



SANYO Semiconductors

DATA SHEET

An ON Semiconductor Company

2SA2039/2SC5706 — PNP/NPN Epitaxial Planar Silicon Transistor

High-Current Switching Applications

Applications

- DC / DC converter, relay drivers, lamp drivers, motor drivers, flash

Features

- Adoption of FBET and MBIT processes
- Large current capacitance
- Low collector-to-emitter saturation voltage
- High-speed switching
- High allowable power dissipation

Specifications () : 2SA2221

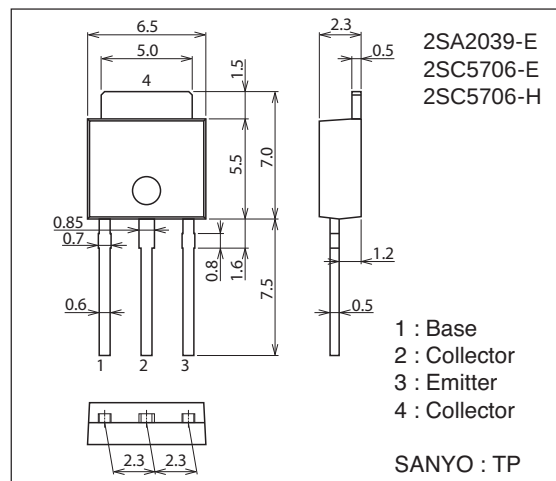
Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	VCBO		(-50)100	V
Collector-to-Emitter Voltage	VCES		(-50)100	V
Collector-to-Emitter Voltage	VCEO		(-)50	V
Emitter-to-Base Voltage	VEBO		(-)6	V
Collector Current	IC		(-)5	A
Collector Current (Pulse)	ICP		(-)7.5	A

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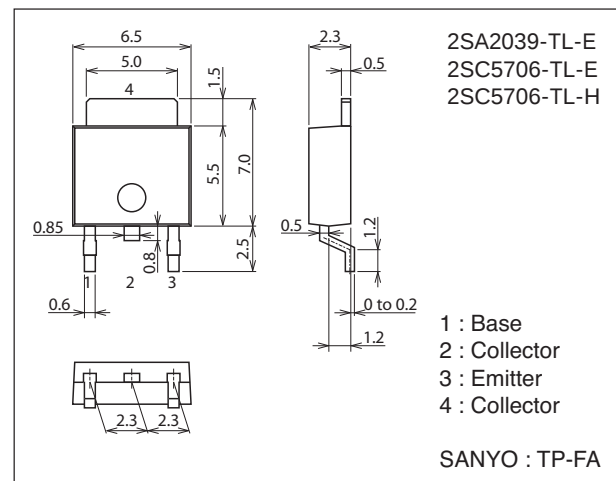
Package Dimensions unit : mm (typ)

7518-003



Package Dimensions unit : mm (typ)

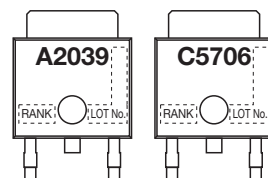
7003-003



Product & Package Information

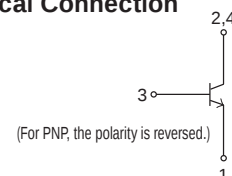
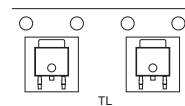
- Package : TP
- JEITA, JEDEC : SC-64, TO-251, SOT-553, DPAK
- Minimum Packing Quantity : 500 pcs./bag

Marking (TP, TP-FA)



- Package : TP-FA
- JEITA, JEDEC : SC-63, TO-252, SOT-428, DPAK
- Minimum Packing Quantity : 700 pcs./reel

Packing Type (TP-FA) : TL Electrical Connection



SANYO Semiconductor Co., Ltd.

