

TPD1024S

LOW-SIDE POWER SWITCH for MOTORS, SOLENOIDS, and LAMP DRIVERS

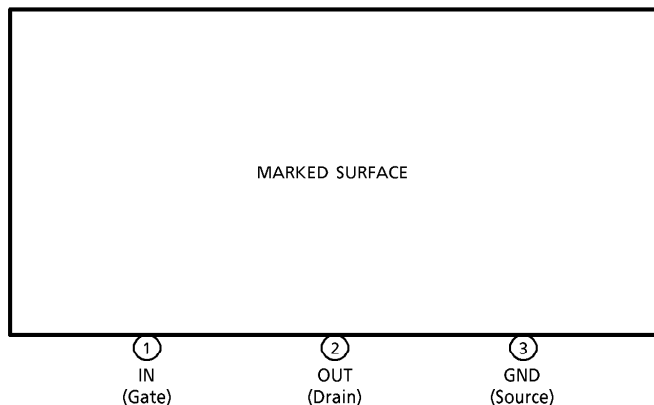
TPD1024S is a monolithic power IC for low-side switches. The IC has a vertical MOS FET output which can be directly driven from a CMOS or TTL logic circuit (e.g, an MPU).

The device offers intelligent self-protection function.

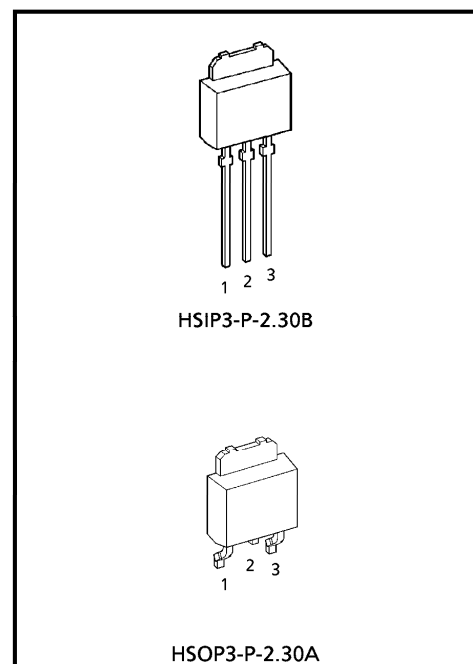
FEATURES

- A monolithic power IC with a new structure combining a control block and a vertical power MOS FET (π -MOS) on a single chip.
- Can directly drive a power load from a CMOS logic.
- Built-in protection against overvoltage, load short circuiting, and overheating.
- Low on resistance : $R_{DS(ON)} = 0.5 \Omega$ (Max),
@ $V_{IN} = 5V$, $T_j = 25^\circ C$
- 3-pin power-molded package usable for surface mounting.

PIN ASSIGNMENT



(Note) : That because of its MOS structure, this product is sensitive to static electricity.

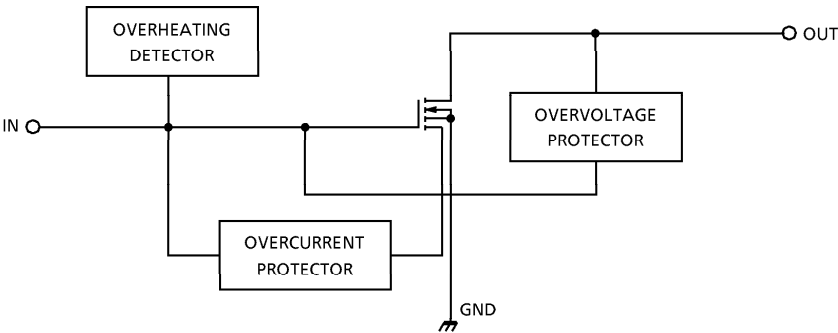


Weight
HSIP3-P-2.30B : 0.36 g (Typ.)
HSOP3-P-2.30A : 0.28 g (Typ.)

