

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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NPN EPITAXIAL SILICON TRANSISTOR
N-CHANNEL SILICON JUNCTION FIELD EFFECT TRANSISTOR
HIGH FREQUENCY AMPLIFIER, AM HIGH FREQUENCY
AUDIO FREQUENCY AMPLIFIER APPLICATION

FEATURES

- Composite type J-FET and NPN Transistor

ORDERING INFORMATION

PART NUMBER	PACKAGE
μ PA509TA	SC-74A

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

FET

Drain to Source Voltage ^{Note}	V _{DSX}	22	V
Gate To Drain Voltage	V _{GDO}	-22	V
Drain Current	I _D	50	mA
Gate Current	I _G	10	mA
Total Power Dissipation	P _T	200	mW

Notes V_{GS} = -2.5 V

TRANSISTOR

Collector to Base Voltage	V _{CBO}	60	V
Collector to Emitter Voltage	V _{CEO}	50	V
Emitter to Base Voltage	V _{EBO}	5	V
Collector Current	I _{C(DC)}	100	mA
Collector Current (pulse) ^{Note}	I _{C(pulse)}	200	mA
Base Current	I _B	20	mA
Total Power Dissipation	P _T	200	mW

Notes PW ≤ 10 ms, Duty Cycle ≤ 50 %

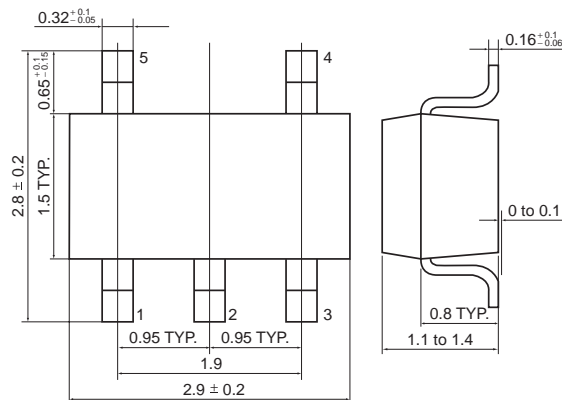
COMMON RATINGS

Total Power Dissipation	P _T	300	mW
Junction Temperature	T _J	150	°C
Storage Temperature	T _{stg}	-55 ~ +150	°C

Remark Please take care of ESD (Electro Static Discharge) when you handle the device in this document.

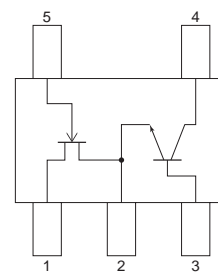
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PACKAGE DRAWING (Unit: mm)



EQUIVALENT CIRCUIT

(Top View)



- 1 : Source
- 2 : Drain / Emitter
- 3 : Base
- 4 : Collector
- 5 : Gate

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

FET

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Gate Current	I _{GSS}	V _{GS} = -15 V, V _{DS} = 0 V			-1.0	nA
Drain Current	I _{DSS}	V _{DS} = 5.0 V, V _{GS} = 0 V	10		30	mA
Gate Cut-off Voltage	V _{GS(off)}	V _{DS} = 5.0 V, I _D = 10 μA		-1.1	-2.5	V
Forward Transfer Admittance	y _{fs1}	V _{DS} = 5.0 V, I _D = 10 mA, f = 1.0 kHz	20	28		mS
	y _{fs2}	V _{DS} = 5.0 V, V _{GS} = 0 V, f = 1.0 kHz	20	35		mS
Input Capacitance	C _{iss}	V _{DS} = 5.0 V, V _{GS} = 0 V, f = 1.0 MHz		8.3		pF
Capacitance	C _{rss}	V _{DS} = 5.0 V, V _{GS} = 0 V, f = 1.0 MHz		2.75		pF
Noise Voltage	NV	Refer to the test circuit		16.8		mV

