MCH5541

PNP/NPN Bipolar Transistor (–)30V, (–)700mA, V_{CE}(sat) ; (–220)190mV (max)

ON Semiconductor®

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Overview

MCH5541 is (–)30V, (–)700mA, V_{CE}(sat) ; (–220)190mV (max), PNP/NPN 2 in 1 type MCPH5, Bipolar Transistor.

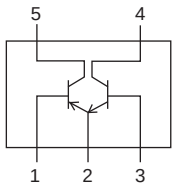
Features

- Composite type with a PNP / NPN transistor contained in one package, facilitating high-density mounting
- Ultrasmall package permitting applied sets to be small and slim. Package : SC-88AFL / MCPH5 (2.0 × 1.6 × 0.85 mm)

Typical Applications

- MOSFET gate drivers
- Relay drivers
- Lamp drivers
- Motor drivers

Electrical Connection



1 : Base1
2 : Emitter Common
3 : Base2
4 : Collector2
5 : Collector1

Top view

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

SPECIFICATIONS ( ) : PNP

ABSOLUTE MAXIMUM RATINGS at Ta = 25°C (Note 1)

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		(–30) 40	V
Collector-to-Emitter Voltage	V_{CEO}		(–30) 30	V
Emitter-to Base Voltage	V_{EBO}		(–) 5	V
Collector Current	I_C		(–) 700	mA
Collector Current (Pulse)	I_{CP}	PW ≤ 10μs	(–) 3	A
Collector Dissipation	P_C	Mounted on a ceramic board (600mm^2 x 0.8m)	0.5	W
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Note 1 : Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS at Ta = 25°C (Note 2)

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=(–)30V, I_E=0			(–) 100	nA
Emitter Cutoff Current	I_{EBO}	V_{EB}=(–)4V, I_C=0			(–) 100	nA
DC Current Gain	h_{FE}	V_{CE}=(–)2V, I_C=(–10)50mA	(200) 300		(500) 800	
Gain-Bandwidth Product	f_T	V_{CE}=(–)2V, I_C=(–)50mA		(520) 540		MHz
Output Capacitance	Cob	V_{CB}=(–)10V, f=1MHz		(4.7) 3.3		pF
Collector-to-Emitter Saturation Voltage	V_{CE}(sat)	I_C=(–)200mA, I_B=(–)10mA		(–110) 85	(–220) 190	mV
Base-to-Emitter Saturation Voltage	V_{BE}(sat)	I_C=(–)200mA, I_B=(–)10mA		(–) 0.9	(–) 1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)}$CBO	I_C=(–)10μA, I_E=0	(–30) 40			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)}$CEO	I_C=(–)1mA, R_{BE}=∞	(–) 30			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)}$EBO	I_E=(–)10μA, I_C=0	(–) 5			V

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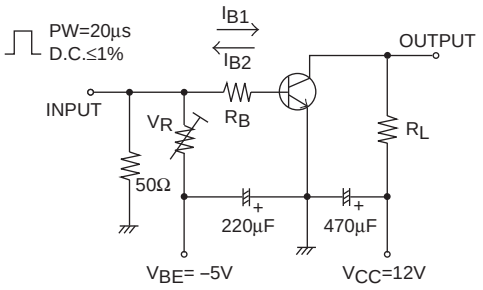
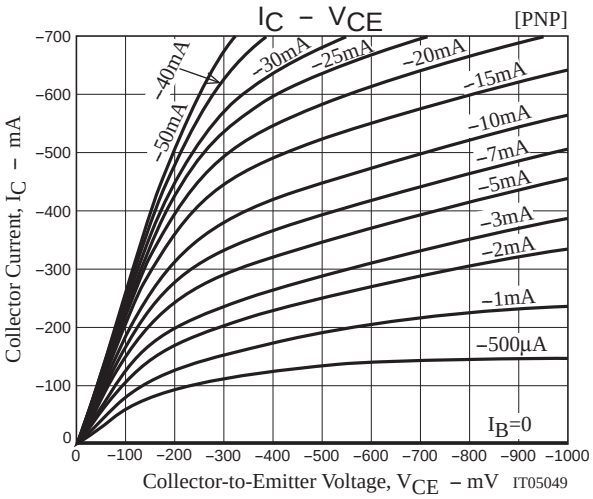
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Time	ton	See specified Test Circuit.		35		ns
Storage Time	tstg	See specified Test Circuit.		(125) 255		ns
Fall Time	t_f	See specified Test Circuit.		(25) 40		ns

