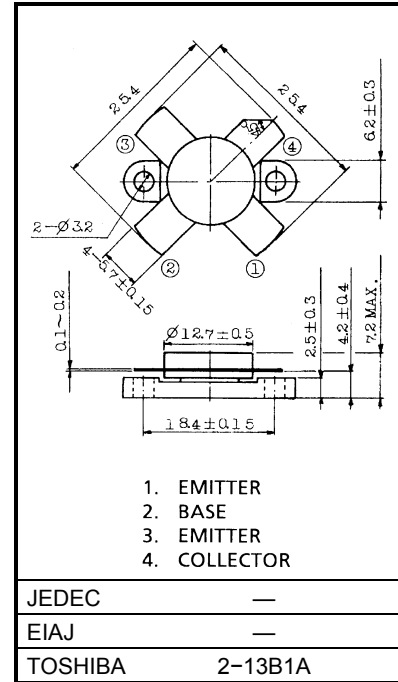
- Specified 12.5V, 28MHz Characteristics
- Output Power :  $P_o = 60\text{WPEP}$  (Min.)
- Power Gain :  $G_p = 11.8\text{dB}$  (Min.)
- Collector Efficiency :  $\eta_C = 35\%$  (Min.)
- Intermodulation Distortion:  $\text{IMD} = -30\text{dB}$  (Max.)

### ABSOLUTE MAXIMUM RATINGS ( $T_c = 25^\circ\text{C}$ )

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	$V_{CB0}$	45	V
Collector-Emitter Voltage	$V_{CES}$	45	V
Collector-Emitter Voltage	$V_{CEO}$	18	V
Emitter-Base Voltage	$V_{EBO}$	4	V
Collector Current	$I_C$	20	A
Collector Power Dissipation	$P_C$	175	W
Junction Temperature	$T_j$	175	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-65~175	$^\circ\text{C}$

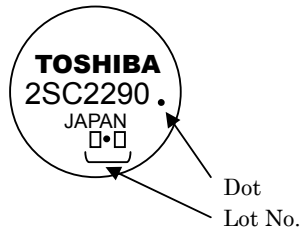
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings. Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Unit in mm



