Ordering number : ENN7177A

SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

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.

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	Mounted on a ceramic board (600mm²×0.8mm)	350	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	Mounted on a ceramic board (600mm²×0.8mm)	350	mW
[Common Ratings]				
Total Dissipation	P_T	Mounted on a ceramic board (600mm²×0.8mm)	500	mW
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C

Marking : 1E

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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}=0V	–15			V
Gate Cutoff Current	I_{GSS}	V_{GS}=–10V, V_{DS}=0V			–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}=0V	10.0*		32.0*	mA
Forward Transfer Admittance	$\|yfs\|$	V_{DS}=5V, V_{GS}=0V, f=1kHz	24	35		mS
Input Capacitance	Ciss	V_{DS}=5V, V_{GS}=0V, f=1MHz		10.0		pF
Reverse Transfer Capacitance	Crss	V_{DS}=5V, V_{GS}=0V, 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=0A			0.1	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=4V, I_C=0A			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=0A	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=0A	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)

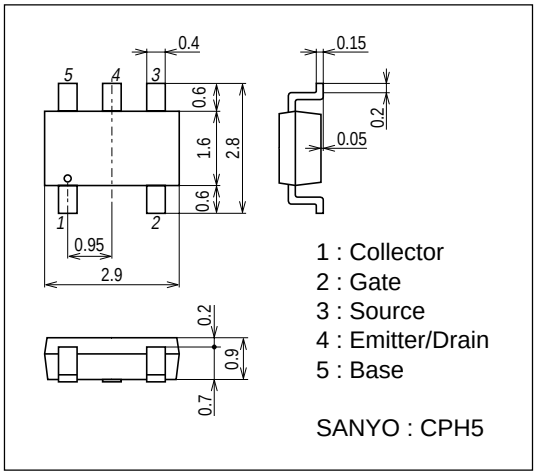
Rank	G	H
I_{DSS}	10.0 to 20.0	16.0 to 32.0

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

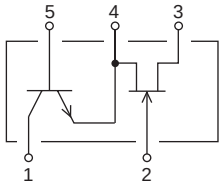
Package Dimensions

unit : mm

7017-007



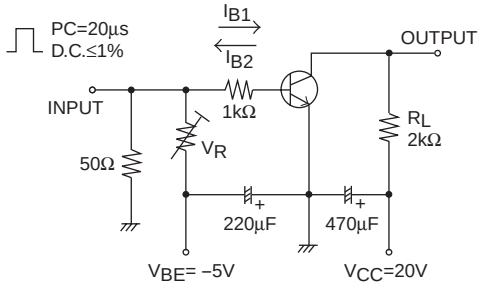
Electrical Connection



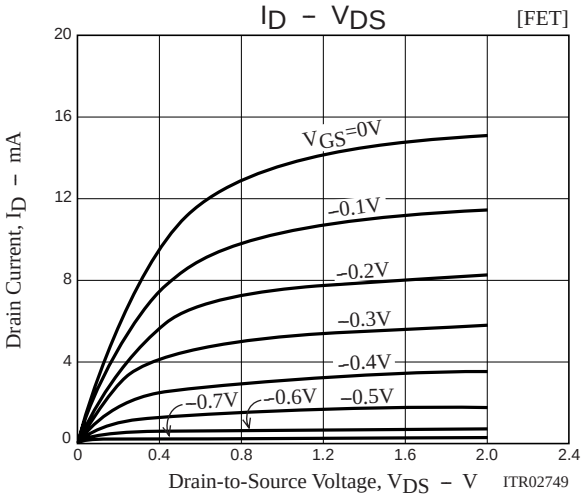
1 : Collector
2 : Gate
3 : Source
4 : Emitter/Drain
5 : Base

