Ordering number : ENN7177

NPN Epitaxial Planar Silicon Transistor
N-Channel Silicon Junction FET

CPH5905

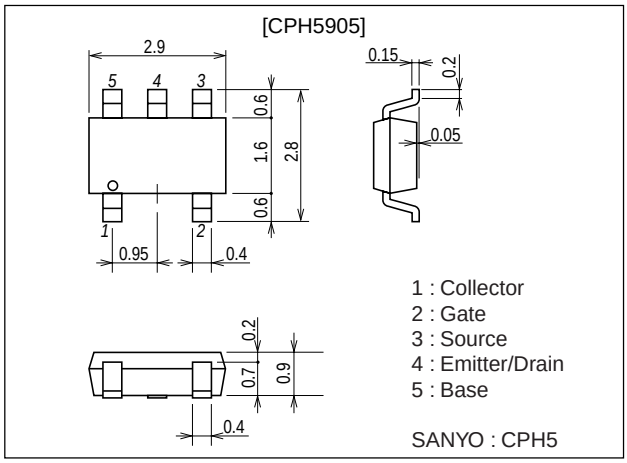
High-Frequency Amplifier, AM Amplifier, Low-Frequency Amplifier Applications

Features

- Composite type with J-FET and NPN transistors contained in the CPH5 package, improving the mounting efficiency greatly.
- The CPH5905 contains a 2SK3557-equivalent chip and a 2SC4639-equivalent chip in one package.
- Drain and emitter are shared.

Package Dimensions

unit : mm
2196



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
[FET]				
Drain-to-Source Voltage	V_{DSX}		15	V
Gate-to-Drain Voltage	V_{GDS}		−15	V
Gate Current	I_G		10	mA
Drain Current	I_D		50	mA
Allowable Power Dissipation	P_D		200	mW
[TR]				
Collector-to-Base Voltage	V_{CBO}		55	V
Collector-to-Emitter Voltage	V_{CEO}		50	V
Emitter-to-Base Voltage	V_{EBO}		6	V
Collector Current	I_C		150	mA
Collector Current (Pulse)	I_{CP}		300	mA
Base Current	I_B		30	mA
Collector Dissipation	P_C		200	mW
[Common Ratings]				
Total Dissipation	P_T		300	mW
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Marking : 1E

SANYO Electric Co.,Ltd. Semiconductor Company
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Electrical Characteristics at Ta=25°C

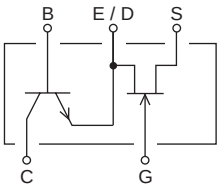
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[FET]						
Gate-to-Drain Breakdown Voltage`	$V_{(BR)GDS}$	I_G=–10μA, V_{DS}=0	–15			V
Gate Cutoff Current	I_{GSS}	V_{GS}=–10V, V_{DS}=0			–1.0	nA
Cutoff Voltage	$V_{GS}(off)$	V_{DS}=5V, I_D=100μA	–0.4	–0.7	–1.5	V
Drain Current	I_{DSS}	V_{DS}=5V, V_{GS}=0	10.0*		32.0*	mA
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=5V, V_{GS}=0, f=1kHz	24	35		mS
Input Capacitance	Ciss	V_{DS}=5V, V_{GS}=0, f=1MHz		10.0		pF
Reverse Transfer Capacitance	Crss	V_{DS}=5V, V_{GS}=0, f=1MHz		2.9		pF
Noise Figure	NF	V_{DS}=5V, Rg=1kΩ, I_D=1mA, f=1kHz		1.0		dB
[TR]						
Collector Cutoff Current	I_{CBO}	V_{CB}=35V, I_E=0			0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0			0.1	μA
DC Current Gain	h_{FE}	V_{CE}=6V, I_C=1mA	135		400	
Gain-Bandwidth Product	f_T	V_{CE}=6V, I_C=10mA		200		MHz
Output Capacitance	Cob	V_{CB}=6V, f=1MHz		1.7		pF
Collector-to-Emitter Saturation Voltage	$V_{CE}(sat)$	I_C=50mA, I_B=5mA		0.08	0.4	V
Base-to-Emitter Saturation Voltage	$V_{BE}(sat)$	I_C=50mA, I_B=5mA		0.8	1.0	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	I_C=10μA, I_E=0	55			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	I_C=1mA, R_{BE}=∞	50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	I_E=10μA, I_C=0	6			V
Turn-ON Time	t_{on}	See specified Test Circuit.		0.15		μs
Storage Time	t_{stg}	See specified Test Circuit.		0.75		μs
Fall Time	t_f	See specified Test Circuit.		0.20		μs