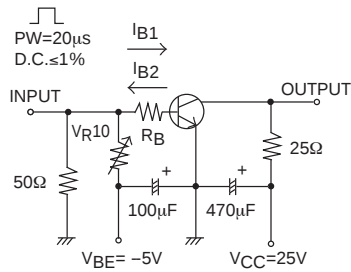
<http://semicon.sanyo.com/en/network>

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Parameter	Symbol	Conditions	Ratings	Unit
Base Current	I_B		(-)1.2	A
Collector Dissipation	P_C		0.8	W
		$T_C=25^{\circ}\text{C}$	15	W
Junction Temperature	T_J		150	$^{\circ}\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^{\circ}\text{C}$

Electrical Characteristics at $T_a=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=(-)40\text{V}, I_E=0\text{A}$			(-)1	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=(-)4\text{V}, I_C=0\text{A}$			(-)1	μA
DC Current Gain	h_{FE}	$V_{CE}=(-)2\text{V}, I_C=(-)500\text{mA}$	200		560	
Gain-Bandwidth Product	f_T	$V_{CE}=(-)10\text{V}, I_C=(-)500\text{mA}$		(360)400		MHz
Output Capacitance	C_{ob}	$V_{CB}=(-)10\text{V}, f=1\text{MHz}$		(24)15		pF
Collector-to-Emitter Saturation Voltage	$V_{CE(sat)1}$	$I_C=(-)1\text{A}, I_B=(-)50\text{mA}$		(-115)90	(-195)135	mV
	$V_{CE(sat)2}$	$I_C=(-)2\text{A}, I_B=(-)100\text{mA}$		(-255)160	(-430)240	mV
Base-to-Emitter Saturation Voltage	$V_{BE(sat)}$	$V_{CE}=(-)2\text{V}, I_B=(-)100\text{mA}$		(-)0.89	(-)1.2	V
Collector-to-Base Breakdown Voltage	$V_{(BR)CBO}$	$I_C=(-)10\mu\text{A}, I_E=0\text{A}$	(-50)100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CES}$	$I_C=(-)100\mu\text{A}, R_{BE}=0\Omega$	(-50)100			V
Collector-to-Emitter Breakdown Voltage	$V_{(BR)CEO}$	$I_C=(-)1\text{mA}, R_{BE}=\infty$	(-)50			V
Emitter-to-Base Breakdown Voltage	$V_{(BR)EBO}$	$I_E=(-)10\mu\text{A}, I_C=0\text{A}$	(-)6			V
Turn-On Time	t_{on}	See specified Test Circuit.		(30)35		ns
Storage Time	t_{stg}			(230)300		ns
Fall Time	t_f			(15)20		ns