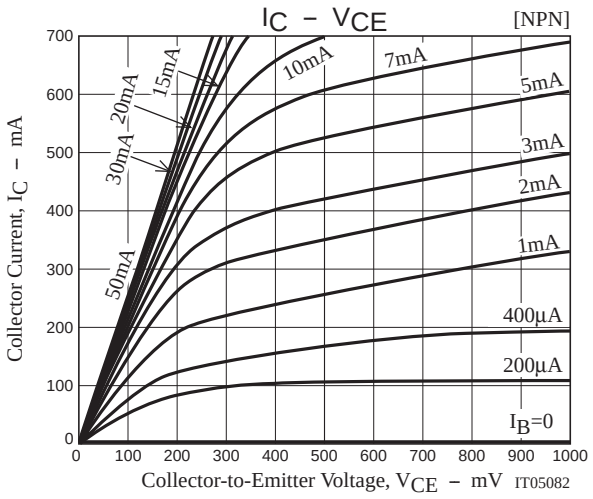
Note 2 : Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

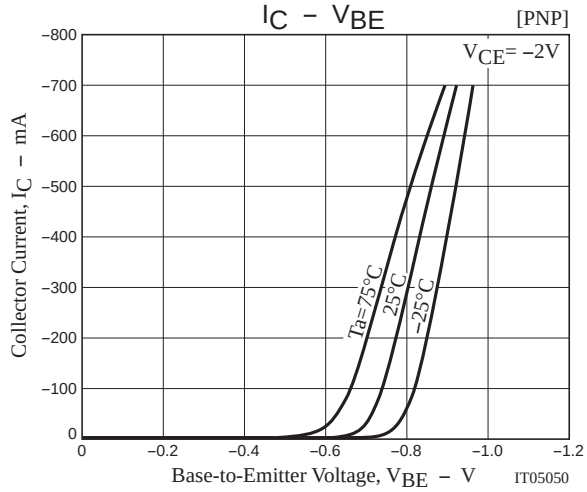
Switching Time Test Circuit

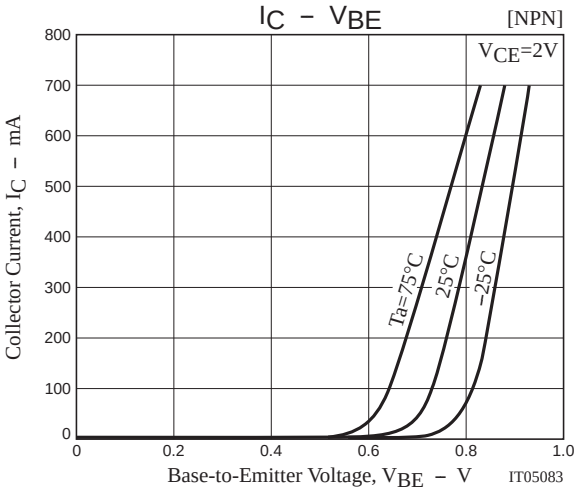


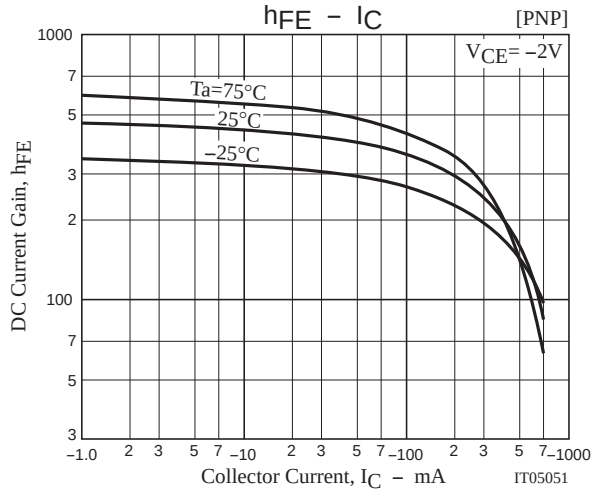
$20I_{B1}= -20I_{B2}=I_C=300mA$
For PNP, minus sign is omitted.