* : The CPH5905 is classified by I_{DSS} as follows : (unit : mA)

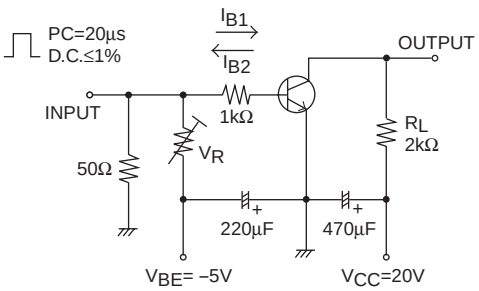
Rank	G	H
I_{DSS}	10.0 to 20.0	16.0 to 32.0

The specifications shown above are for each individual FET or a transistor.

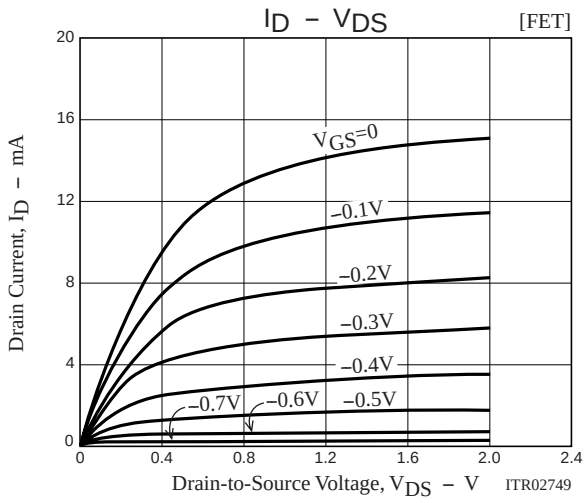
Electrical Connection (Top view)