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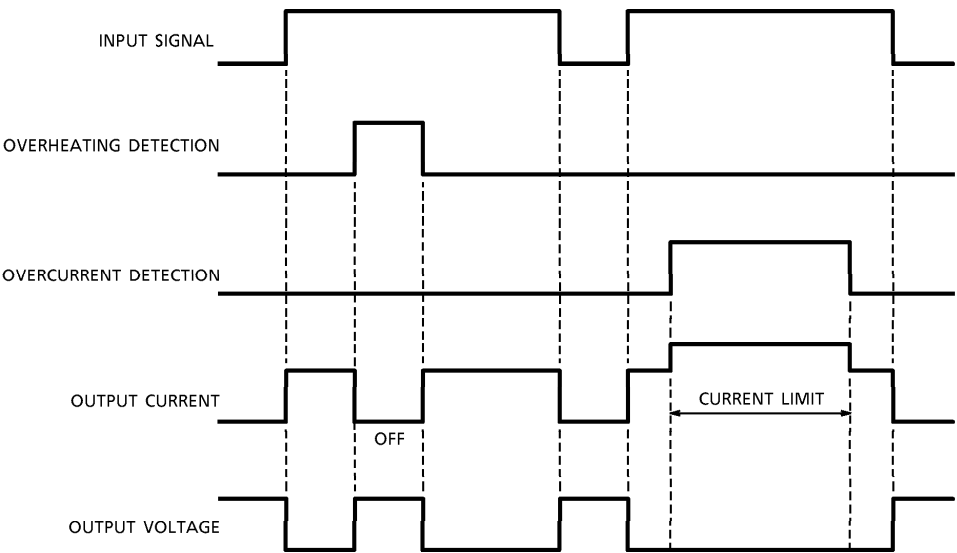
BLOCK DIAGRAM



PIN DESCRIPTION

PIN No.	SYMBOL	FUNCTION
1	IN	Input pin. Input is CMOS-compatible, with pull-down resistor connected. Even if the input is open, output will not accidentally turn on.
2	OUT	Output pin. When current in excess of the typical current (3.5 A) flows to the output pin, the current limiter operates to protect the IC.
3	GND	Ground pin.

TIMING CHART



MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Drain-source Voltage	$V_{DS}(\text{DC})$	40	V
Output Current	I_D	1.5	A
Input Voltage	V_{GS}	-0.5~6	V
Power Dissipation	P_D	1	W
		10	
Operating Temperature	T_{opr}	-40~85	$^\circ\text{C}$
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55~150	$^\circ\text{C}$

RECOMMENDABLE CONDITION

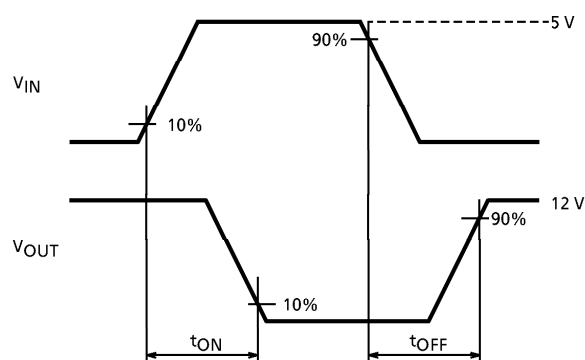
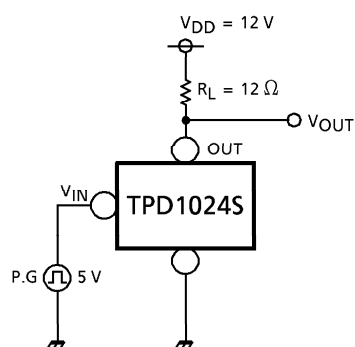
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	V_{IN}	—	4.5	5	6	V

