NEC

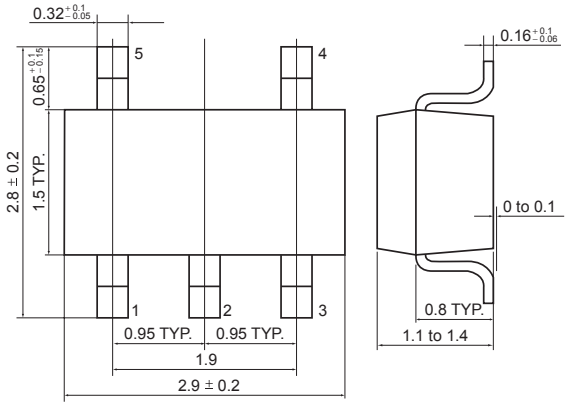
μPA509TA

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

PACKAGE DRAWING (Unit: mm)



ORDERING INFORMATION

PART NUMBER	PACKAGE
μPA509TA	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

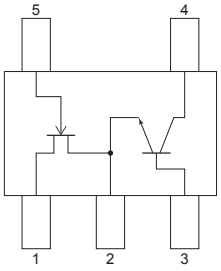
Notes PW ≤ 10 ms, Duty Cycle ≤ 50 %

COMMON RATINGS

Total Power Dissipation	P_T	300	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–55 ~ +150	°C

EQUIVALENT CIRCUIT

(Top View)



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

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

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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

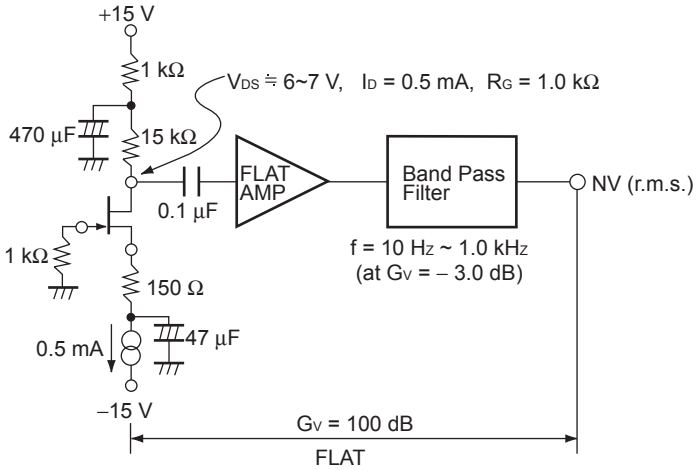
TRANSISTOR

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

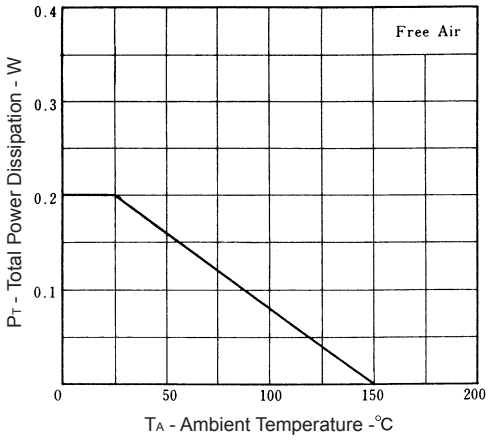
Noise Voltage Test Circuit



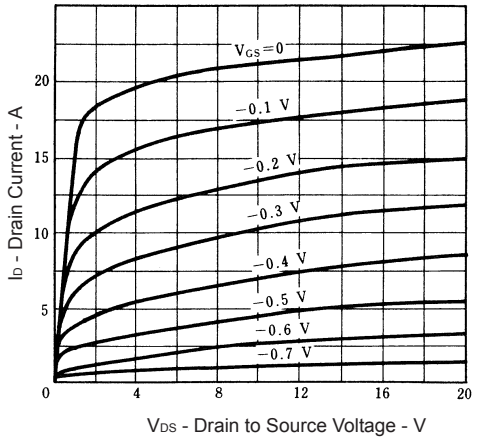
TYPICAL CHARACTERISTICS (T_A = 25°C)