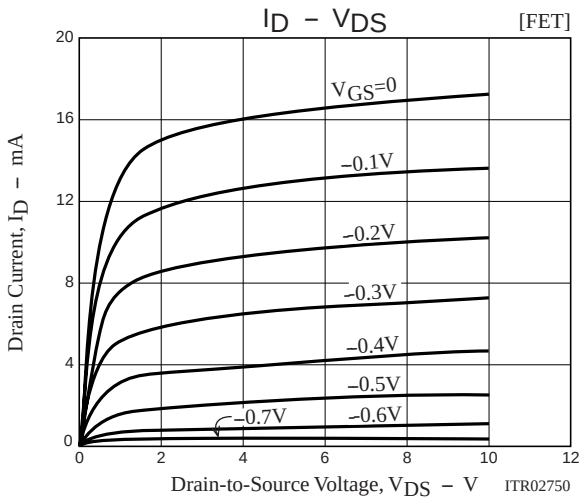


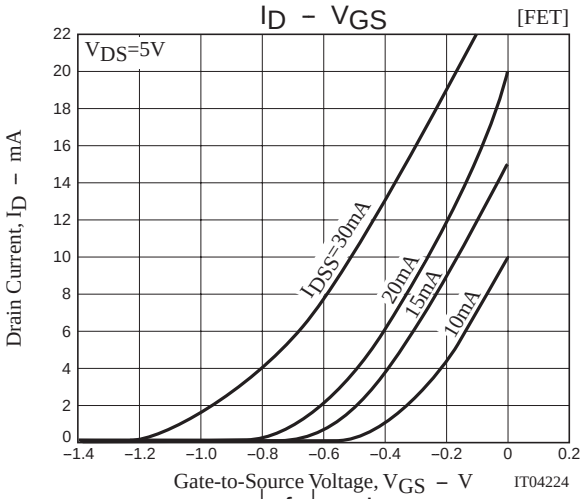
Switching Time Test Circuit

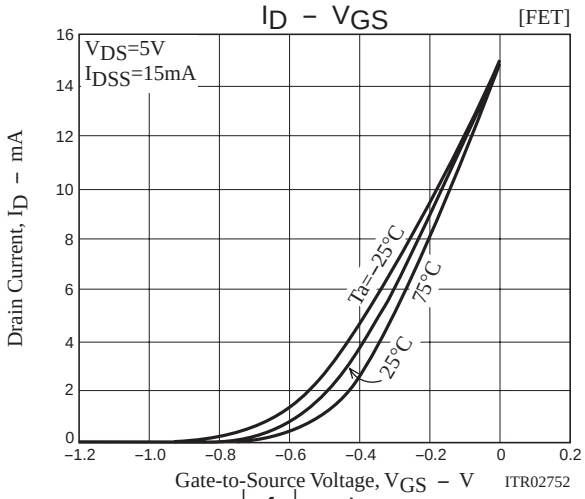


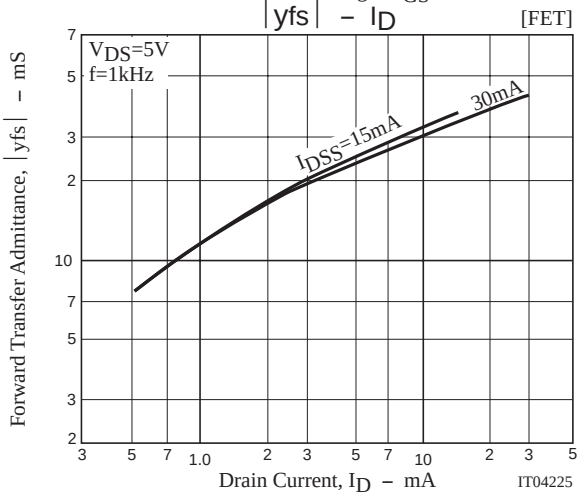
$10I_{B1}$= –$10I_{B2}$=I_C=10mA

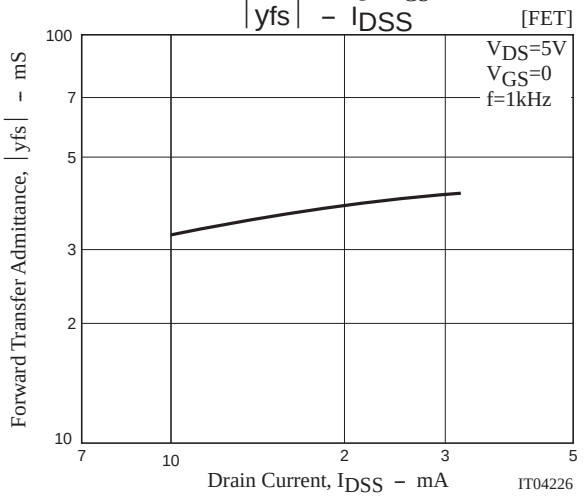


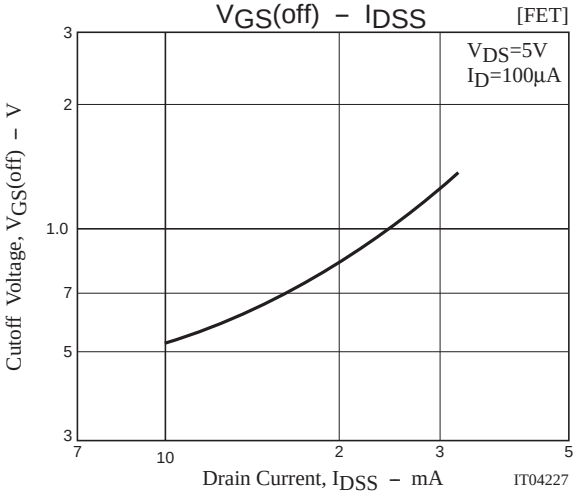


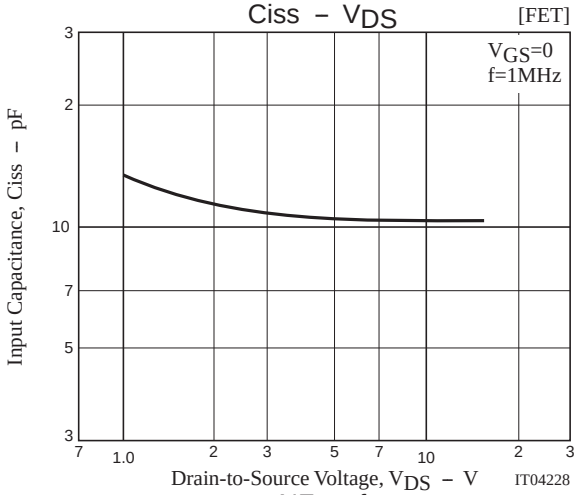

ID – VGS [FET]
VDS=5V
IDSS=30mA
20mA
15mA
10mA
Drain Current, ID – mA
Gate-to-Source Voltage, VGS – V
IT04224