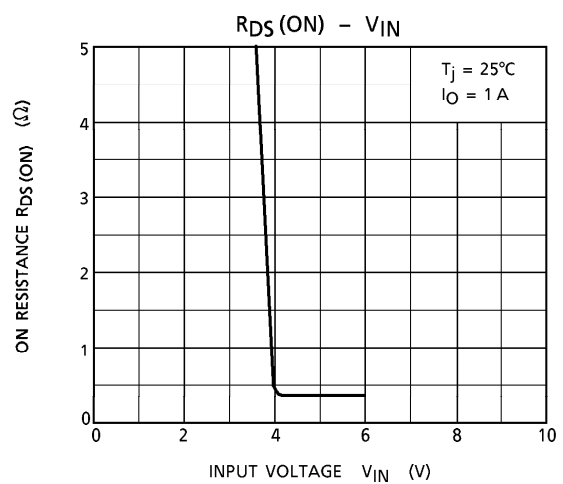
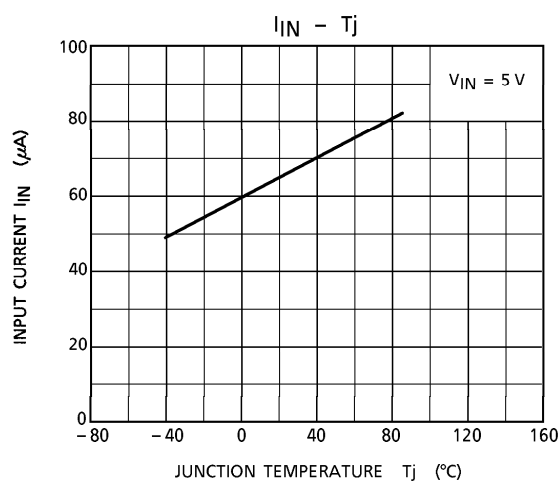
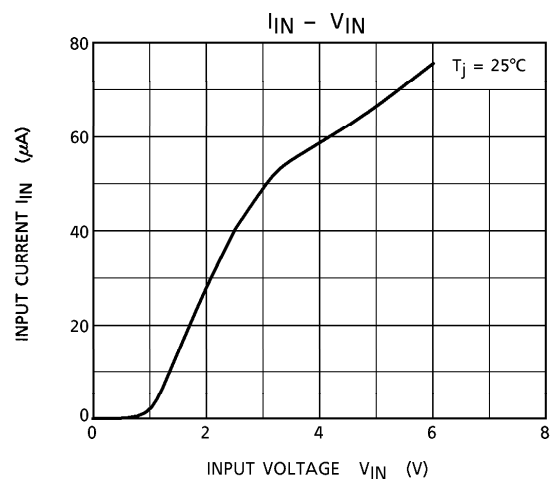
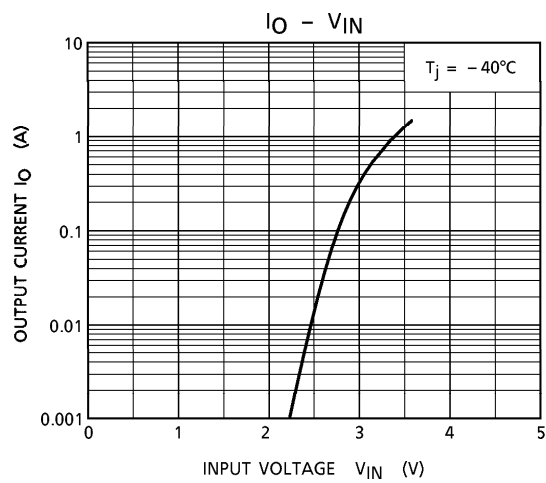
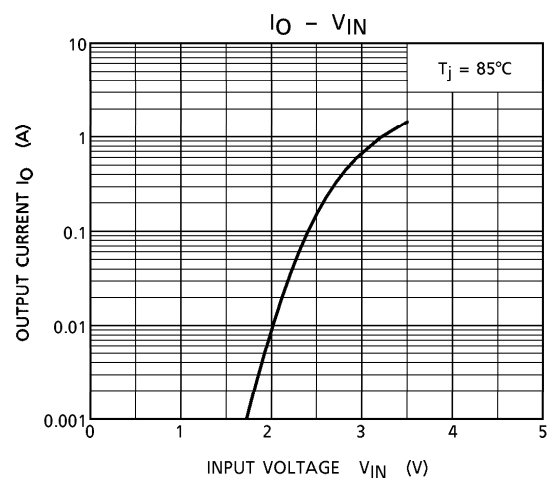
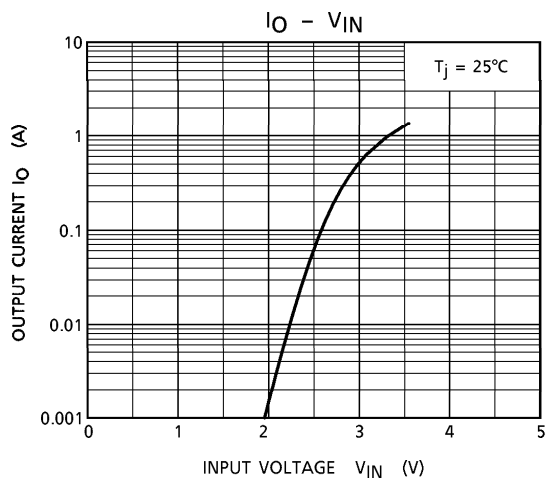
ELECTRICAL CHARACTERISTICS ($T_j = 25^\circ\text{C}$)