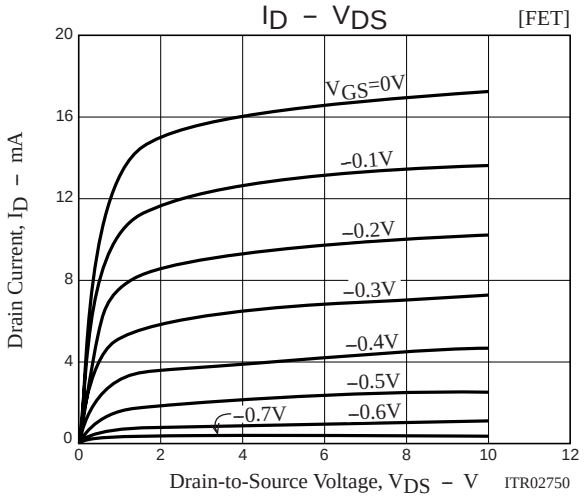
Top view

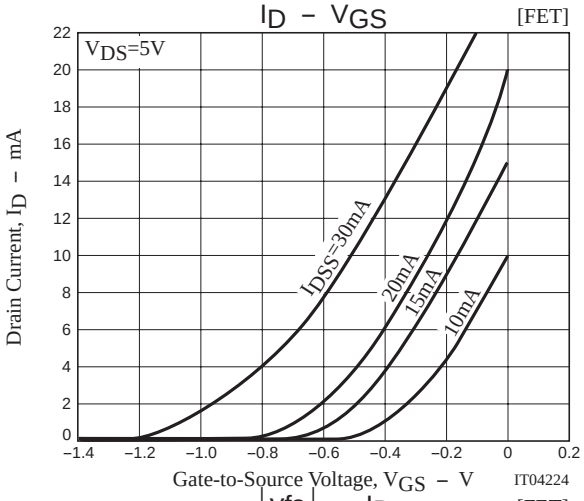
Switching Time Test Circuit

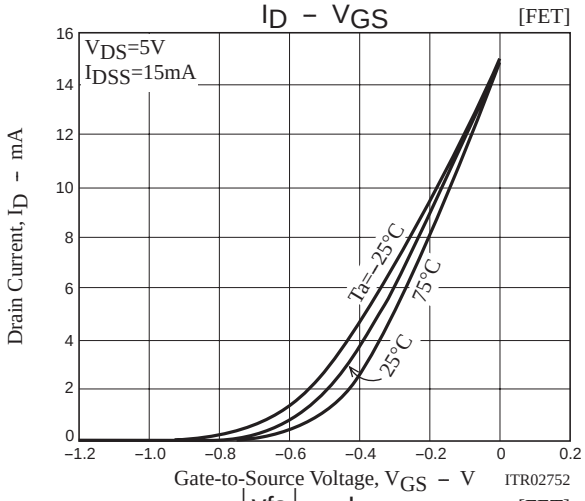


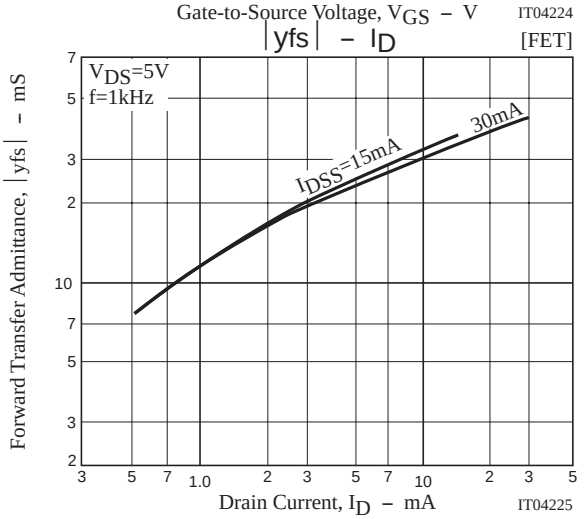
$10I_{B1}$= –$10I_{B2}$=I_C=10mA

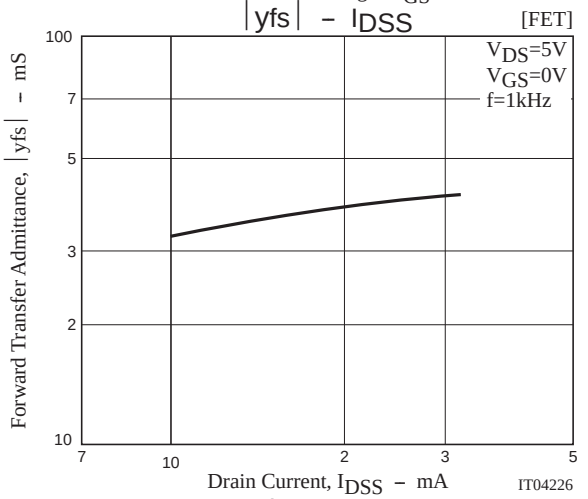

ID – VDS
[FET]
Drain Current, ID – mA
VGS=0V
–0.1V
–0.2V
–0.3V
–0.4V
–0.5V
–0.6V
–0.7V
Drain-to-Source Voltage, VDS – V
ITR02749