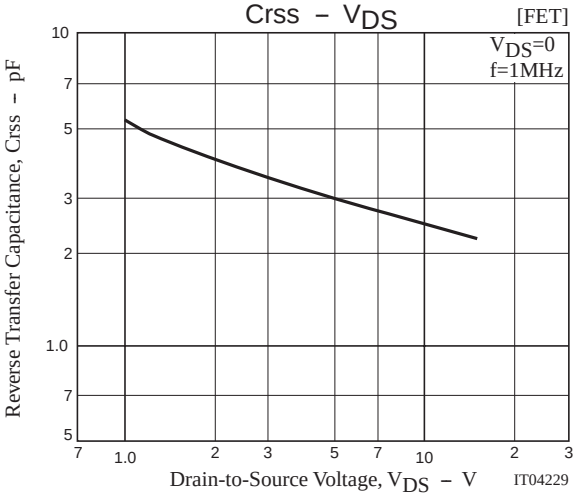

ID – VGS [FET]
VDS=5V
IDSS=15mA
Ta=–25°C
75°C
25°C
Drain Current, ID – mA
Gate-to-Source Voltage, VGS – V
ITR02752

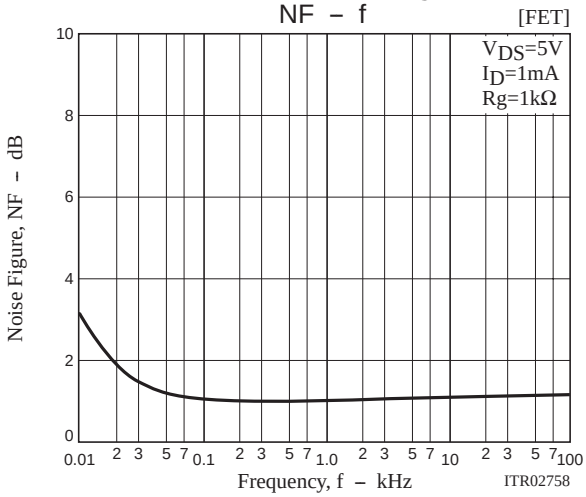

|yfs| – ID [FET]
VDS=5V
f=1kHz
IDSS=15mA
30mA
Forward Transfer Admittance, |yfs| – mS
Drain Current, ID – mA
IT04225

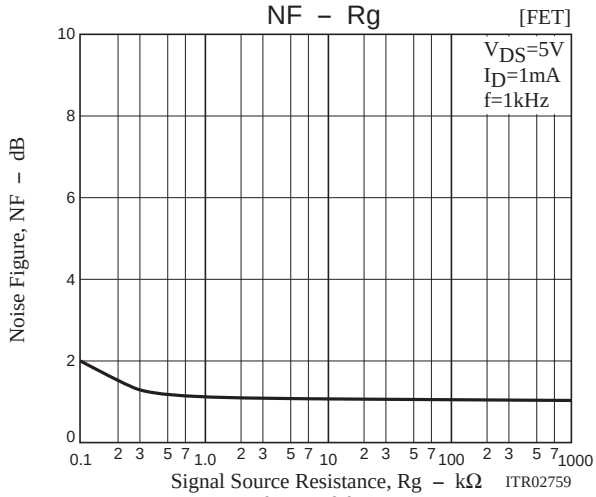

|yfs| – IDSS [FET]
VDS=5V
VGS=0
f=1kHz
Forward Transfer Admittance, |yfs| – mS
Drain Current, IDSS – mA
IT04226