FET

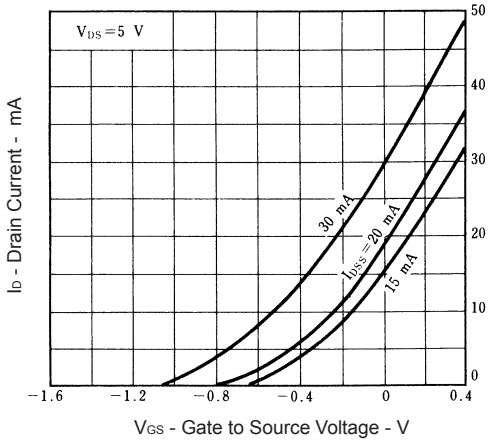
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



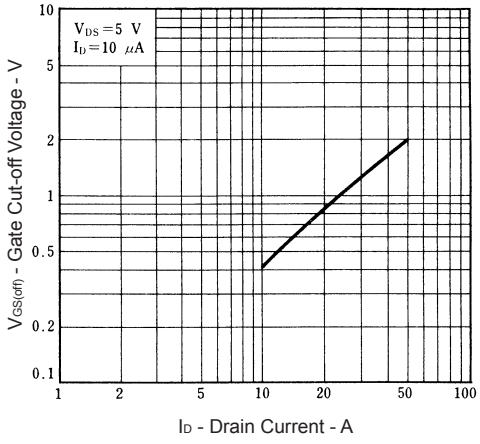
DRAIN CURRENT vs. DRAIN TO SOURCE VOLTAGE



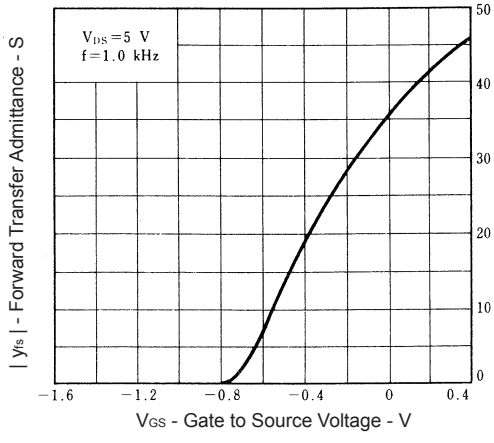
DRAIN CURRENT vs. GATE TO SOURCE VOLTAGE



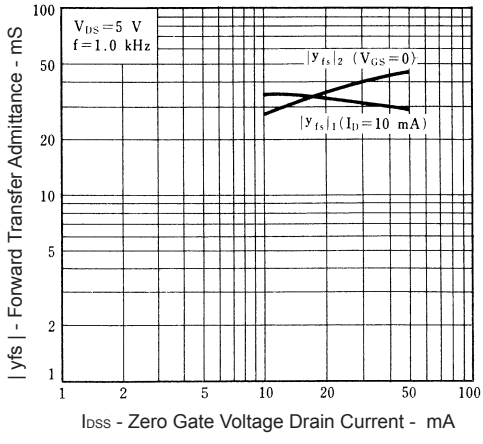
GATE TO SOURCE CUTOFF VOLTAGE vs. ZERO-GATE VOLTAGE DRAIN CURRENT



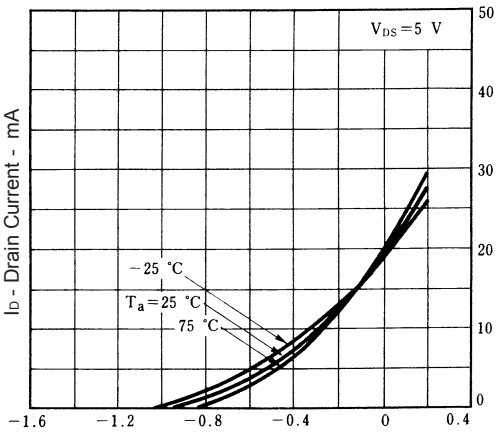
FORWARD TRANSFER ADMITTANCE vs. GATE TO SOURCE VOLTAGE