Weight: 5.2g

### MARKING

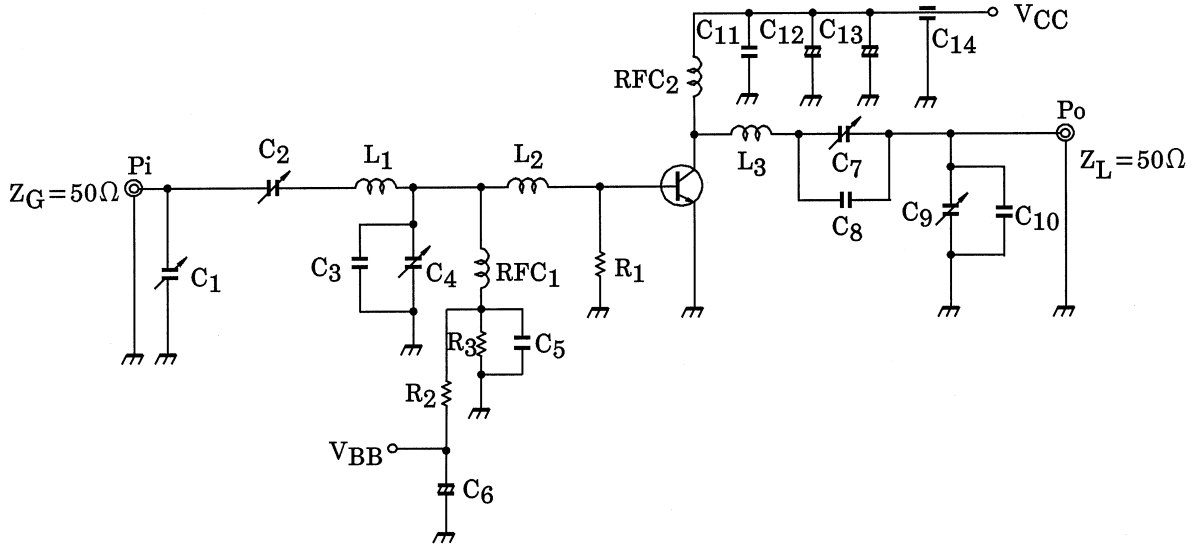


## ELECTRICAL CHARACTERISTICS (Tc = 25°C)

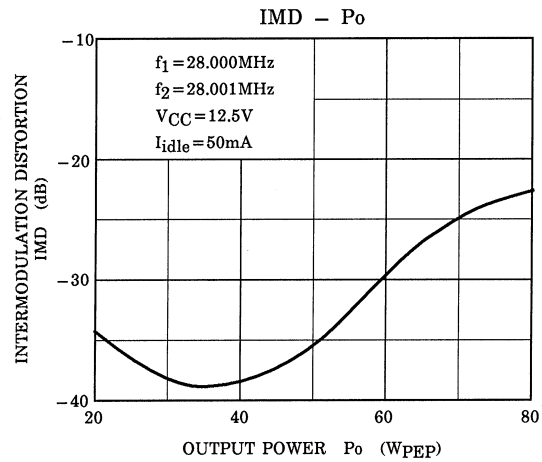
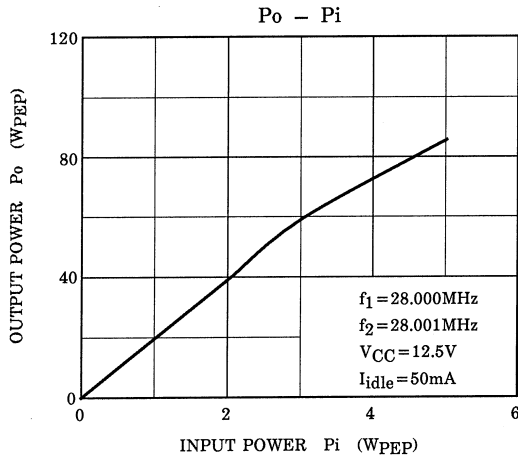
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector-Emitter Breakdown Voltage	$V_{(BR) CEO}$	$I_C = 100\text{mA}, I_B = 0$	18	—	—	V
Collector-Emitter Breakdown Voltage	$V_{(BR) CES}$	$I_C = 100\text{mA}, V_{EB} = 0$	45	—	—	V
Emitter-Base Breakdown Voltage	$V_{(BR) EBO}$	$I_E = 1\text{mA}, I_C = 0$	4	—	—	V
DC Current Gain	$h_{FE}$	$V_{CE} = 5\text{V}, I_C = 10\text{A}^*$	10	—	150	—
Collector Output Capacitance	$C_{ob}$	$V_{CB} = 12.5\text{V}, I_E = 0$ $f = 1\text{MHz}$	—	—	500	pF
Power Gain	$G_p$	$V_{CC} = 12.5\text{V}, f_1 = 28.000\text{MHz},$ $f_2 = 28.001\text{MHz}$ $I_{idle} = 50\text{mA}$ $P_o = 60W_{PEP}$ (Fig.)	11.8	13.8	—	dB
Input Power	$P_i$		—	2.5	4	$W_{PEP}$
Collector Efficiency	$\eta_C$		35	—	—	%
Intermodulation Distortion	IMD		—	—	-30	dB
Series Equivalent Input Impedance	$Z_{in}$	$V_{CC} = 12.5\text{V}, f_1 = 28.000\text{MHz},$ $f_2 = 28.001\text{MHz}$ $P_o = 60W_{PEP}$	—	1.02 -j0.17	—	$\Omega$
Series Equivalent Output Impedance	$Z_{out}$		—	0.86 -j0.21	—	$\Omega$

\* Pulse Test: Pulse Width  $\leq 100\mu\text{s}$ , Duty Cycle  $\leq 3\%$

**Fig. Pi TEST CIRCUIT**



- |   |  |
|---|--|
| C <sub>1</sub> , C <sub>2</sub> , C <sub>4</sub> , C <sub>7</sub> : 7~150pF | L <sub>1</sub> : φ0.8 ENAMEL COATED COPPER WIRE, 9ID, 6T     |
| C <sub>3</sub> : 250pF  | L <sub>2</sub> : φ1 SILVER PLATED COPPER WIRE, 9ID, 2T       |
| C <sub>5</sub> : 0.4μF  | L <sub>3</sub> : φ1.5 ENAMEL COATED COPPER WIRE, 9ID, 5T     |
| C <sub>6</sub> : 100μF 10WV   | RFC <sub>1</sub> : φ0.8 ENAMEL COATED COPPER WIRE, 9ID, 20T  |
| C <sub>8</sub> : 150pF  | RFC <sub>2</sub> : φ1.5 ENAMEL COATED COPPER WIRE, 12ID, 15T |
| C <sub>9</sub> : 10~200pF   | R <sub>1</sub> : 5.6Ω (1 / 2W)                               |
| C <sub>10</sub> : 600pF   | R <sub>2</sub> : 5Ω (5W)                                     |
| C <sub>11</sub> : 0.4μF   | R <sub>3</sub> : 1.5Ω (10W)                                  |
| C <sub>12</sub> , C <sub>13</sub> : 22μF 35WV                               |  |
| C <sub>14</sub> : 1000pF  |  |
- (FEED THROUGH)



**CAUTION**

These are only typical curves and devices are not necessarily guaranteed at these curves.

**RESTRICTIONS ON PRODUCT USE**

20070701-EN GENERAL

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