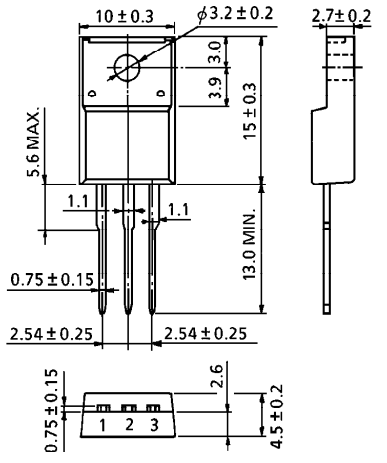
TOSHIBA TRANSISTOR SILICON NPN TRIPLE DIFFUSED TYPE

2SD2012

AUDIO FREQUENCY POWER AMPLIFIER APPLICATIONS

Unit in mm

- High DC Current Gain : $h_{FE\,(1)}=100$ (Min.)
- Low Saturation Voltage
  : $V_{CE\,(sat)}=1.0V$ (Max.)
- High Power Dissipation : $P_C=25W$ ($T_c=25°C$)



1. BASE
2. COLLECTOR
3. EMITTER

JEDEC	—
EIAJ	—
TOSHIBA	2-10R1A

Weight : 1.7g (Typ.)

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage		V_{CBO}	60	V
Collector-Emitter Voltage		V_{CEO}	60	V
Emitter-Base Voltage		V_{EBO}	7	V
Collector Current		I_C	3	A
Base Current		I_B	0.5	A
Collector Power Dissipation	Ta=25°C	P_C	2.0	W
	Tc=25°C		25	
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_{stg}	−55~150	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB}=60V$, $I_E=0$	—	—	100	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB}=7V$, $I_C=0$	—	—	100	μA
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=50mA$, $I_E=0$	60	—	—	V
DC Current Gain	$h_{FE\,(1)}$	$V_{CE}=5V$, $I_C=0.5A$	100	—	320	
	$h_{FE\,(2)}$	$V_{CE}=5V$, $I_C=2A$	20	—	—	
Collector-Emitter Saturation Voltage	$V_{CE\,(sat)}$	$I_C=2A$, $I_B=0.2A$	—	0.4	1.0	V
Base-Emitter Voltage	V_{BE}	$V_{CE}=5V$, $I_C=0.5A$	—	0.75	1.0	V
Transition Frequency	f_T	$V_{CE}=5V$, $I_C=0.5A$	—	3	—	MHz
Collector Output Capacitance	C_{ob}	$V_{CB}=10V$, $I_E=0$, f=1MHz	—	35	—	pF

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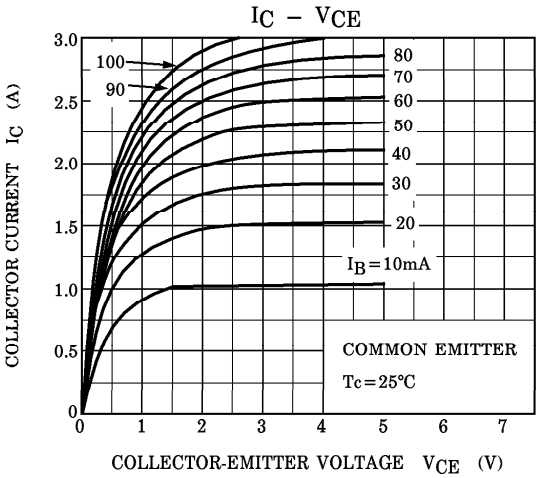
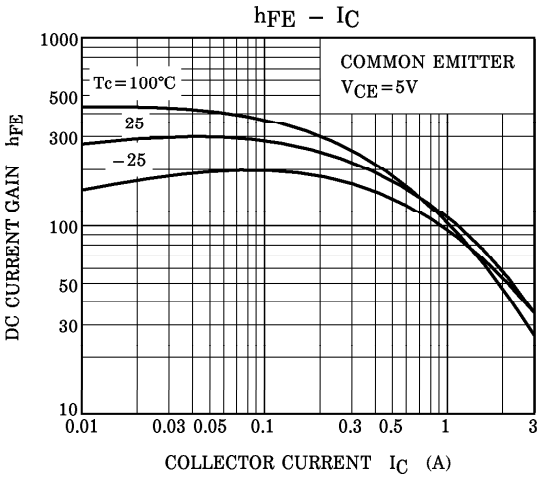
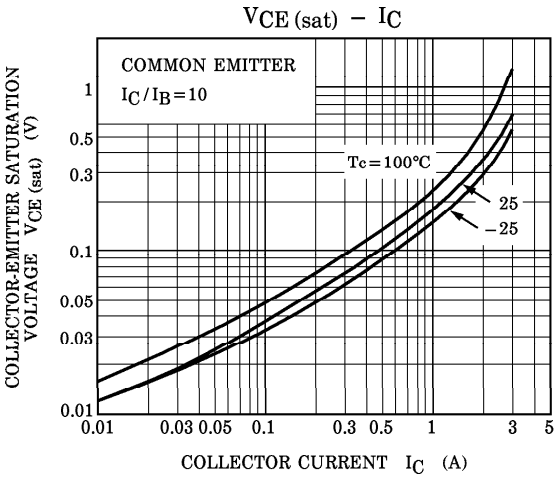
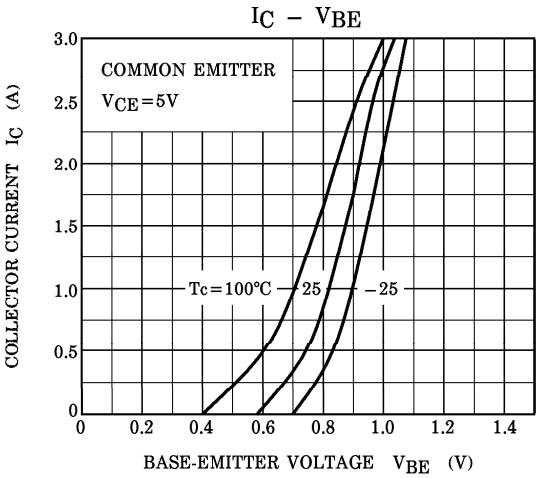
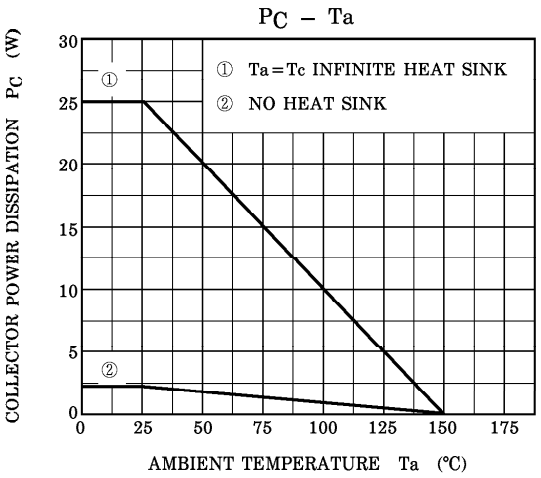
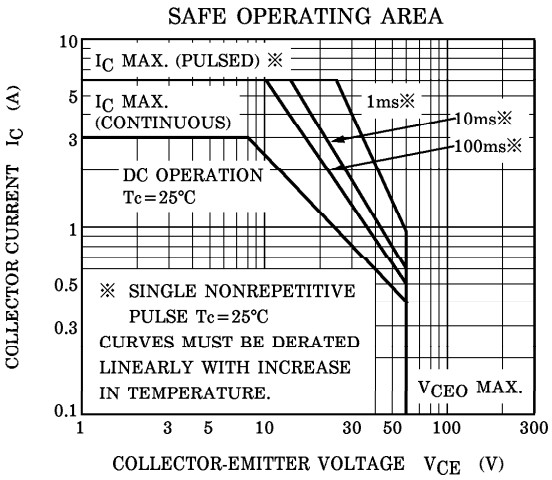