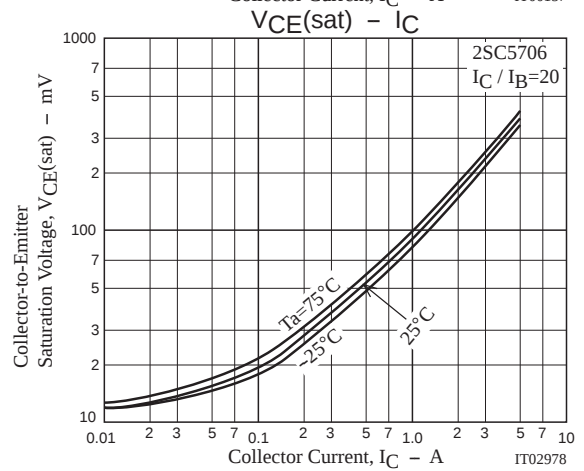
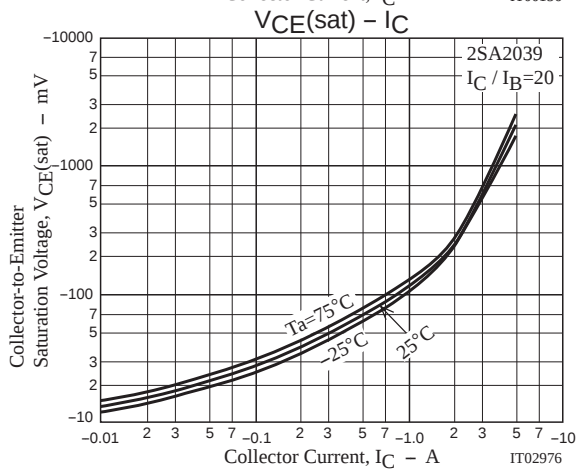
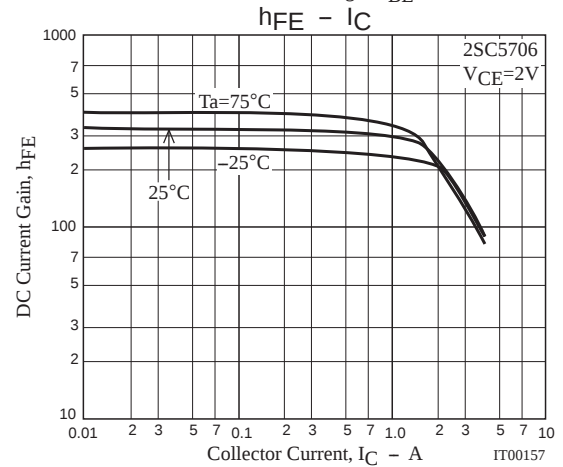
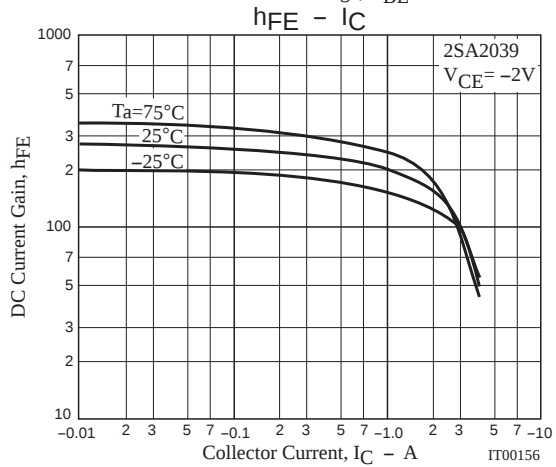
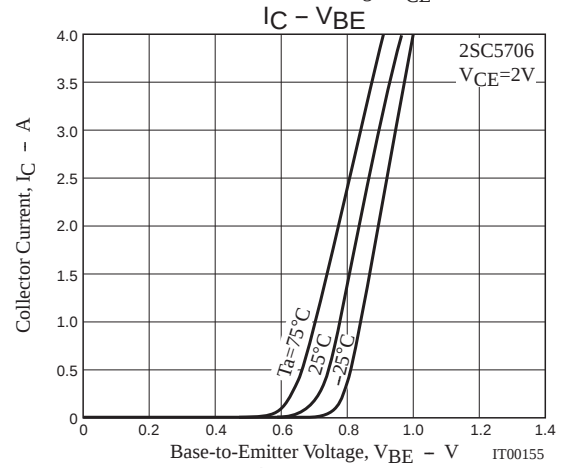
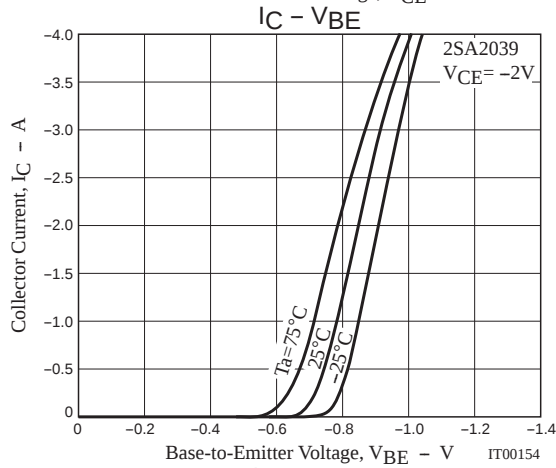
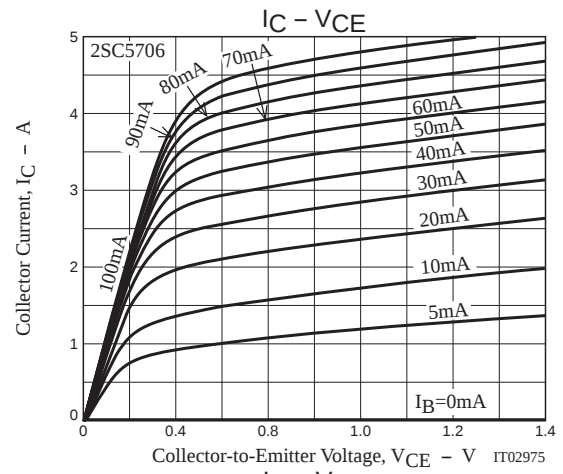
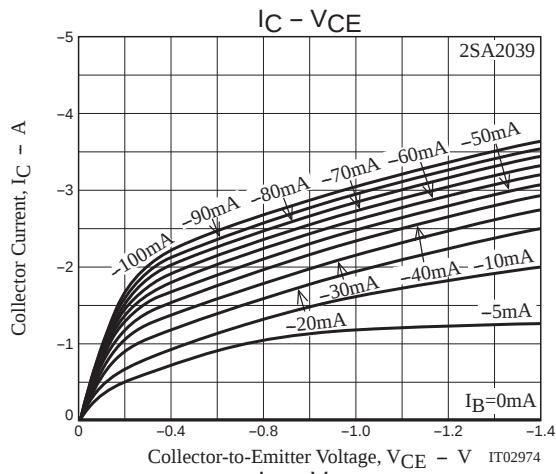
Switching Time Test Circuit