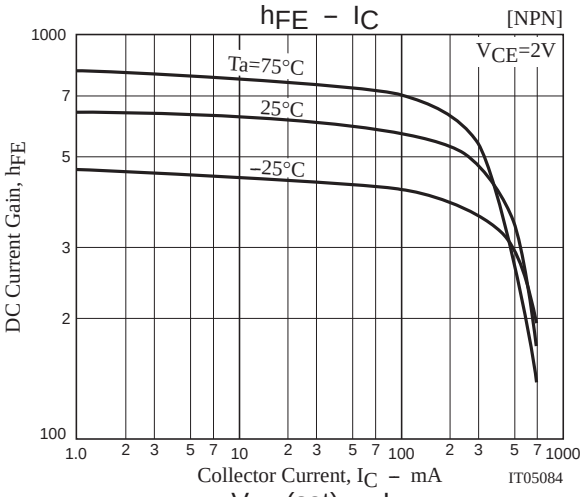


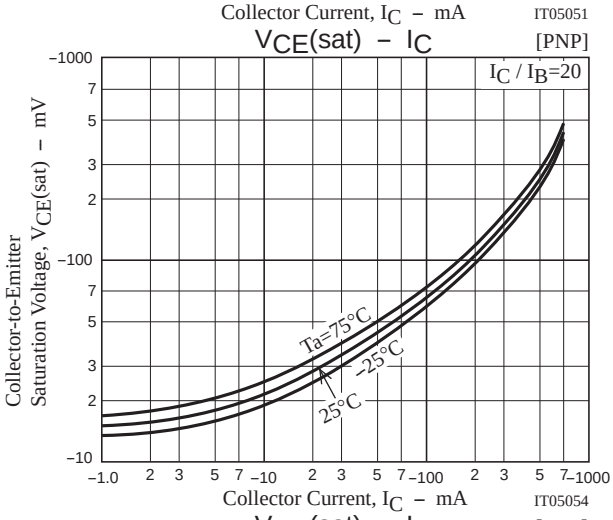


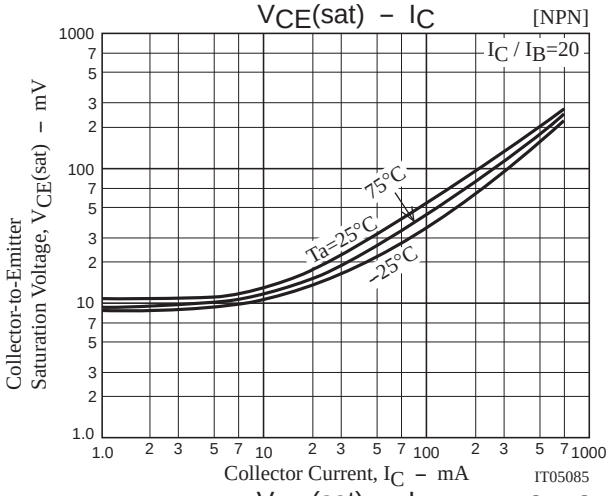

IC – VBE [PNP]
VCE= –2V
Collector Current, IC – mA
Ta=75°C
25°C
–25°C
Base-to-Emitter Voltage, VBE – V
IT05050

