



# MCH5541

PNP / NPN Epitaxial Planar Silicon Transistor

## Push-Pull Circuit Applications

### Applications

- MOSFET gate drivers, relay drivers, lamp drivers, motor drivers.

### 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.

### Specifications ( ) : PNP

#### Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V <sub>CB0</sub>		(-30)40	V
Collector-to-Emitter Voltage	V <sub>CEO</sub>		(-30)30	V
Emitter-to-Base Voltage	V <sub>EBO</sub>		(-)5	V
Collector Current	I <sub>C</sub>		(-)700	mA
Collector Current (Pulse)	I <sub>CP</sub>	PW≤10μs	(-)3	A
Collector Dissipation	P <sub>C</sub>	Mounted on a ceramic board (600mm <sup>2</sup> X0.8m)	0.5	W
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C

#### Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> =(-)30V, I <sub>E</sub> =0			(-)100	nA
Emitter Cutoff Current	I <sub>EBO</sub>	V <sub>EB</sub> =(-)4V, I <sub>C</sub> =0			(-)100	nA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)50mA	(200)300		(500)800	
Gain-Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> =(-)2V, I <sub>C</sub> =(-)50mA		(520)540		MHz
Output Capacitance	C <sub>ob</sub>	V <sub>CB</sub> =(-)10V, f=1MHz		(4.7)3.3		pF
Collector-to-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> =(-)200mA, I <sub>B</sub> =(-)10mA		(-110)85	(-220)190	mV
Base-to-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	I <sub>C</sub> =(-)200mA, I <sub>B</sub> =(-)10mA		(-)0.9	(-)1.2	V
Collector-to-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	I <sub>C</sub> =(-)10μA, I <sub>E</sub> =0	(-30)40			V
Collector-to-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	I <sub>C</sub> =(-)1mA, R <sub>BE</sub> =∞	(-)30			V
Emitter-to-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	I <sub>E</sub> =(-)10μA, I <sub>C</sub> =0	(-)5			V

Marking : E1

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# MCH5541

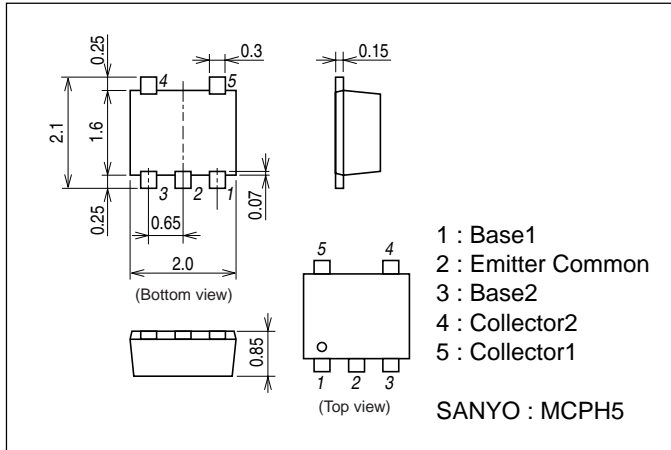
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Turn-ON Time	$t_{on}$	See specified Test Circuit.		35		ns
Storage Time	$t_{stg}$	See specified Test Circuit.		(125)255		ns
Fall Time	$t_f$	See specified Test Circuit		(25)40		ns