FORWARD TRANSFER ADMITTANCE vs. ZERO-GATE VOLTAGE DRAIN CURRENT

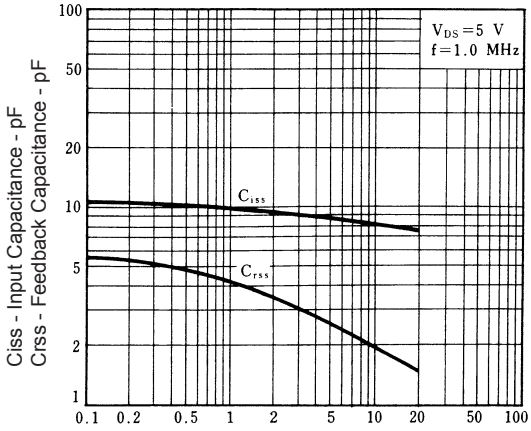


DRAIN CURRENT vs.
GATE TO SOURCE VOLTAGE



V_{GS} - Gate to Source Voltage - V

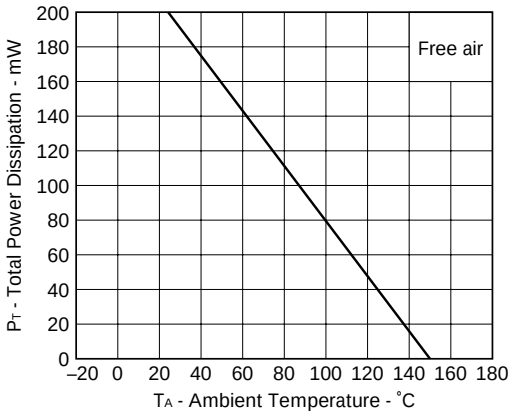
INPUT AND FEEDBACK CAPACITANCE vs.
DRAIN TO SOURCE VOLTAGE



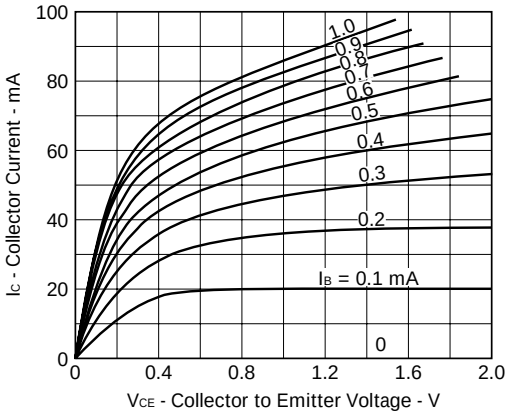
V_{DS} - Drain to Source Voltage - V

TRANSISTOR

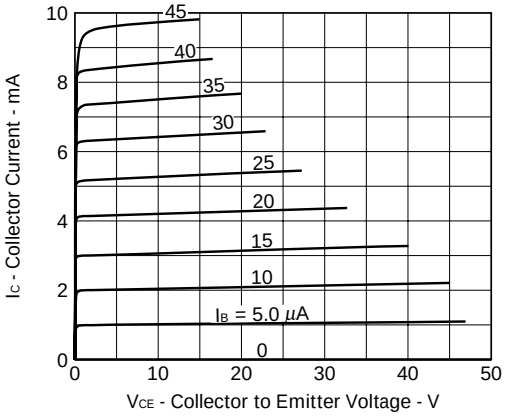
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



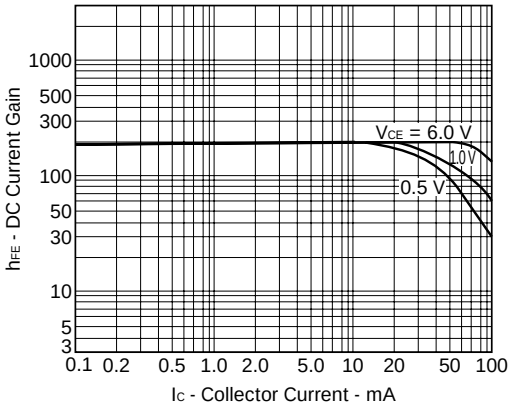
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