IC – VCE
COLLECTOR CURRENT IC (A)
COLLECTOR-EMITTER VOLTAGE VCE (V)
100
90
80
70
60
50
40
30
20
IB=10mA
COMMON EMITTER
Tc=25°C

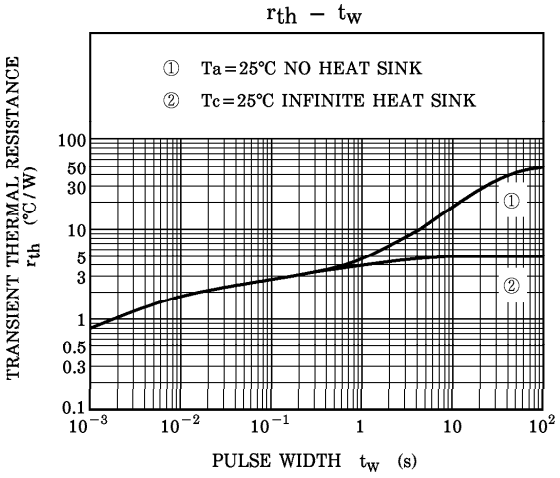

hFE – IC
DC CURRENT GAIN hFE
COLLECTOR CURRENT IC (A)
COMMON EMITTER
VCE=5V
Tc=100°C
25
−25


VCE (sat) – IC
COLLECTOR-EMITTER SATURATION VOLTAGE VCE (sat) (V)
COLLECTOR CURRENT IC (A)
COMMON EMITTER
IC/IB=10
Tc=100°C
25
−25


IC – VBE
COLLECTOR CURRENT IC (A)
BASE-EMITTER VOLTAGE VBE (V)
COMMON EMITTER
VCE=5V
Tc=100°C
25
−25


PC – Ta
COLLECTOR POWER DISSIPATION PC (W)
AMBIENT TEMPERATURE Ta (°C)
① Ta=Tc INFINITE HEAT SINK
② NO HEAT SINK


SAFE OPERATING AREA
COLLECTOR CURRENT IC (A)
COLLECTOR-EMITTER VOLTAGE VCE (V)
IC MAX. (PULSED) ※
IC MAX. (CONTINUOUS)
1ms※
10ms※
100ms※
DC OPERATION
Tc=25°C
※ SINGLE NONREPETITIVE PULSE Tc=25°C
CURVES MUST BE DERATED LINEARLY WITH INCREASE IN TEMPERATURE.
VCEO MAX.


rth – tw
① Ta=25°C NO HEAT SINK
② Tc=25°C INFINITE HEAT SINK
TRANSIENT THERMAL RESISTANCE rth (°C/W)
100
50
30
10
5
3
1
0.5
0.3
0.1
10−3
10−2
10−1
1
10
102
PULSE WIDTH tw (s)