TOSHIBA 2SC380TM

TOSHIBA TRANSISTOR SILICON NPN EPITAXIAL PLANAR TYPE (PCT PROCESS)

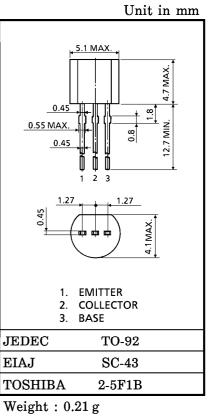
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HIGH FREOUENCY AMPLIFIER APPLICATIONS

- High Power Gain : $G_{pe} = 29dB$ (Typ.) (f = 10.7 MHz)
- Recommended for FM IF, OSC Stage and AM CONV. IF Stage.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	v_{CBO}	35	V
Collector-Emitter Voltage	v_{CEO}	30	V
Emitter-Base Voltage	$V_{ m EBO}$	4	V
Collector Current	$I_{\mathbf{C}}$	50	mA
Emitter Current	${f I_E}$	-50	mA
Collector Power Dissipation	$P_{\mathbf{C}}$	300	mW
Junction Temperature	T_{j}	125	°C
Storage Temperature Range	$ m T_{stg}$	-55~125	°C



ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB} = 35 \text{ V}, I_{E} = 0$	_	_	0.1	μ A
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 4 \text{ V}, I_{C} = 0$	_		0.1	μ A
DC Current Gain	h _{FE} (Note)	$V_{ m CE} = 12 m V, I_{ m C} = 2 mA$	40	_	240	
Collector-Emitter Saturation Voltage	V _{CE} (sat)	$I_{\mathrm{C}} = 10 \mathrm{mA}, \; I_{\mathrm{B}} = 1 \mathrm{mA}$	_	_	0.4	V
Base-Emitter Voltage	$V_{ m BE}$	$I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$	_	_	1.0	V
Transition Frequency	$ m f_{T}$	$V_{CE} = 10 \text{ V}, I_{C} = 1 \text{ mA}$	100		400	MHz
Collector Output Capacitance	C_{ob}	$egin{aligned} V_{ ext{CB}} &= 10 ext{V}, I_{ ext{E}} &= 0, \\ f &= 1 ext{MHz} \end{aligned}$	1.4	2.0	3.2	pF
Collector-Base Time Constant	C _c .r _{bb} ,	$egin{aligned} { m V_{CE}} &= 10 \ { m V, \ I_{E}} &= -1 \ { m mA,} \ { m f} &= 30 \ { m MHz} \end{aligned}$	10	_	50	ps
Power Gain	$G_{ m pe}$	$V_{\mathrm{CC}} = 6 \mathrm{V}, \mathrm{I_E} = -1 \mathrm{mA},$ $\mathrm{f} = 10.7 \mathrm{MHz} (\mathrm{Fig.})$	27	29	33	dB

(Note): hFE classification $R: 40\sim80, O: 70\sim140, Y: 120\sim240$

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TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.

In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..

The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.

y PARAMETERS (Typ.)

(1) (COMMON EMITTER f = 455 kHz, $Ta = 25^{\circ}\text{C}$)

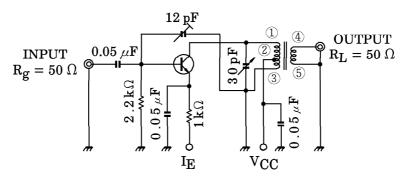
CHARACTERISTIC	SYMBOL	2SC380TM-R	2SC380TM-O	2SC380TM-Y	UNIT
Collector-Emitter Voltage	v_{CE}	6	6	6	V
Emitter Current	$I_{\mathbf{E}}$	-1	-1	-1	mA
Input Conductance	gie	0.58	0.41	0.26	mS
Input Capacitance	Cie	53	46	38	рF
Output Conductance	goe	1.9	2.7	4.8	μ S
Output Capacitance	C_{oe}	2.6	2.8	3.6	рF
Forward Transfer Admittance	lуfel	38	38	38	mS
Phase Angle of Forward Transfer Admittance	$ heta_{\mathbf{fe}}$	-0.79	-0.83	-0.92	0
Reverse Transfer Admittance	y _{re}	5.7	5.7	6.2	μ S
Phase Angle of Reverse Transfer Admittance	$ heta_{ extbf{re}}$	-90	-90	-90	0

(2) (COMMON EMITTER f = 10.7 MHz, $Ta = 25^{\circ}\text{C}$)

CHARACTERISTIC	SYMBOL	2SC380TM-R	2SC380TM-O	2SC380TM-Y	UNIT
Collector-Emitter Voltage	v_{CE}	6	6	6	V
Emitter Current	$I_{\mathbf{E}}$	-1	-1	-1	mA
Input Conductance	gie	1.04	0.85	0.65	mS
Input Capacitance	Cie	49	43	36	рF
Output Conductance	goe	10	15	28	μ S
Output Capacitance	C_{oe}	2.7	2.9	3.6	pF
Forward Transfer Admittance	y _{fe}	37	37	37	mS
Phase Angle of Forward Transfer Admittance	$ heta_{\mathbf{fe}}$	-9.6	-10.4	-11.5	0
Reverse Transfer Admittance	y _{re}	120	120	140	μ S
Phase Angle of Reverse Transfer Admittance	$ heta_{ extbf{re}}$	-90	-90	-90	0

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4-5 0.1 mm ϕ UEW 2T

Fig.1 Gpe TEST CIRCUIT