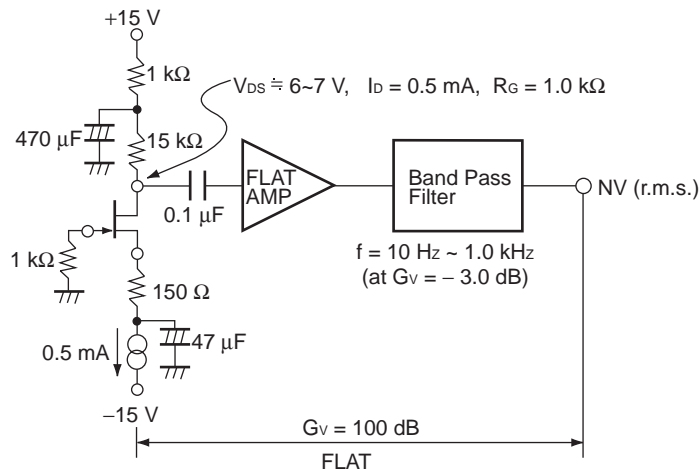
TRANSISTOR

CHARACTERISTICS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I _{CBO}	V _{CB} = 60 V, I _E = 0 mA			100	nA
Emitter Cut-off Current	I _{EBO}	V _{EB} = 5.0 V, I _C = 0 V			100	nA
DC Current Gain	h _{FE}	V _{CE} = 6.0 V, I _C = 1 mA	135		400	
Base to Emitter Voltage	V _{BE}	V _{CE} = 6.0 V, I _C = 1 mA	0.55		0.65	V
Base to Emitter Saturation Voltage	V _{BE(sat)}	I _C = 100 mA, I _B = 10 mA		0.86	1.0	V
Collector to Emitter Saturation Voltage	V _{CE(sat)}	I _C = 100 mA, I _B = 10 mA		0.15	0.3	V
Gain Bandwidth Product	f _T	V _{CE} = 6.0 V, I _E = -10 mA		250		MHz
Output Capacitance	C _{ob}	V _{CB} = 60 V, I _E = 0, f = 1.0 MHz		3.0		pF