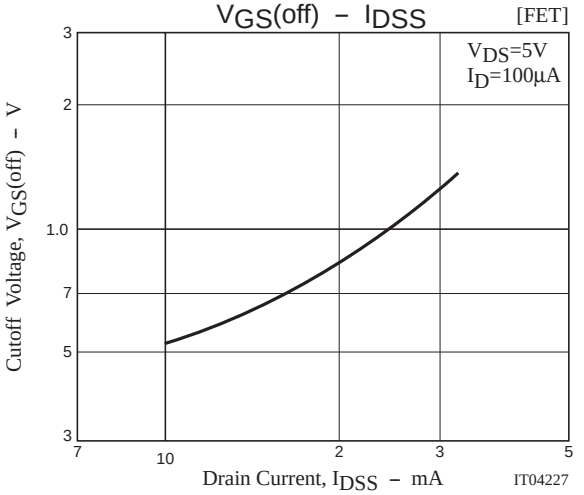

ID – VDS
[FET]
Drain Current, ID – mA
VGS=0V
–0.1V
–0.2V
–0.3V
–0.4V
–0.5V
–0.6V
–0.7V
Drain-to-Source Voltage, VDS – V
ITR02750

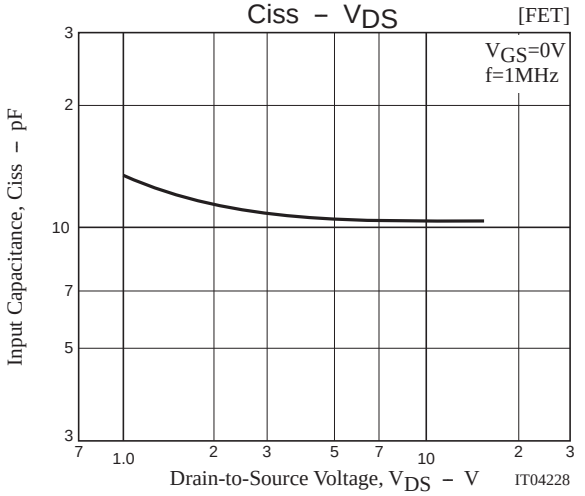

ID – VGS
[FET]
VDS=5V
Drain Current, ID – mA
IDSS=30mA
20mA
15mA
10mA
Gate-to-Source Voltage, VGS – V
IT04224


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

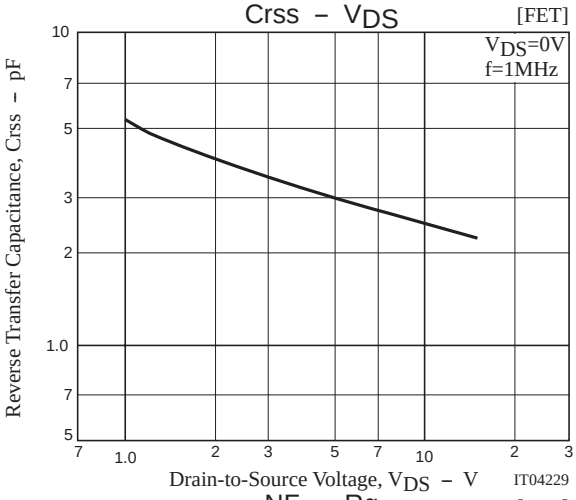

|yfs| – ID
[FET]
VDS=5V
f=1kHz
IDSS=15mA
30mA
Forward Transfer Admittance, |yfs| – mS
Drain Current, ID – mA
IT04225


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

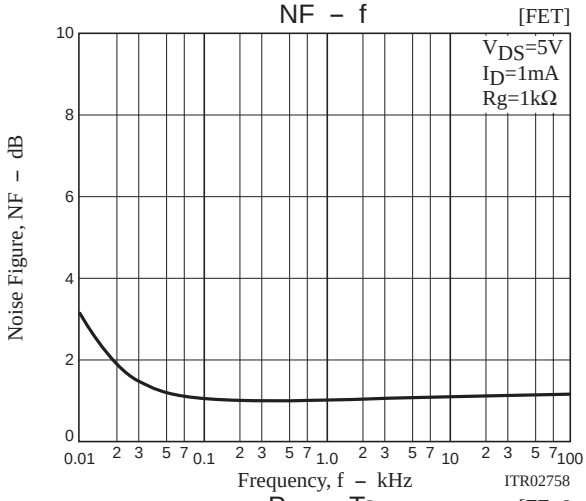

VGS(off) – IDSS
[FET]
VDS=5V
ID=100µA
Cutoff Voltage, VGS(off) – V
Drain Current, IDSS – mA
IT04227