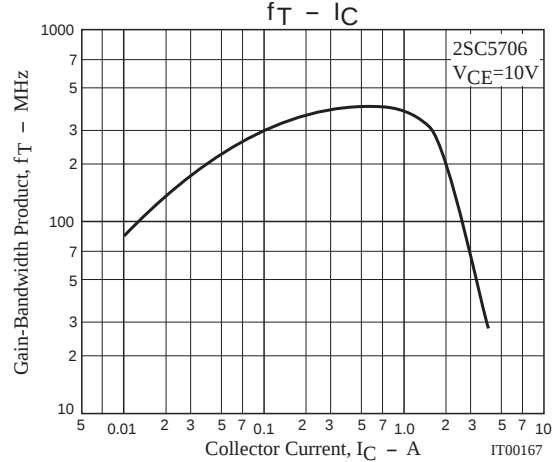
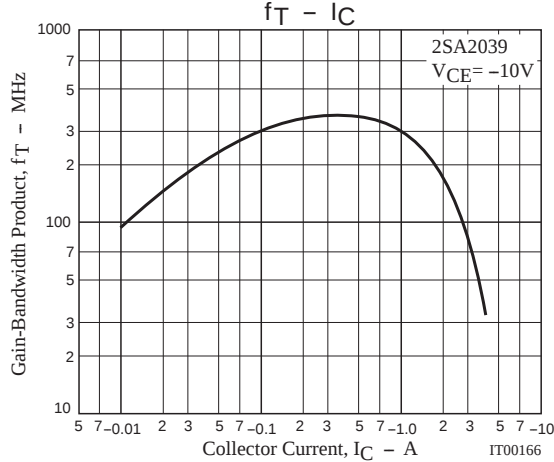
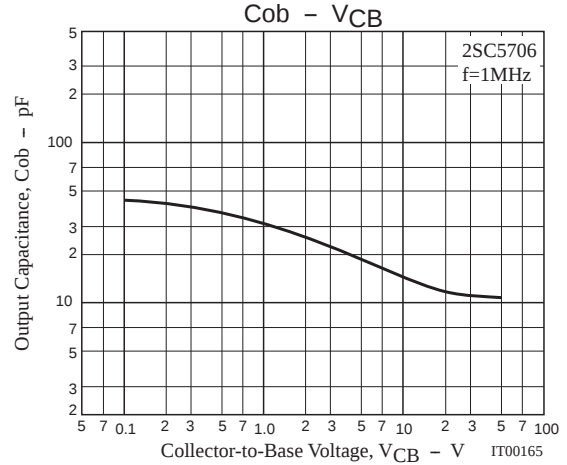
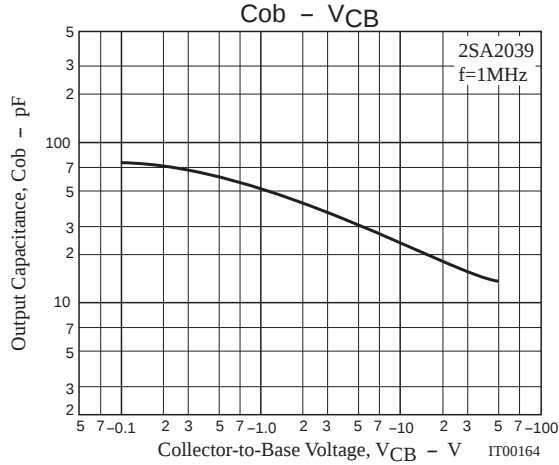
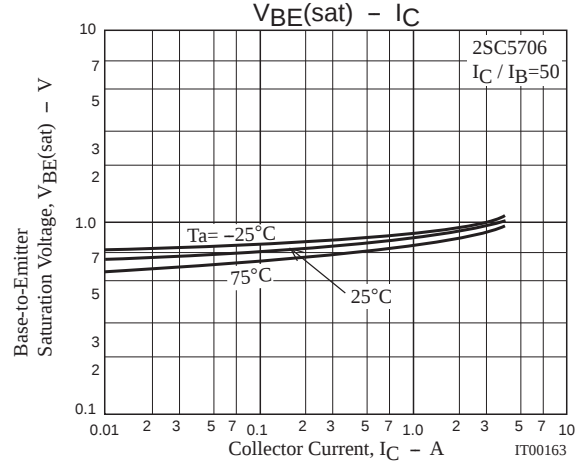