I_{DSS} Classification

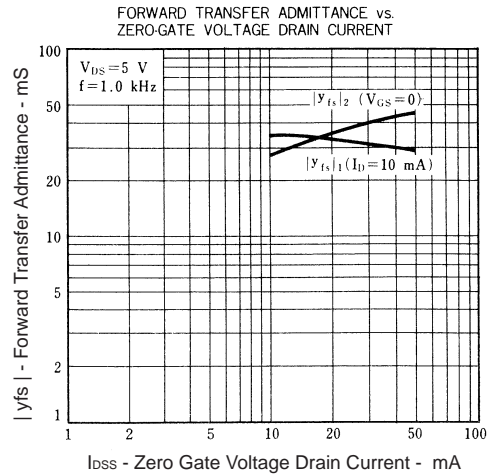
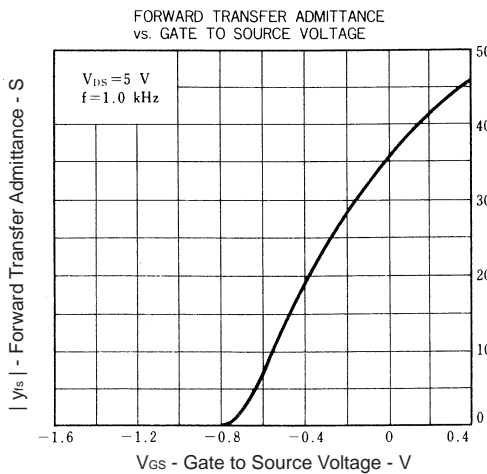
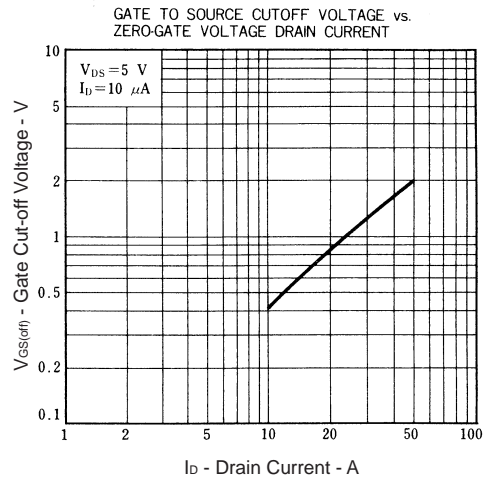
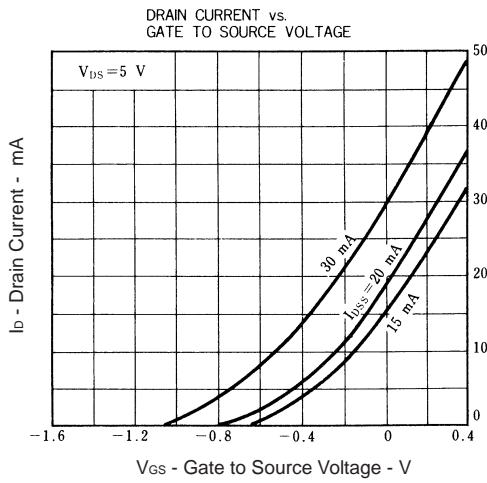
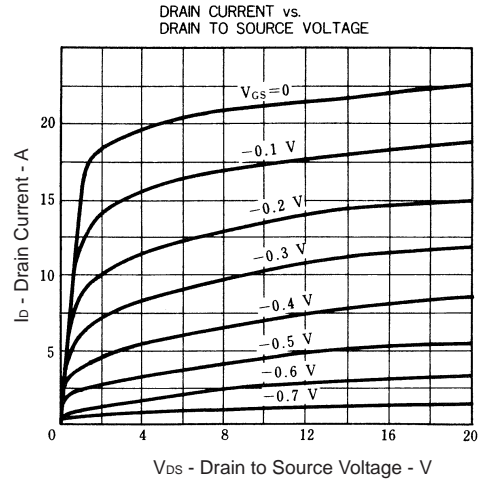
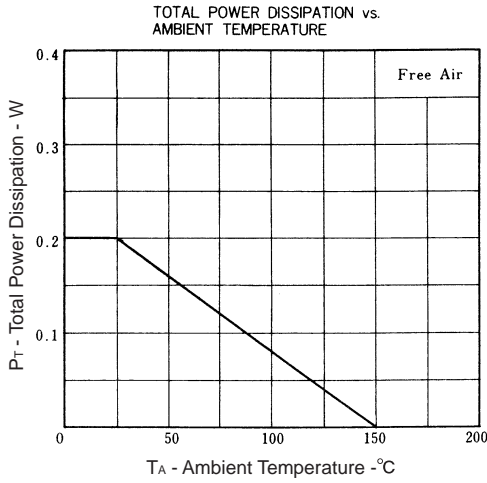
Rank Marking	UV	UW
I _{DSS} (mA)	10~20	15~30

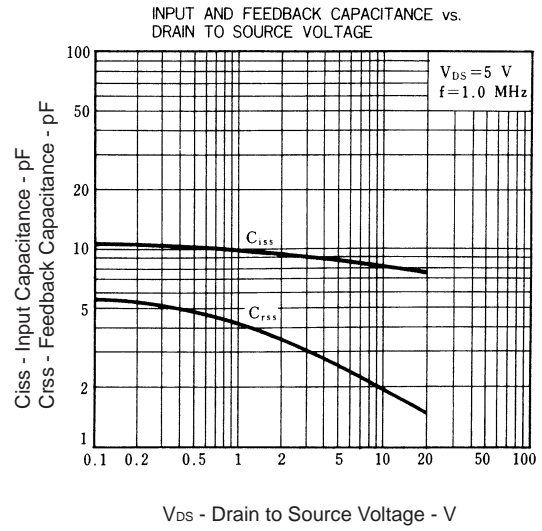
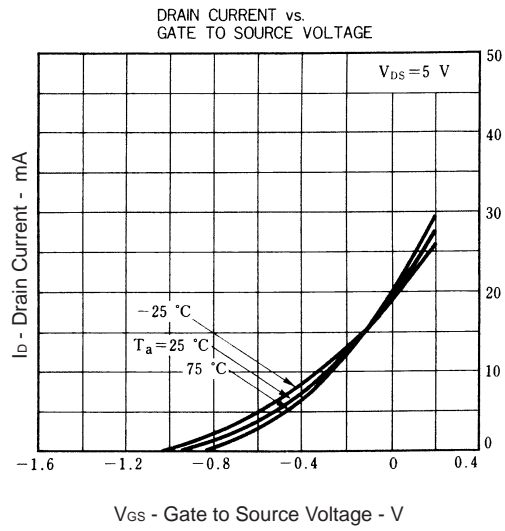
Noise Voltage Test Circuit