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

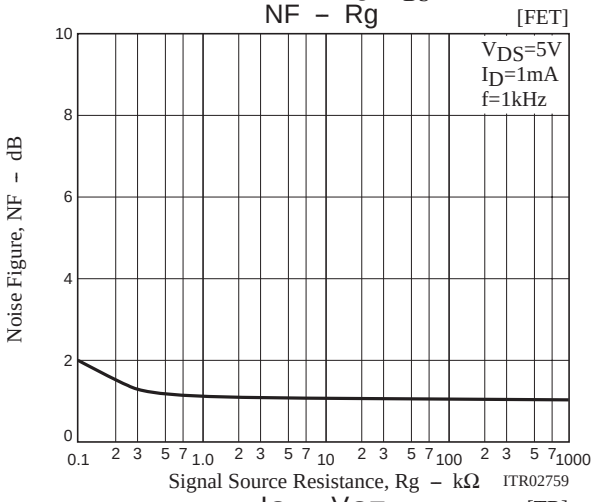
Crss – V_{DS} [FET]



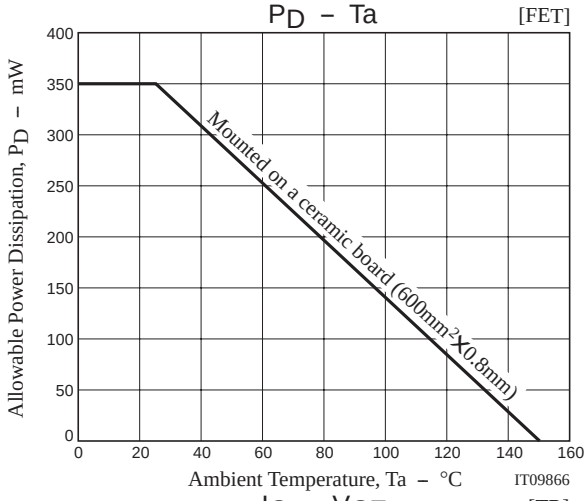
NF – f [FET]



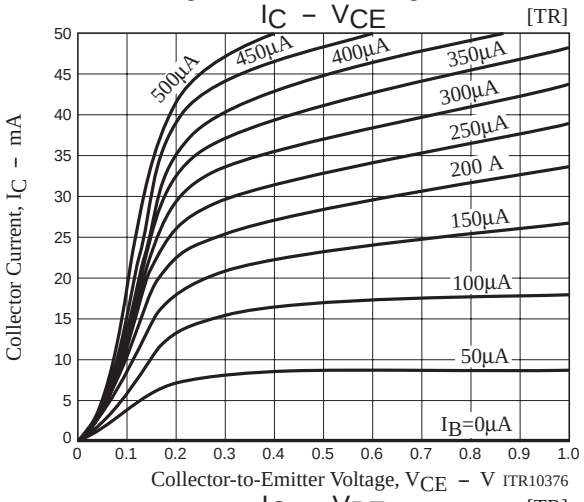
NF – Rg [FET]



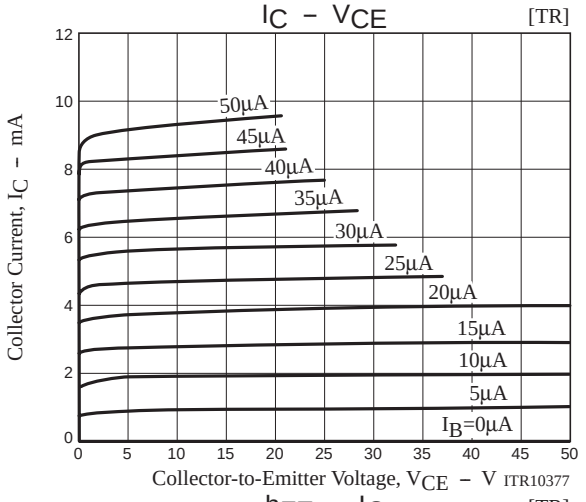
P_D – Ta [FET]