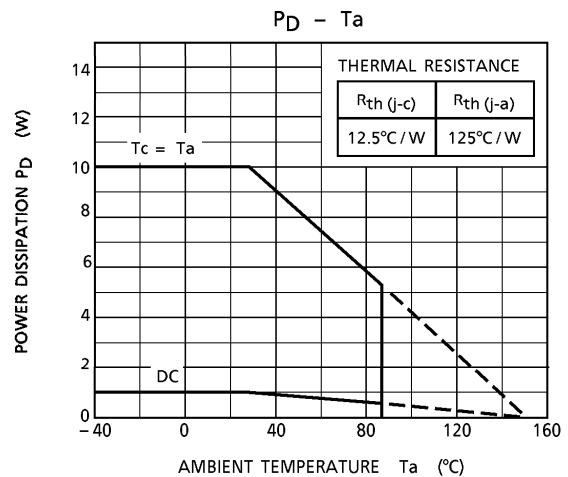
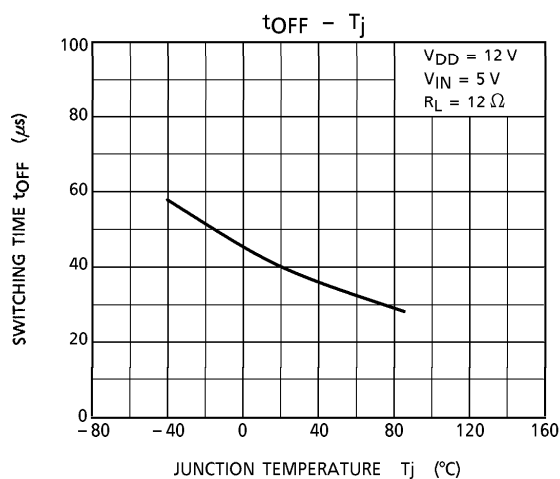
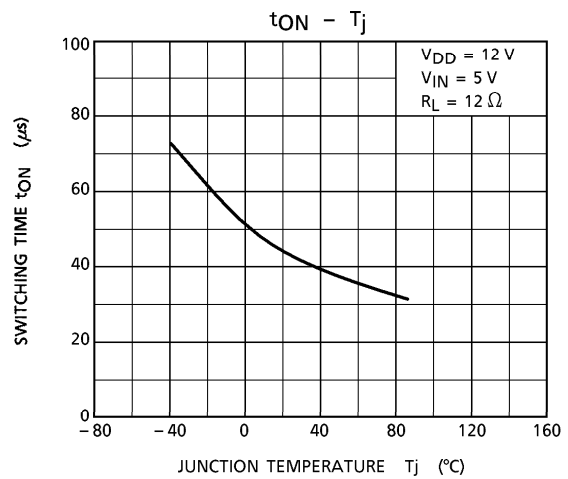
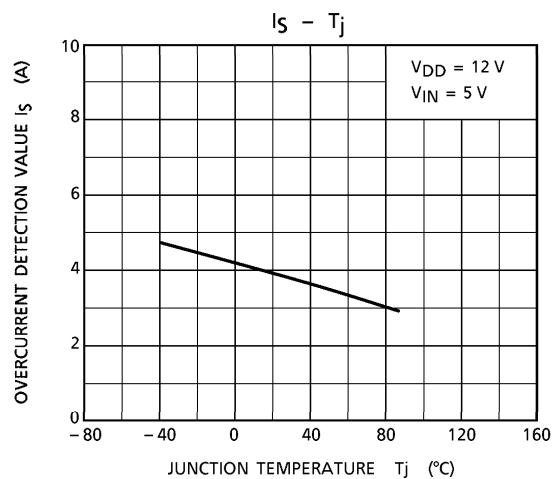
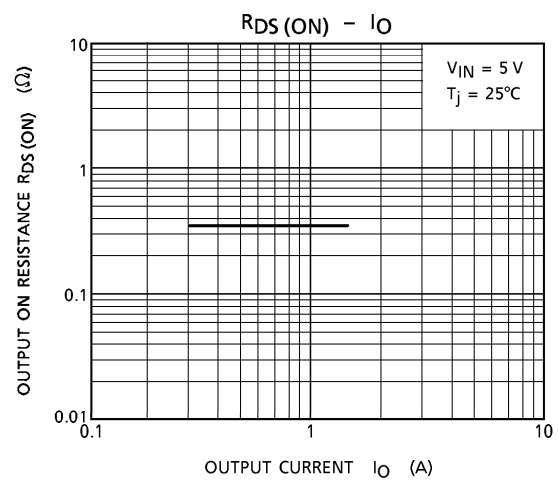
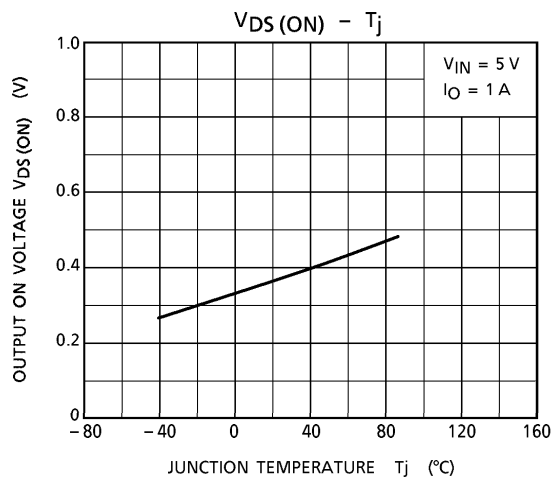
CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Drain-source Breakdown Voltage	$V_{(BR)DSS}$	—	$V_{GS} = 0, I_D = 10\text{ mA}$	40	—	—	V
Operating Supply Voltage	$V_{DD}(\text{OPR})$	—	—	—	—	18	V
Current at Output Off	$I_{DSS}(1)$	—	$V_{GS} = 0, V_{DS} = 40\text{ V}$	—	—	3	mA
	$I_{DSS}(2)$	—	$V_{GS} = 0, V_{DS} = 24\text{ V}$	—	—	100	μA
Input Threshold Voltage	V_{th}	—	$V_{DS} = 10\text{ V}, I_D = 1\text{ mA}$	0.8	—	2.5	V
Input Current	I_{GSS}	—	$V_{GS} = 5\text{ V},$ at normal operation	—	—	300	μA
On Resistance	$R_{DS}(\text{ON})$	—	$V_{GS} = 5\text{ V}, I_D = 1\text{ A}$	—	—	0.5	Ω
Overheating Protection	T_S	—	—	—	160	—	$^\circ\text{C}$
Overcurrent Protection	I_S	—	$V_{DS} = 12\text{ V}, V_{GS} = 5\text{ V}$	—	3.5	—	A
Switching Time	t_{ON}	1	$V_{DS} = 12\text{ V}, V_{GS} = 5\text{ V},$ $R_L = 12\ \Omega$	—	50	—	μs
	t_{OFF}			—	10	—	μs
Diode Forward Voltage Between Drain and Source	V_{DSF}	—	$I_F = 1.5\text{ A}$	—	0.9	1.8	V
Avalanche Energy Rating	E_A	—	$L = 10\text{ mH}, \text{Single-shot pulse}$	30	—	—	mJ