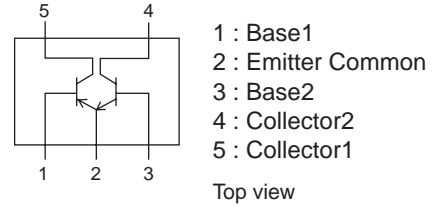
## Package Dimensions

unit : mm

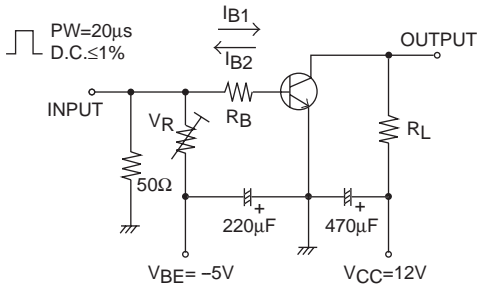
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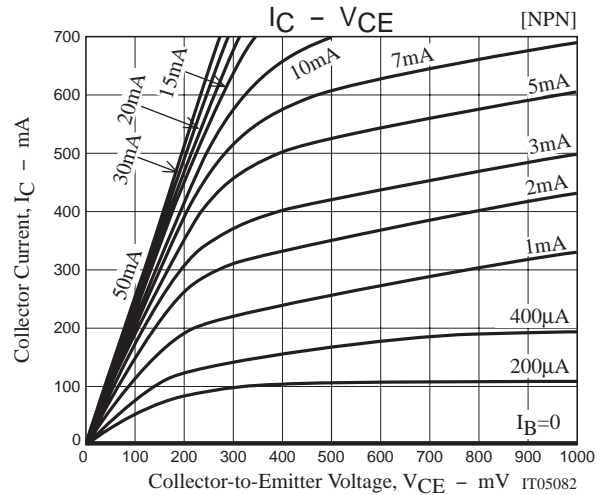
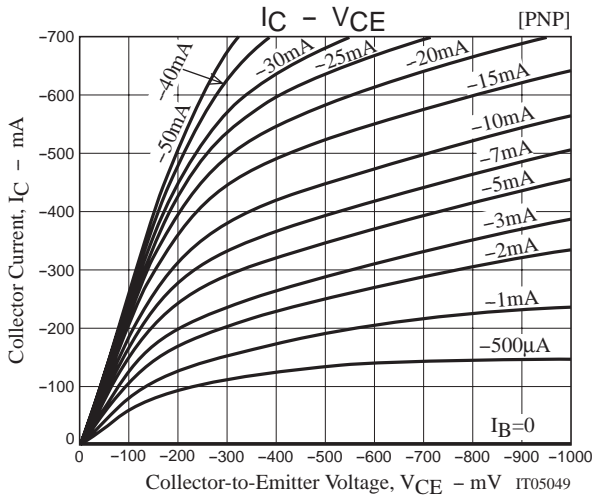
## Electrical Connection