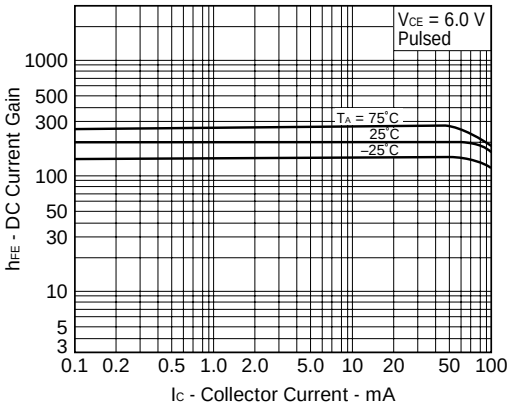
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



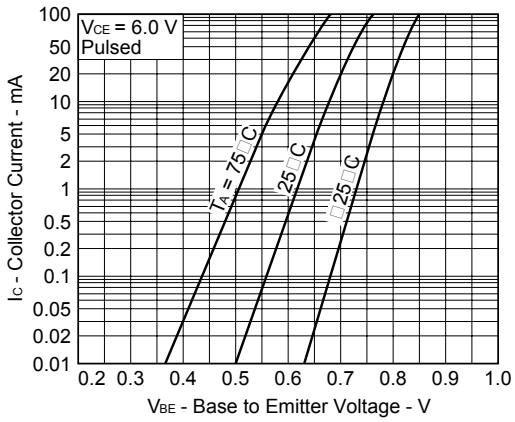
DC CURRENT GAIN vs.
COLLECTOR CURRENT



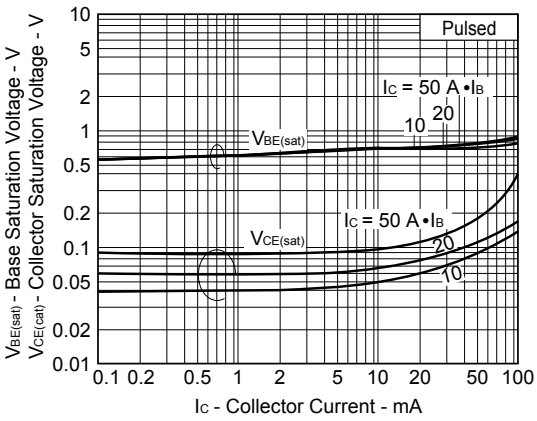
DC CURRENT GAIN vs.
COLLECTOR CURRENT



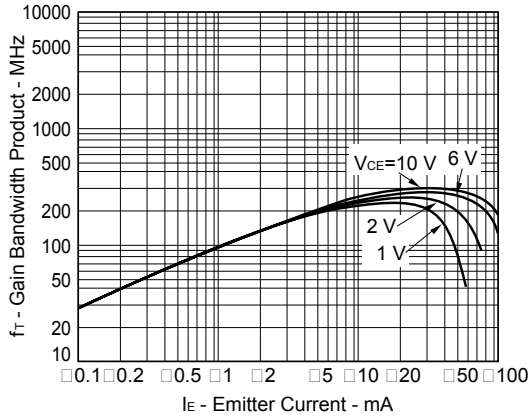
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



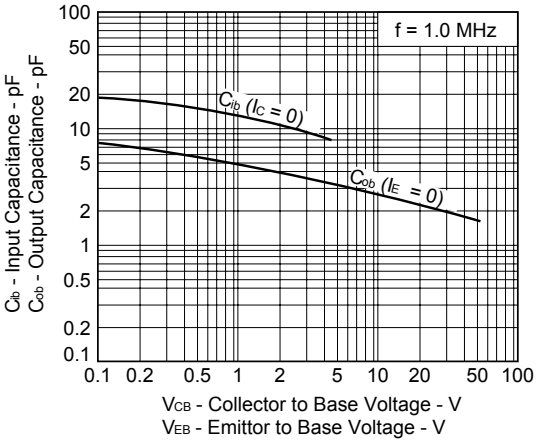
COLLECTOR AND BASE SATURATION
VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs.
EMITTER CURRENT



INPUT AND OUTPUT CAPACITANCE
vs. REVERSE VOLTAGE



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