TOSHIBA TRANSISTOR

MPS2222A

SILICON NPN EPITAXIAL TYPE (PCT PROCESS)

T-29-21

TOSHIBA (DISCRETE/OPTO)

FOR GENERAL PURPOSE USE
MEDIUM-SPEED SWITCHING AND AUDIO TO
VHF FREQUENCY APPLICATION.

FEATURES:

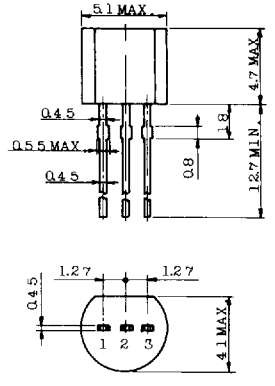
. DC Current Gain Specified : 0.1 ~ 500mA

. Low Collector-Emitter Saturation Voltage
: $V_{CE(sat)}$=1.0V(Max.) @ I_C=500mA

. High Transition Frequency
: @ I_C=20mA MPS2222A ; 300MHz(Min.)

. Complementary to MPS2907A.

Unit in mm



1. EMITTER
2. BASE
3. COLLECTOR

JEDEC	TO-92
EIAJ	SC-43
TOSHIBA	2-5F1F

Weight : 0.21g

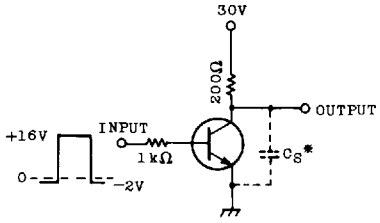
MAXIMUM RATINGS (Ta=25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Collector-Base Voltage	V_{CBO}	75	V
Collector-Emitter Voltage	V_{CEO}	40	V
Emitter-Base Voltage	V_{EBO}	6	V
Collector Current	I_C	600	mA
Base Current	I_B	160	mA
Total Device Dissipation @ Tc=25°C	P_C	625	mW
Derate above 25°C		5.0	mW/°C
Total Device Dissipation @ Ta=25°C	P_C	1.5	W
Derate above		12	mW/°C
Junction Temperature	T_j	150	°C
Storage Tempetature Range	T_{stg}	-55 ~ 150	°C

ELECTRICAL CHARACTERISTICS (Ta=25°C, Unless otherwise noted)

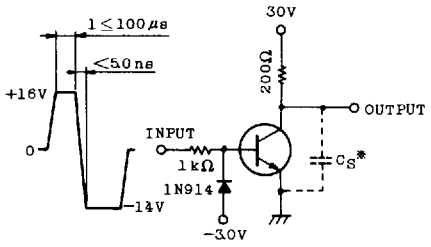
CHARACTERISTIC		SYMBOL	TEST CONDITION	MPS2222A MIN.	MPS2222A MAX.	UNIT
Collector Cut-off Current		I_{CBO}	V_{CB}=60V, I_E=0	-	10	nA
Collector Cut-off Current		I_{CBO}	V_{CB}=60V, I_E=0, Ta=150°C	-	10	μA
Collector Cut-off Current		I_{CEX}	V_{CE}=60V, V_{BE}=-3V	-	10	nA
Emitter Cut-off Current		I_{EBO}	V_{EB}=3.0V, I_C=0	-	10	nA
Base Cut-off Current		I_{BL}	V_{CE}=60V, V_{BE}=-3V	-	20	nA
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	I_C=10μA, I_E=0	75	-	V
Collector-Emitter Breakdown Voltage		$V_{(BR)CEO}$	I_C=10mA, I_B=0	40	-	V
Emitter-Base Breakdown Voltage		$V_{(BR)EBO}$	I_E=10μA, I_C=0	6.0	-	V
DC Current Gain		h_{FE}	V_{CE}=10V, I_C=0.1mA	35	-	
			V_{CE}=10V, I_C=1.0mA	50	-	
			V_{CE}=10V, I_C=10mA	75	-	
			V_{CE}=10V, I_C=150mA	100	300	
			V_{CE}=10V, I_C=500mA	40	-	
			V_{CE}=1V, I_C=150mA	50	-	
			V_{CE}=10V, I_C=10mA Ta=-55°C	35	-	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=150mA, I_B=15mA	-	0.3	V
			I_C=500mA, I_B=50mA	-	1.0	
Base-Emitter Saturation Voltage		$V_{BE(sat)}$	I_C=150mA, I_B=15mA	0.6	1.2	V
			I_C=500mA, I_B=50mA	-	2.0	
Transition Frequency		f_T	V_{CE}=20V, I_C=20mA, f=100MHz	300	-	MHz
Collector Output Capacitance		C_{ob}	V_{CB}=10V, I_E=0, f=100kHz	-	8.0	pF
Input Capacitance		C_{ib}	V_{EB}=0.5V, I_C=0, f=100kHz	-	25	pF
Collector-Base Time Constant		C_c, $r_{bb'}$	V_{CB}=20V, I_E=20mA f=31.8MHz	-	150	pS
Noise Figure		NF	V_{CE}=10V, I_C=100μA R_S=1kΩ, f=1kHz	-	4.0	dB
Switching Time	Delay Time	t_d	V_{CC}=30V, $V_{BE(off)}$=-0.5V	-	10	ns
	Rise Time	t_r	I_C=150mA, I_{B1}=15mA Fig. 1	-	25	
	Storage Time	t_{stg}	V_{CC}=30V, I_C=150mA	-	225	
	Fall Time	t_f	I_{B1}=-I_{B2}=15mA Fig. 2	-	60	

Fig. 1 DELAY AND RISE TIME EQUIVALENT TEST CIRCUIT



P_W=1~100μs
DUTY CYCLE=2.0%

Fig. 2 STORAGE TIME AND FALL TIME EQUIVALENT TEST CIRCUIT



DUTY CYCLE=2.0%

SCOPE RISE TIME < 4ns

* C_S : TOTAL SHUNT CAPACITANCE