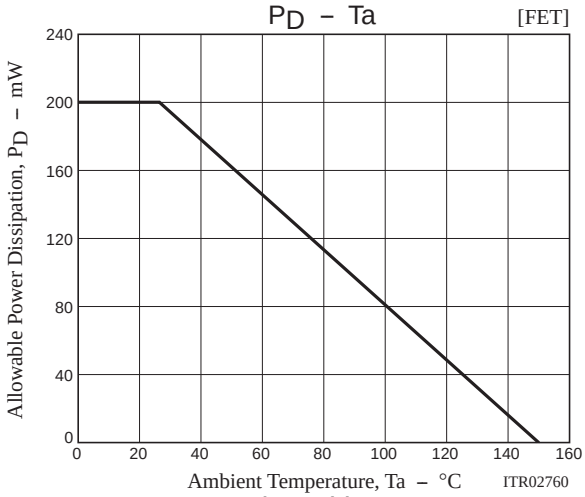

VGS(off) – IDSS [FET]
VDS=5V
ID=100μA
Cutoff Voltage, VGS(off) – V
Drain Current, IDSS – mA
IT04227

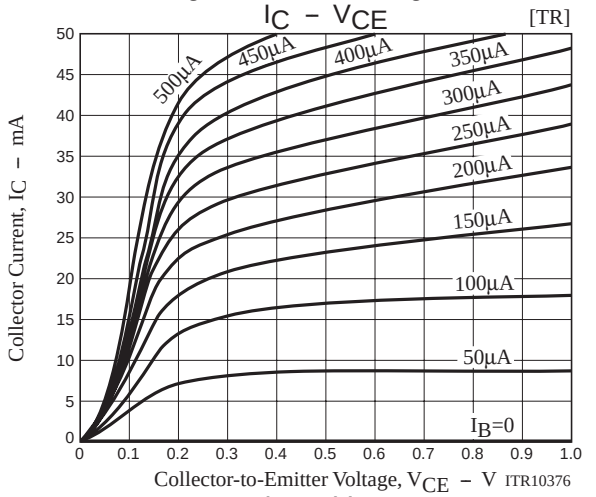

Ciss – VDS [FET]
VGS=0
f=1MHz
Input Capacitance, Ciss – pF
Drain-to-Source Voltage, VDS – V
IT04228

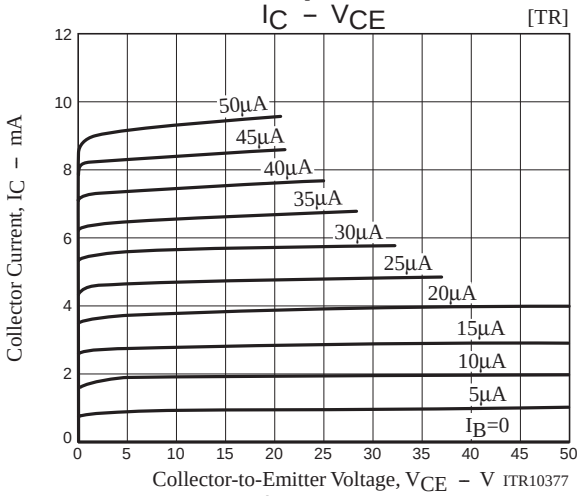

Crss – VDS [FET]
VDS=0
f=1MHz
Reverse Transfer Capacitance, Crss – pF
Drain-to-Source Voltage, VDS – V
IT04229

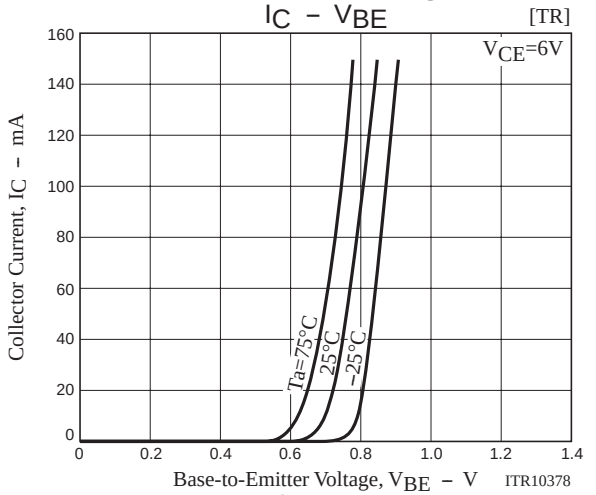

NF – f [FET]
VDS=5V
ID=1mA
Rg=1kΩ
Noise Figure, NF – dB
Frequency, f – kHz
ITR02758