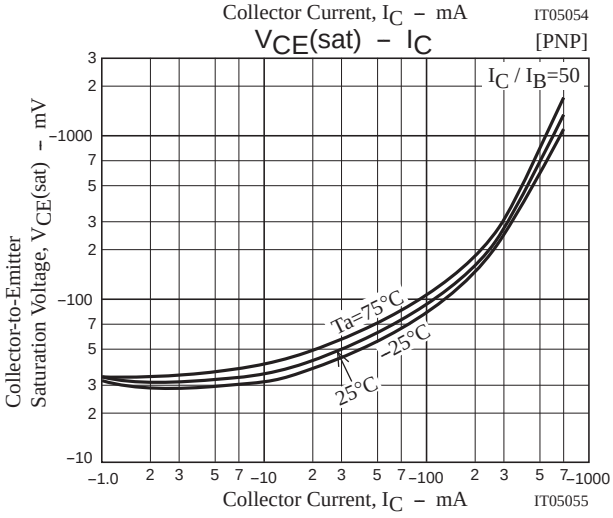

IC – VBE [NPN]
VCE=2V
Collector Current, IC – mA
Ta=75°C
25°C
–25°C
Base-to-Emitter Voltage, VBE – V
IT05083

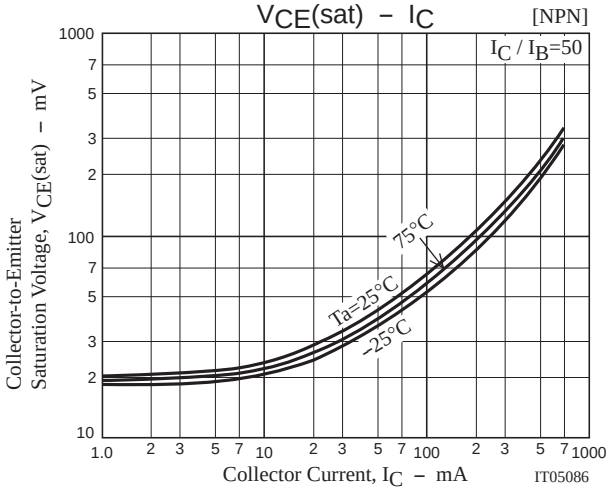

hFE – IC [PNP]
VCE= –2V
DC Current Gain, hFE
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
IT05051

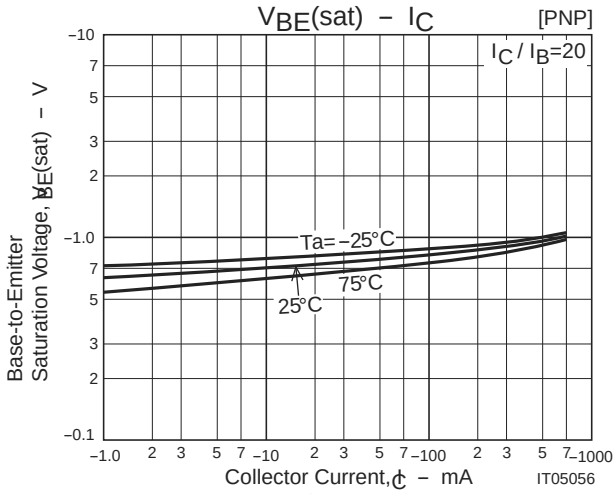

hFE – IC [NPN]
VCE=2V
DC Current Gain, hFE
Ta=75°C
25°C
–25°C
Collector Current, IC – mA
IT05084

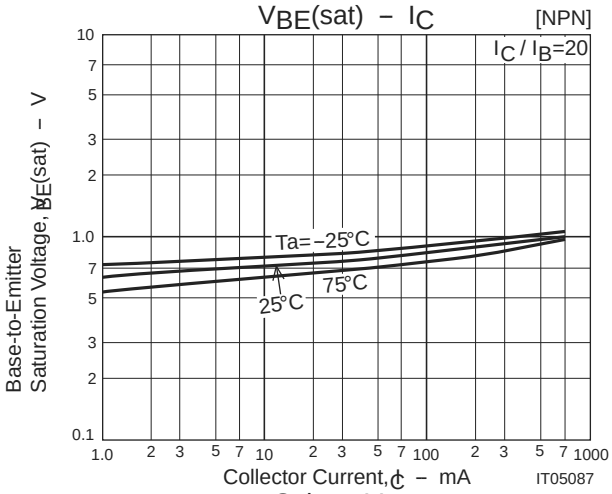

VCE(sat) – IC [PNP]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Ta=75°C
–25°C
25°C
Collector Current, IC – mA
IT05054