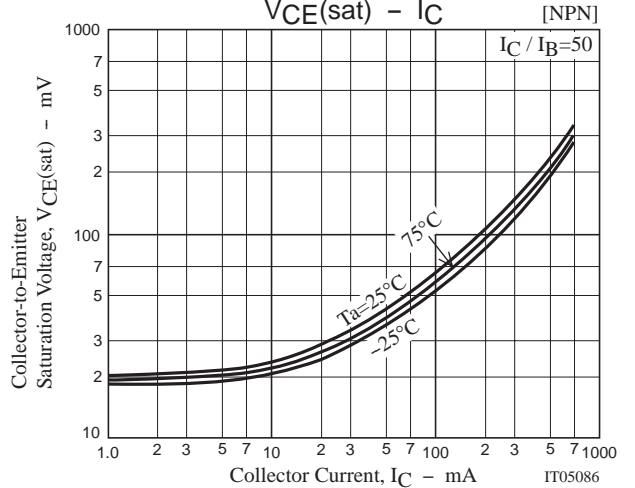
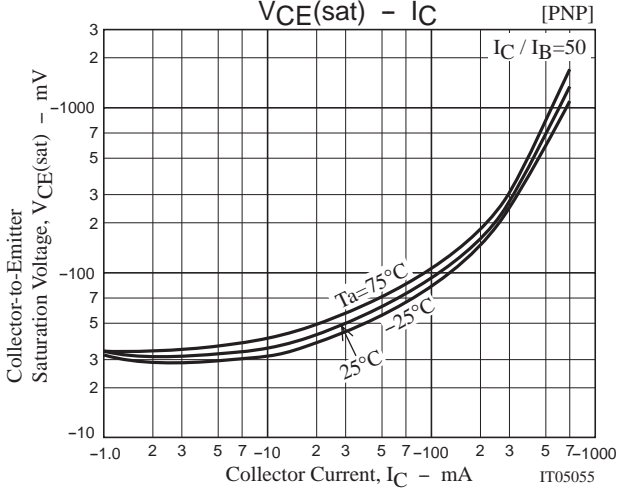
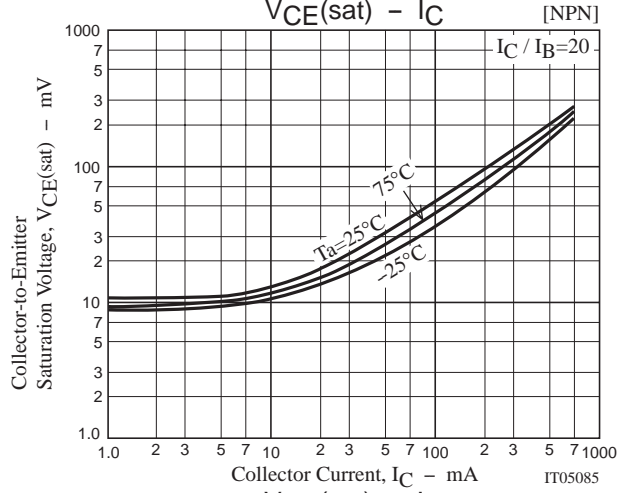
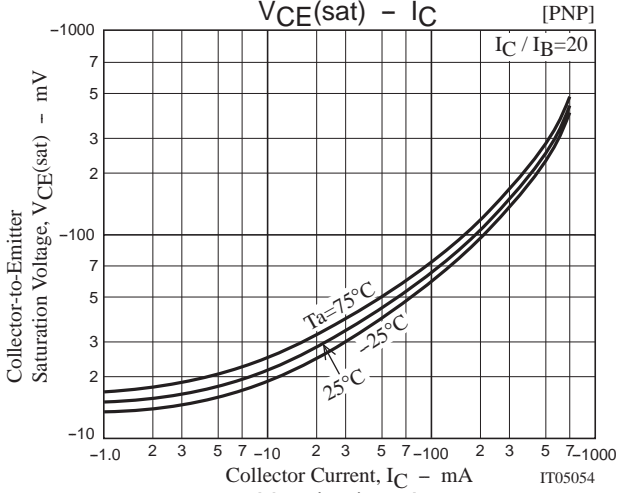