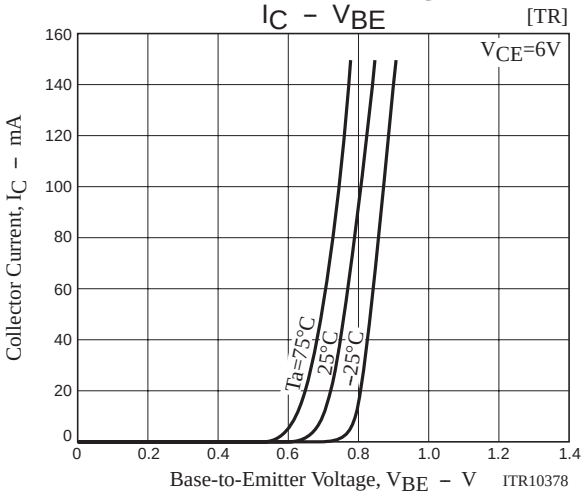
I_C – V_{CE} [TR]



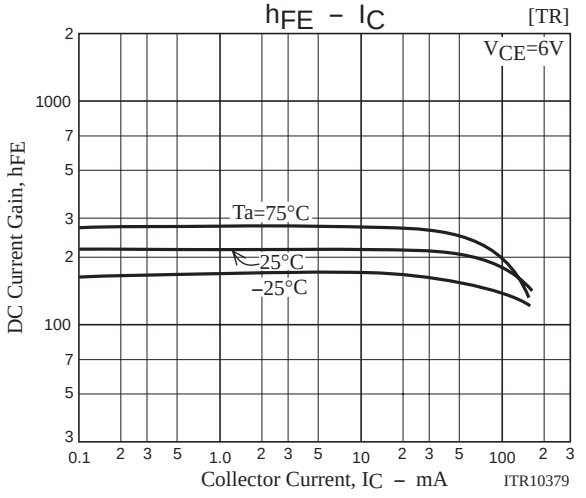
I_C – V_{CE} [TR]

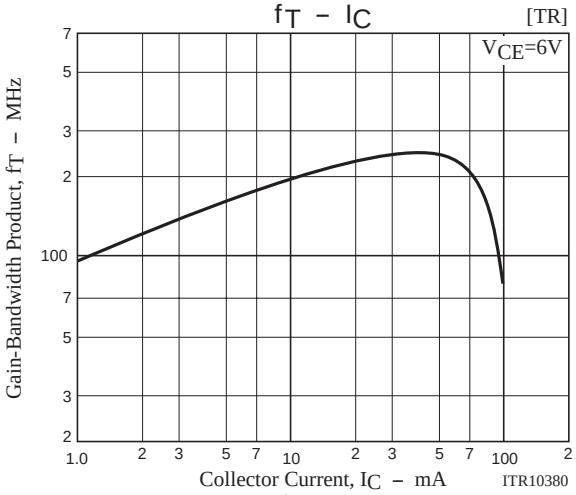


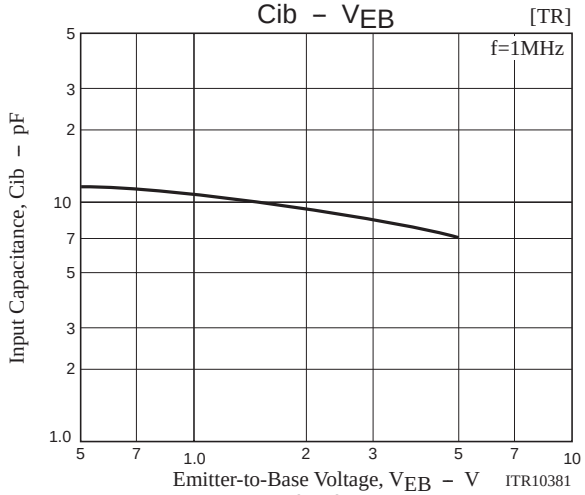
I_C – V_{BE} [TR]