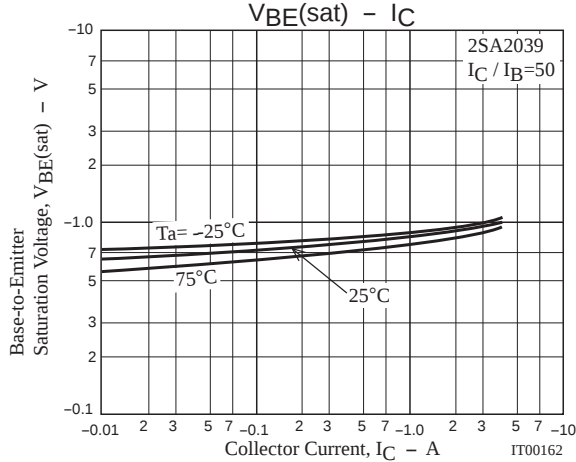
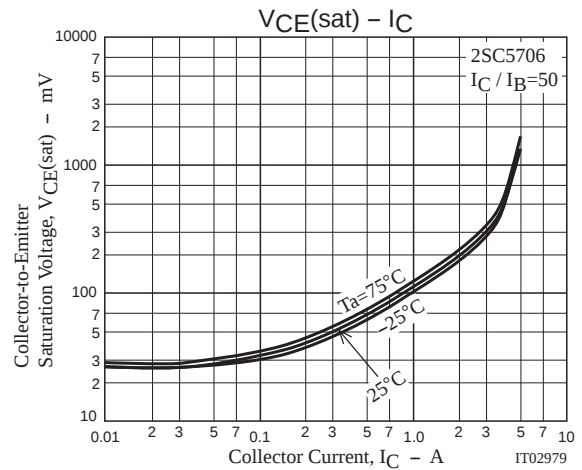
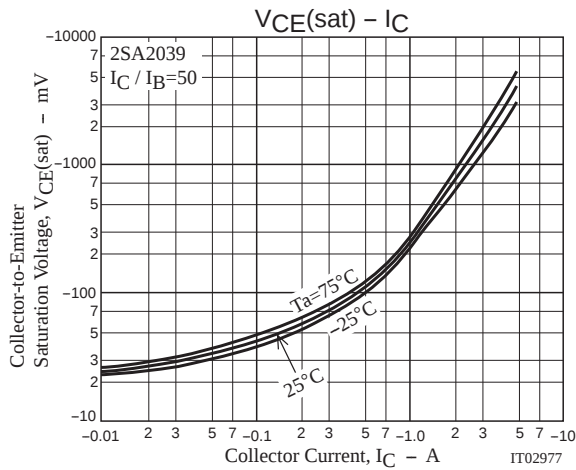
$$10I_{B1} = -10I_{B2} = I_C = 1\text{A}$$