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

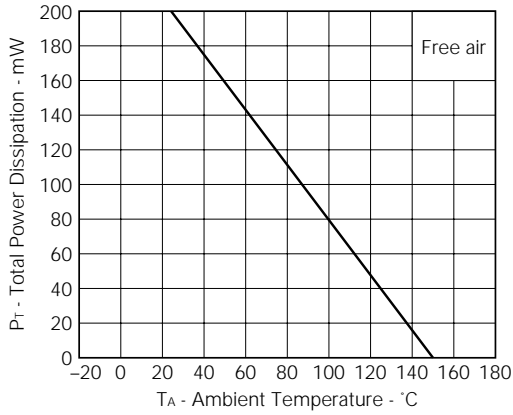
FET



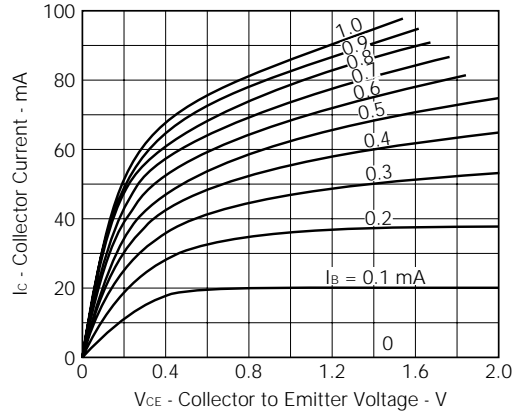


TRANSISTOR

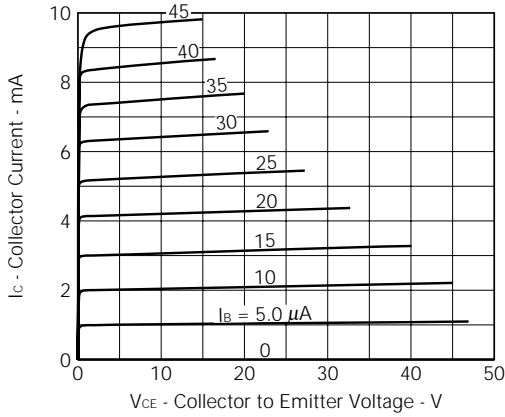
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



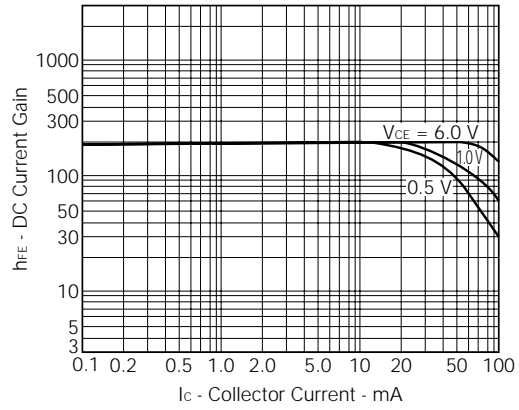
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