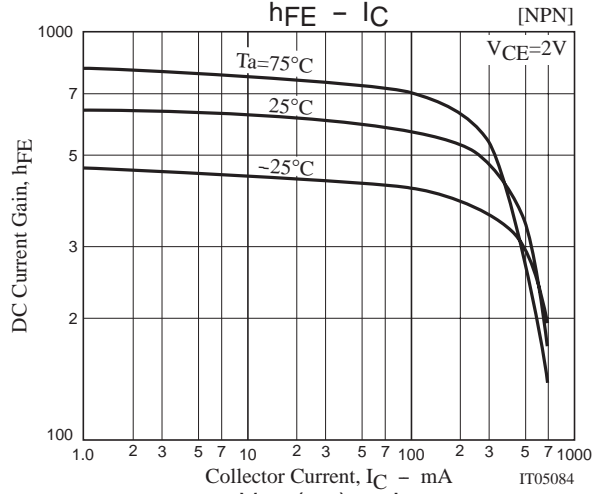
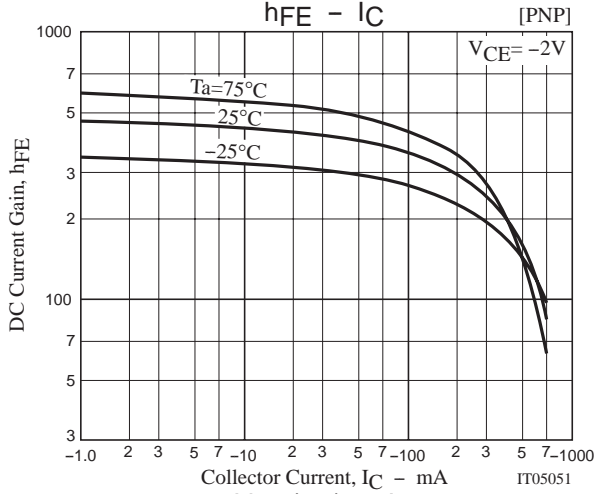
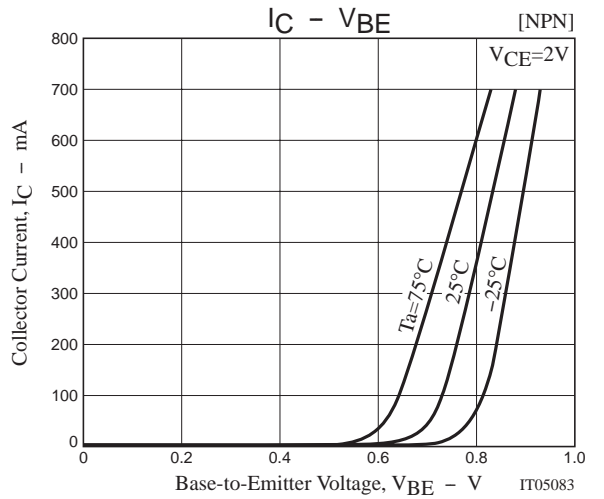
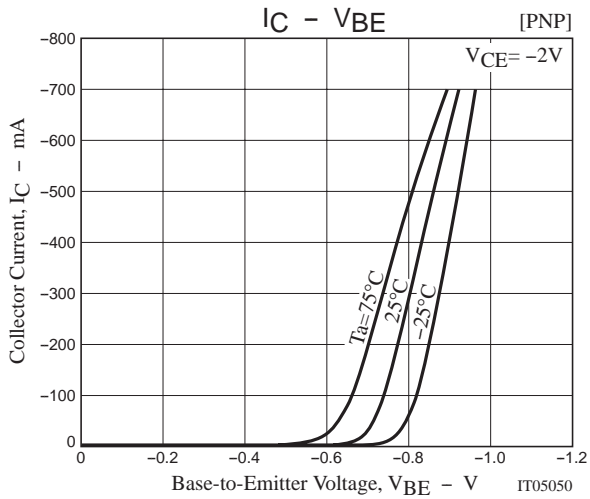
## Switching Time Test Circuit