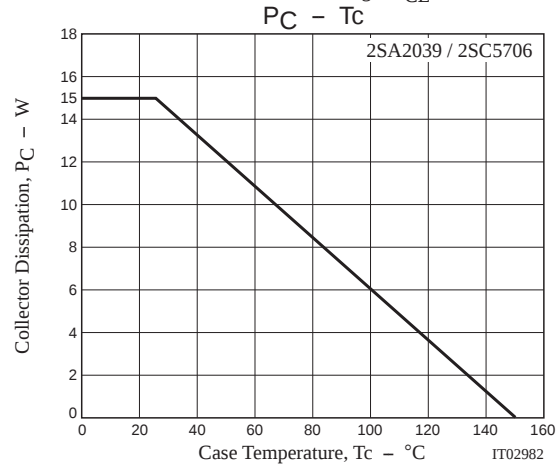
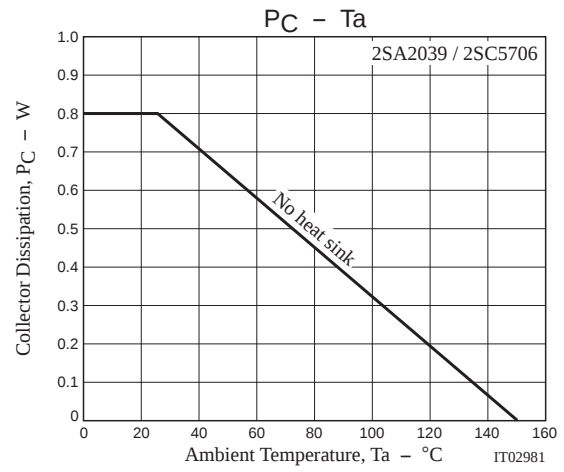
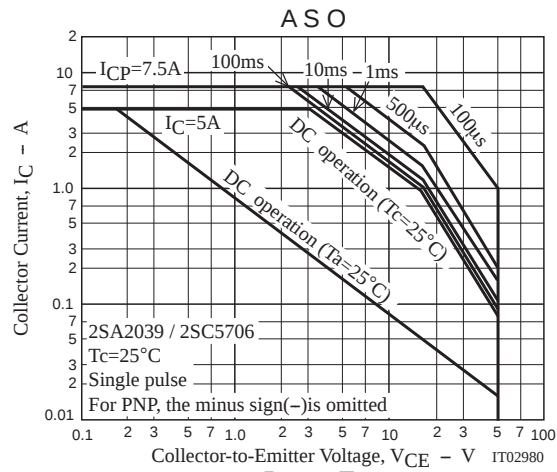
For PNP, the polarity is reversed.