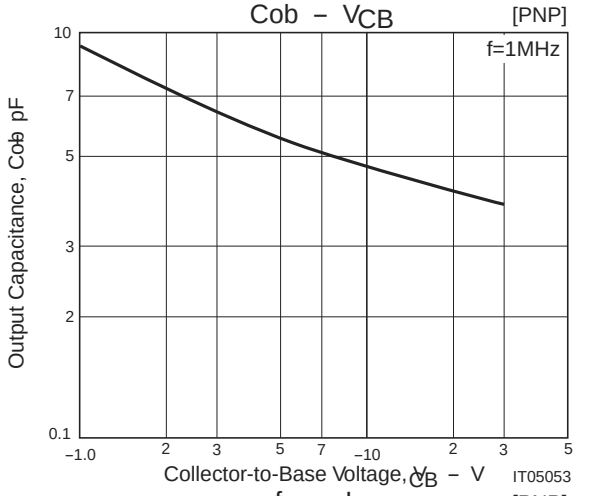

VCE(sat) – IC [NPN]
IC / IB=20
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
75°C
Ta=25°C
–25°C
Collector Current, IC – mA
IT05085

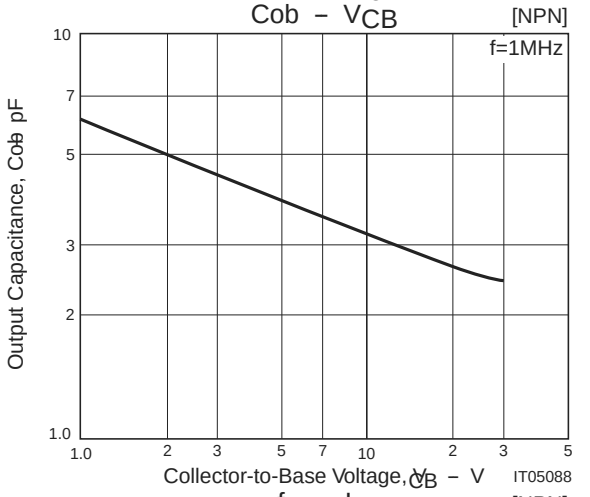

VCE(sat) – IC [PNP]
IC / IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
Ta=75°C
–25°C
25°C
Collector Current, IC – mA
IT05055

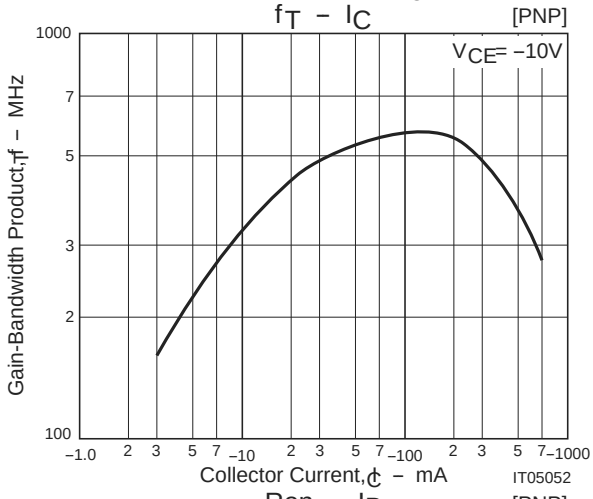

VCE(sat) – IC [NPN]
IC / IB=50
Collector-to-Emitter Saturation Voltage, VCE(sat) – mV
75°C
Ta=25°C
–25°C
Collector Current, IC – mA
IT05086

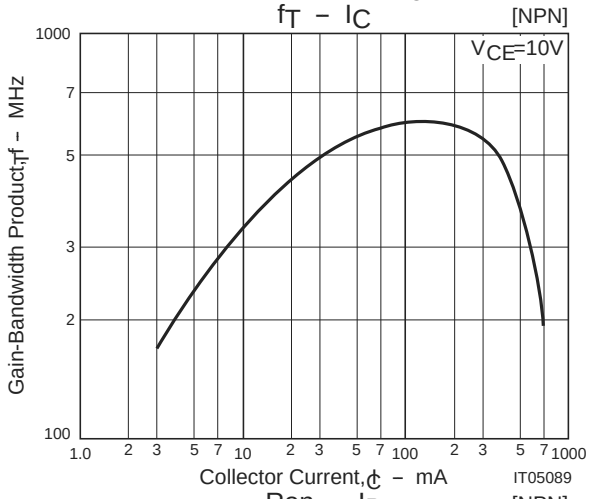

VBE(sat) – IC
[PNP]
IC / IB=20
Ta=–25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05056