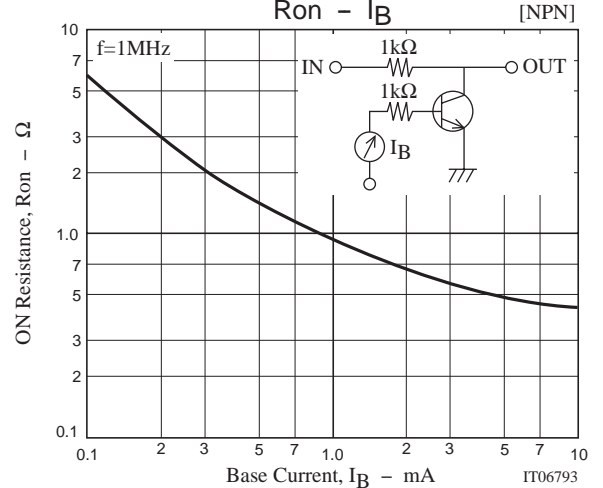
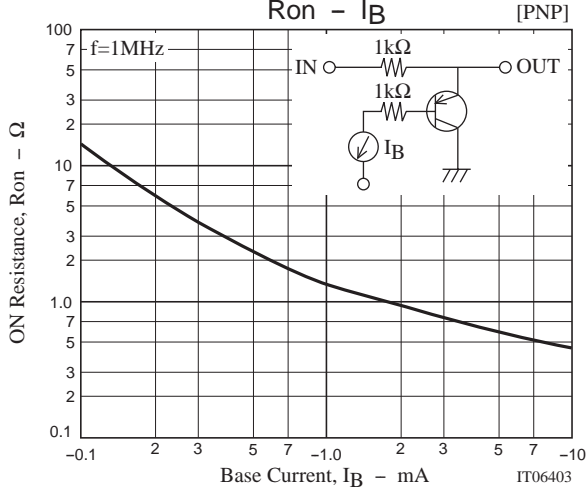
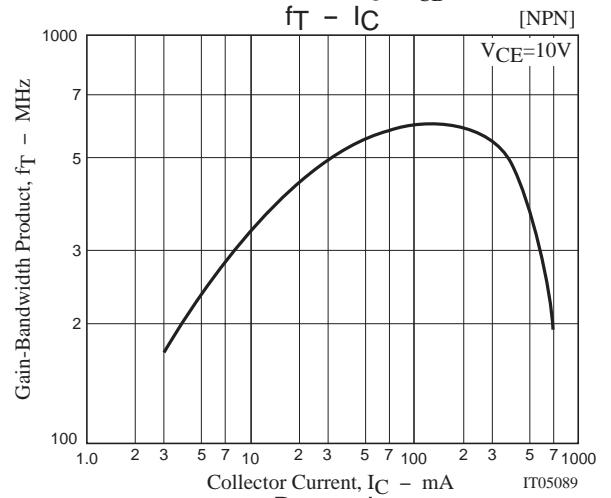
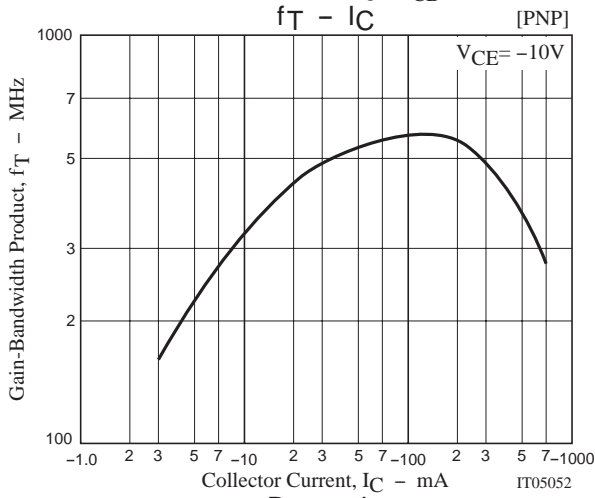
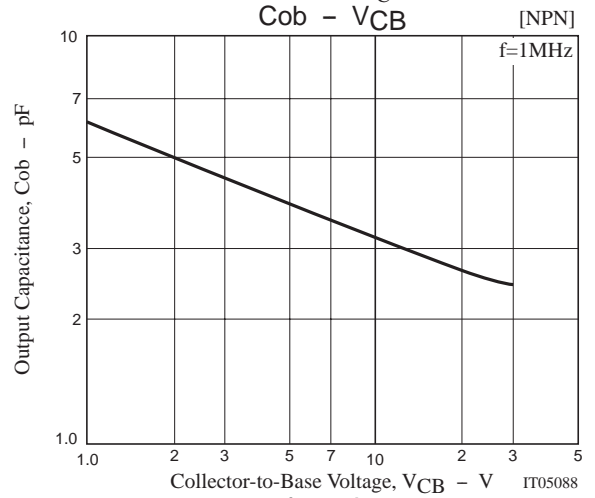
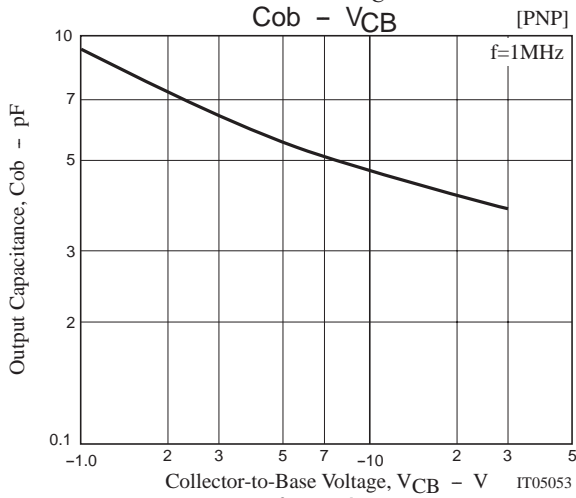
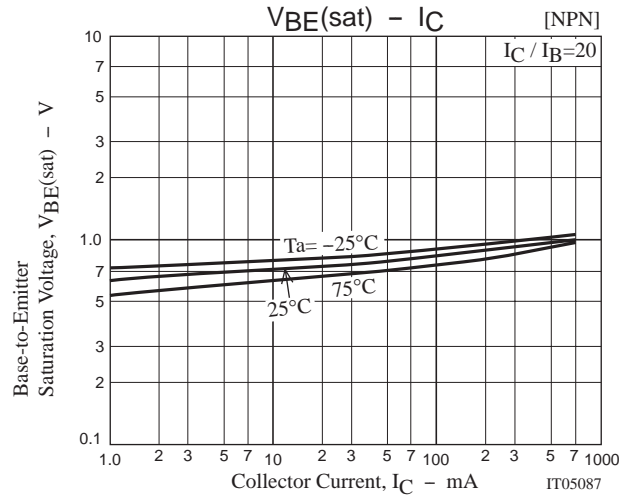
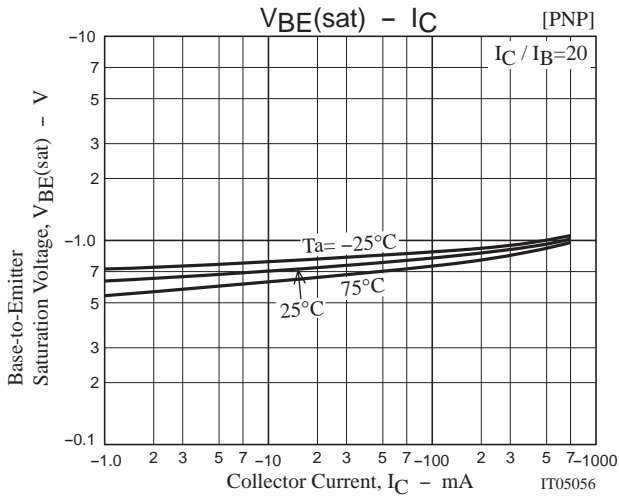
$20I_{B1} = -20I_{B2} = I_C = 300\text{mA}$   
 For PNP, minus sign is omitted.