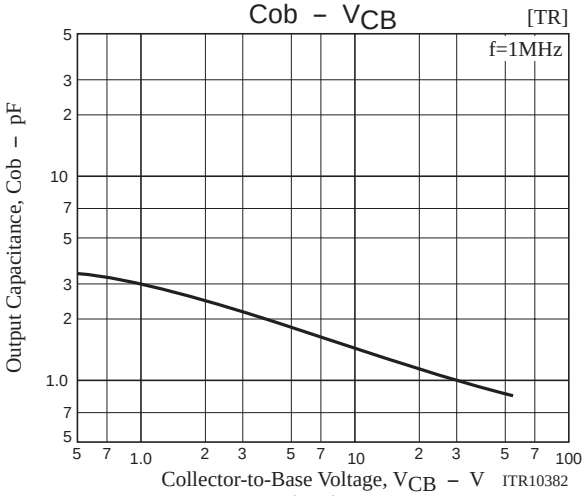


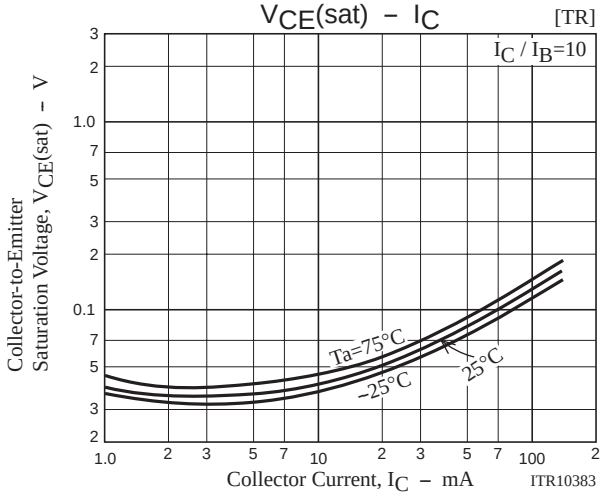
h_{FE} – I_C [TR]

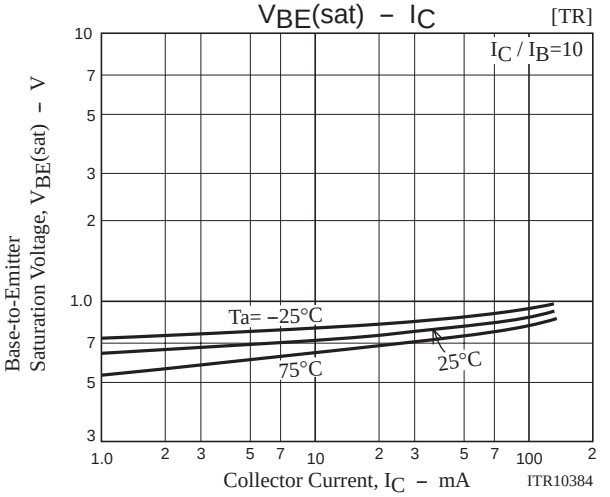


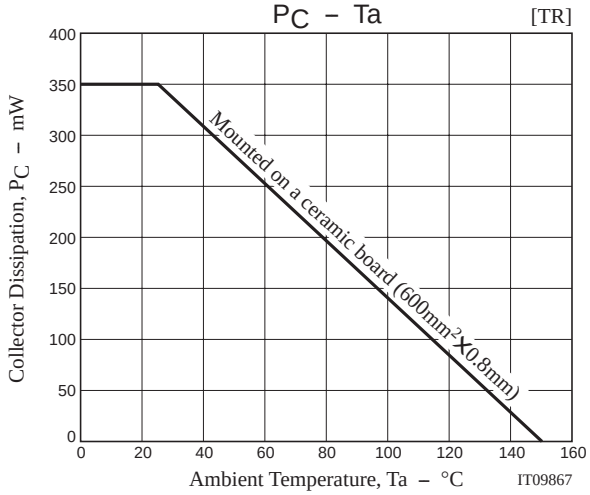

fT – IC
[TR]
VCE=6V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
ITR10380


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


Cob – VCB
[TR]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
ITR10382


VCE(sat) – IC
[TR]
IC / IB=10
Collector-to-Emitter Saturation Voltage, VCE(sat) – V
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
ITR10383


VBE(sat) – IC
[TR]
IC / IB=10
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Ta= –25°C
75°C
25°C
Collector Current, IC – mA
ITR10384


PC – Ta
[TR]
Collector Dissipation, PC – mW
Mounted on a ceramic board (600mm2×0.8mm)
Ambient Temperature, Ta – °C
IT09867

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