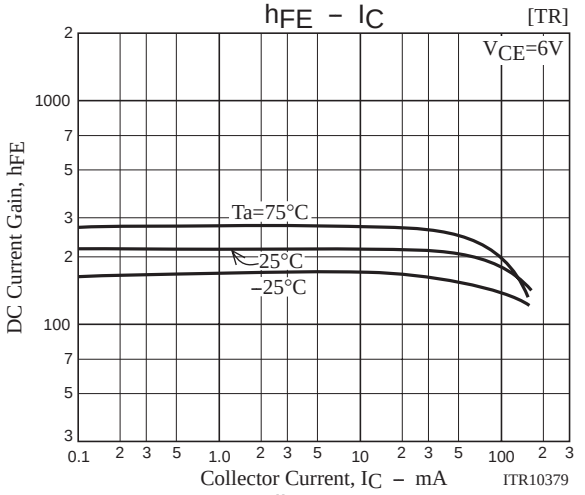

NF – Rg
[FET]
V_{DS}=5V
I_D=1mA
f=1kHz
Noise Figure, NF – dB
Signal Source Resistance, Rg – kΩ
ITR02759

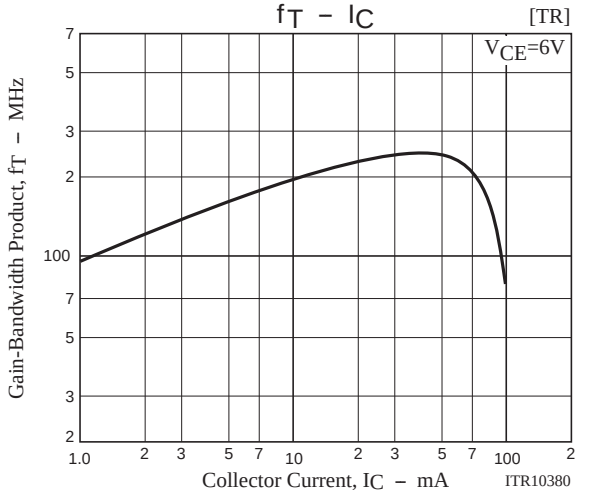

P_D – Ta
[FET]
Allowable Power Dissipation, P_D – mW
Ambient Temperature, Ta – °C
ITR02760

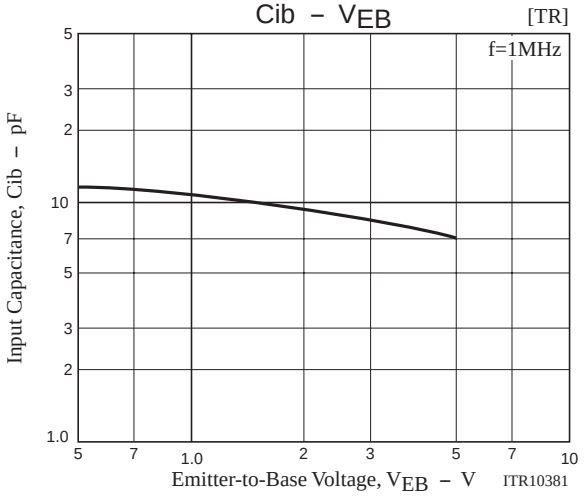

I_C – V_{CE}
[TR]
500μA
450μA
400μA
350μA
300μA
250μA
200μA
150μA
100μA
50μA
I_B=0
Collector Current, I_C – mA
Collector-to-Emitter Voltage, V_{CE} – V
ITR10376


I_C – V_{CE}
[TR]
50μA
45μA
40μA
35μA
30μA
25μA
20μA
15μA
10μA
5μA
I_B=0
Collector Current, I_C – mA
Collector-to-Emitter Voltage, V_{CE} – V
ITR10377


I_C – V_{BE}
[TR]
V_{CE}=6V
Ta=75°C
25°C
–25°C
Collector Current, I_C – mA
Base-to-Emitter Voltage, V_{BE} – V
ITR10378


h_{FE} – I_C
[TR]
V_{CE}=6V
Ta=75°C
25°C
–25°C
DC Current Gain, h_{FE}
Collector Current, I_C – mA
ITR10379


f_T – I_C
[TR]
V_{CE}=6V
Gain-Bandwidth Product, f_T – MHz
Collector Current, I_C – mA
ITR10380


Cib – V_{EB}
[TR]
f=1MHz
Input Capacitance, Cib – pF
Emitter-to-Base Voltage, V_{EB} – V
ITR10381