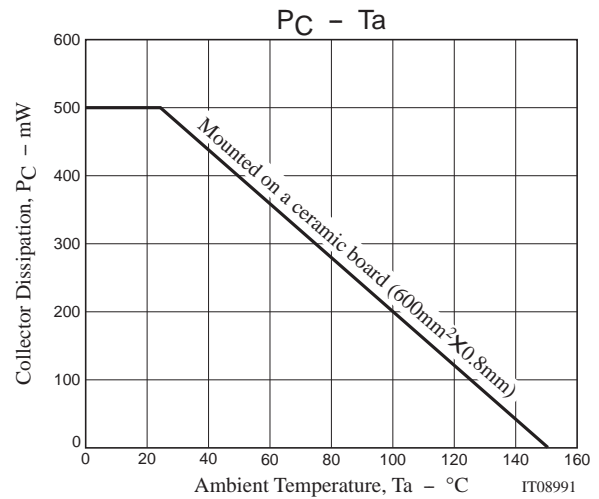
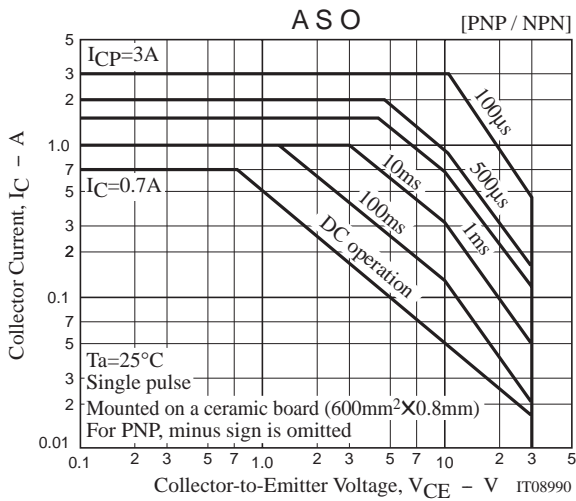
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# MCH5541



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