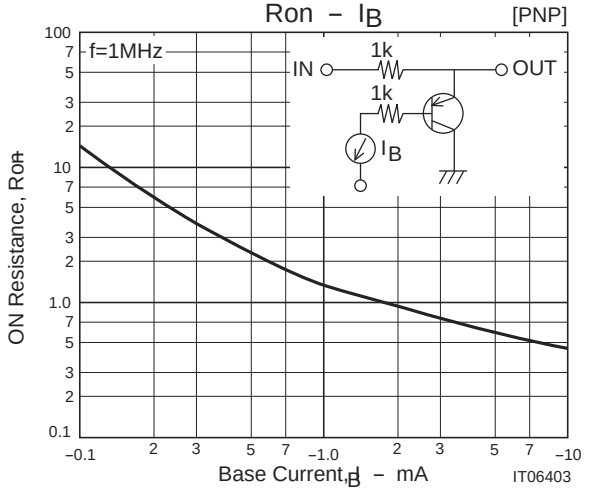

VBE(sat) – IC
[NPN]
IC / IB=20
Ta=–25°C
75°C
25°C
Base-to-Emitter Saturation Voltage, VBE(sat) – V
Collector Current, IC – mA
IT05087

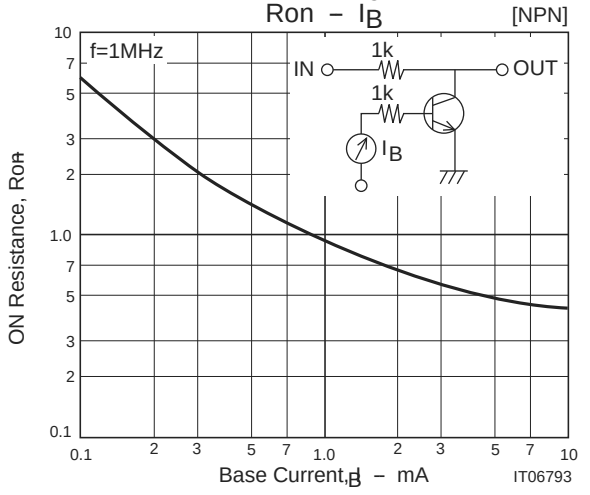

Cob – VCB
[PNP]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05053

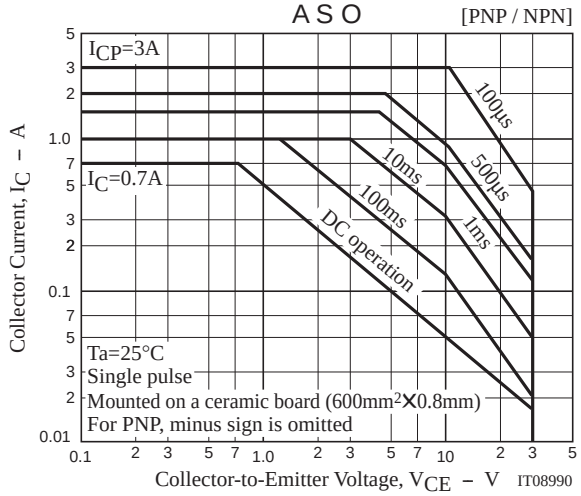

Cob – VCB
[NPN]
f=1MHz
Output Capacitance, Cob – pF
Collector-to-Base Voltage, VCB – V
IT05088