Ordering Information

Device	Package	Shipping	memo
2SA2039-E	TP	500pcs./bag	Pb Free
2SC5706-E	TP	500pcs./bag	
2SC5706-H	TP	500pcs./bag	Pb Free & Halogen Free
2SA2039-TL-E	TP-FA	700pcs./reel	Pb Free
2SC5706-TL-E	TP-FA	700pcs./reel	
2SC5706-TL-H	TP-FA	700pcs./reel	Pb Free & Halogen Free



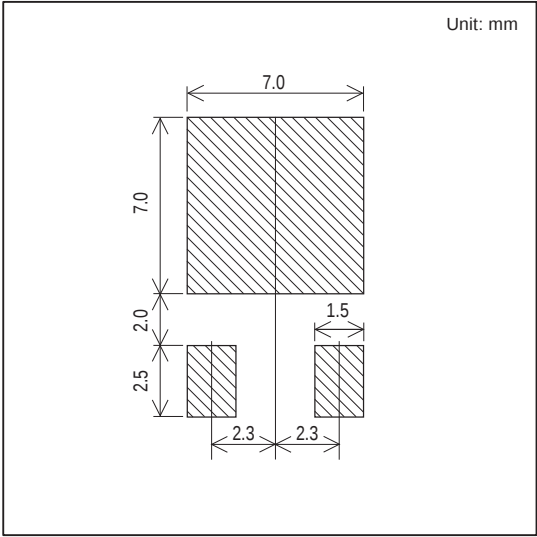
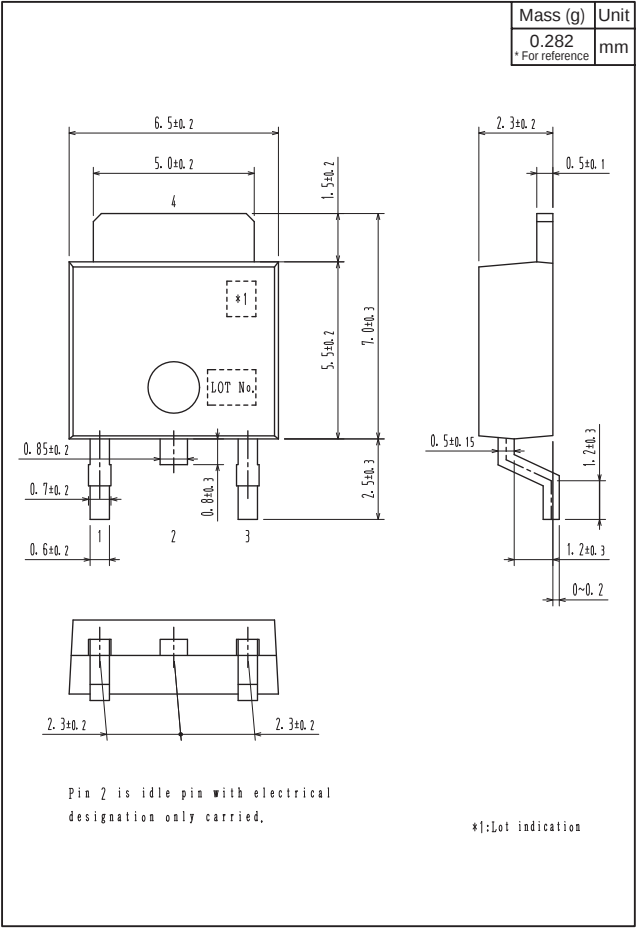




Outline Drawing

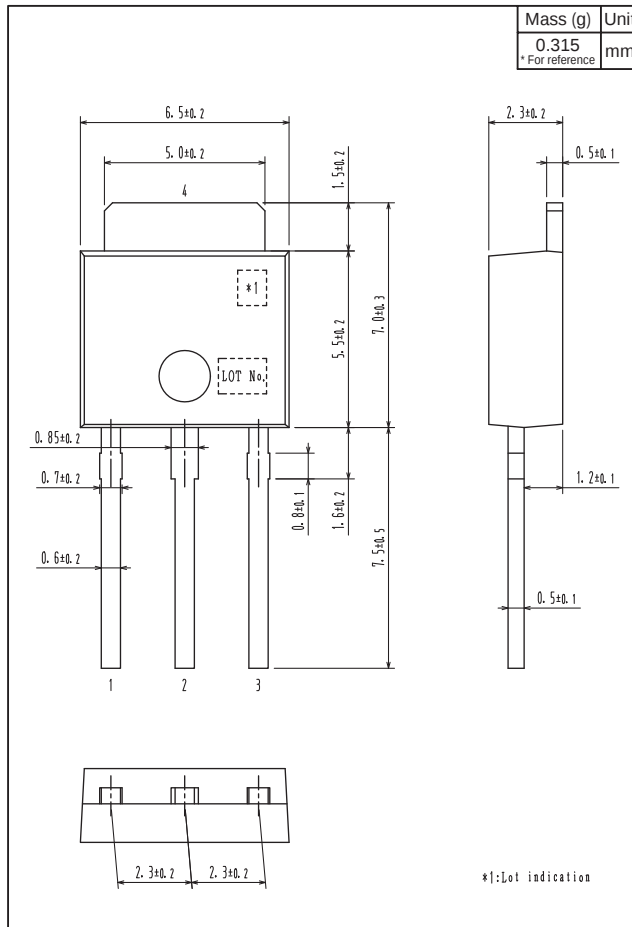
2SA2039-TL-E, 2SC5706-TL-E, 2SC5706-TL-H

Land Pattern Example



Outline Drawing

2SA2039-E, 2SC5706-E, 2SC5706-H



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