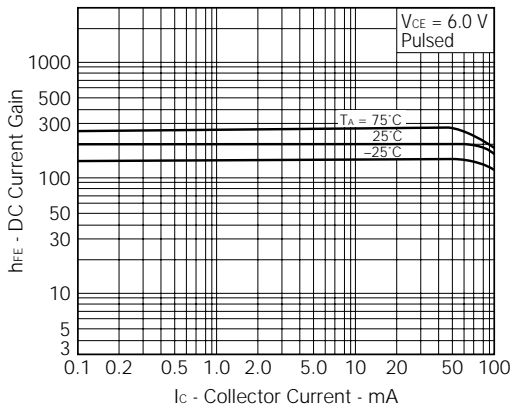
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



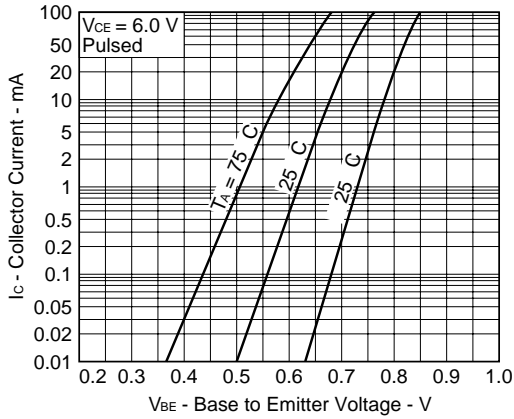
DC CURRENT GAIN vs. COLLECTOR CURRENT



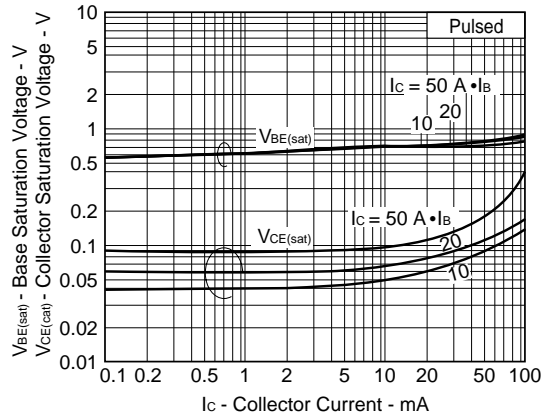
DC CURRENT GAIN vs. COLLECTOR CURRENT



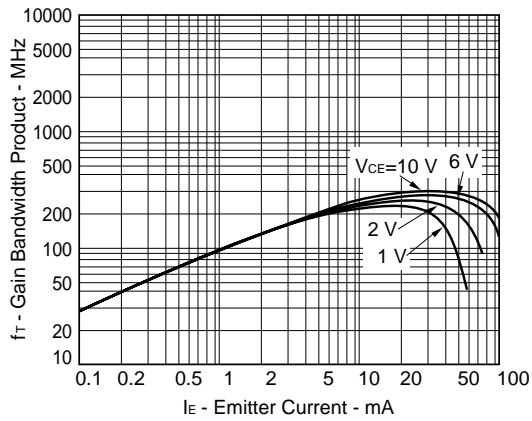
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



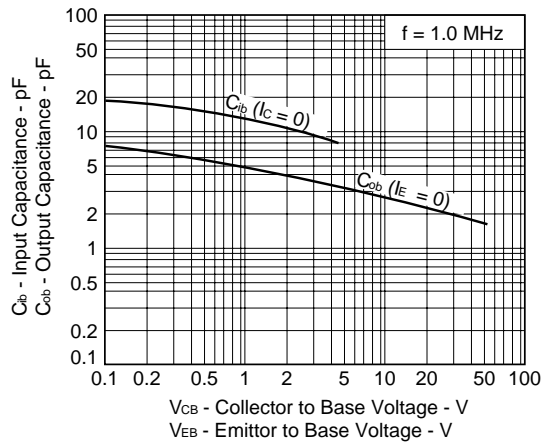
COLLECTOR AND BASE SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



INPUT AND OUTPUT CAPACITANCE vs. REVERSE VOLTAGE



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