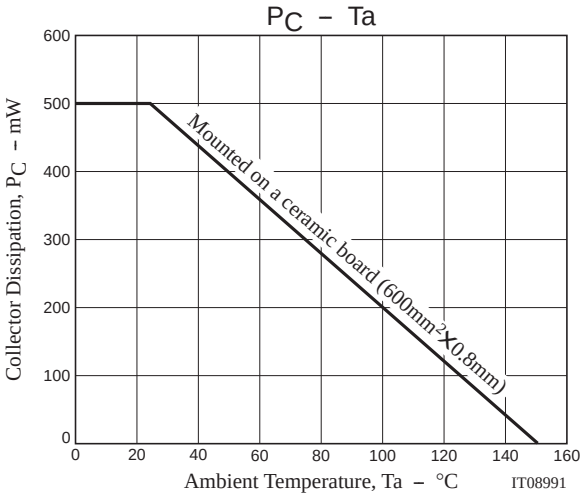

fT – IC
[PNP]
VCE= –10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05052


fT – IC
[NPN]
VCE=10V
Gain-Bandwidth Product, fT – MHz
Collector Current, IC – mA
IT05089


Ron – IB
[PNP]
f=1MHz
IN
1k
1k
OUT
IB
ON Resistance, Ron
Base Current, IB – mA
IT06403


Ron – IB
[NPN]
f=1MHz
IN
1k
1k
OUT
IB
ON Resistance, Ron
Base Current, IB – mA
IT06793





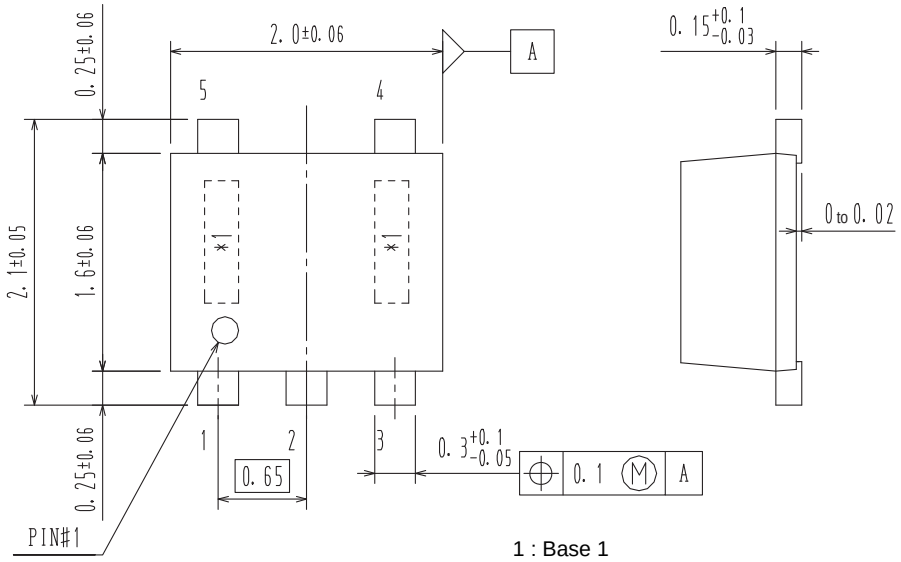
PACKAGE DIMENSIONS

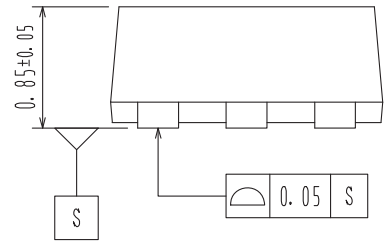
unit : mm

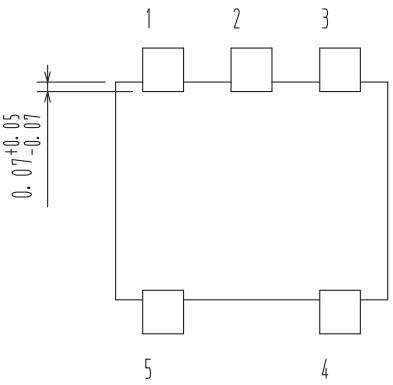
SC-88AFL / MCPH5

CASE 419AP

ISSUE O







ORDERING INFORMATION

Device	Marking	Package	Shipping (Qty / Packing)
MCH5541-TL-E	E1	SC-88AFL / MCPH5 (Pb-Free)	3000 / Tape & Reel

† For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D. http://www.onsemi.com/pub_link/Collateral/BRD8011-D.PDF