TEST CIRCUIT 1

Switching Time

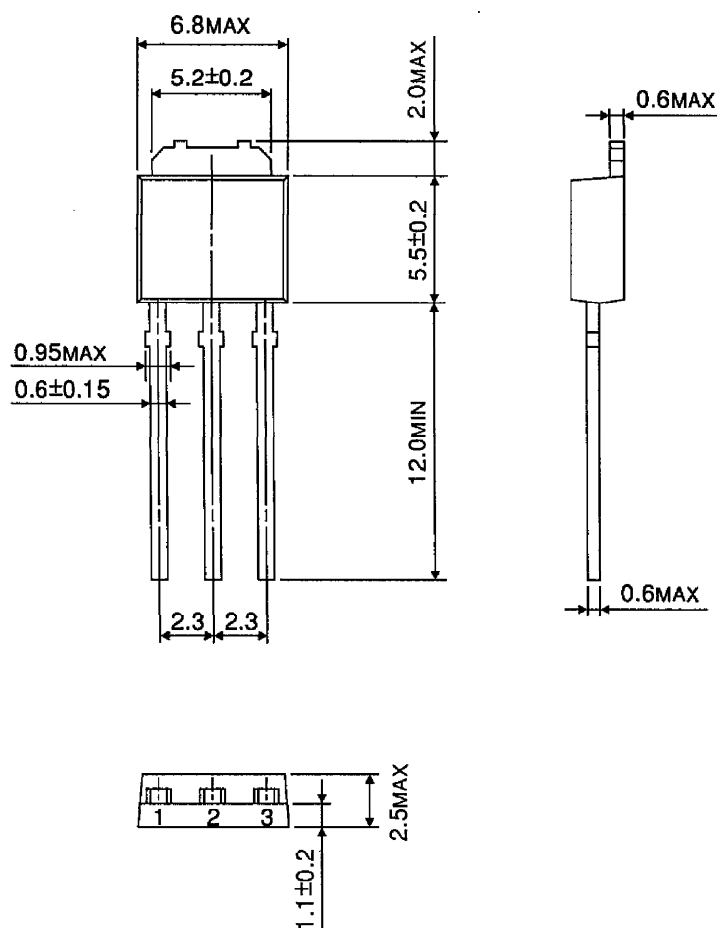






OUTLINE DRAWING
HSIP3-P-2.30B

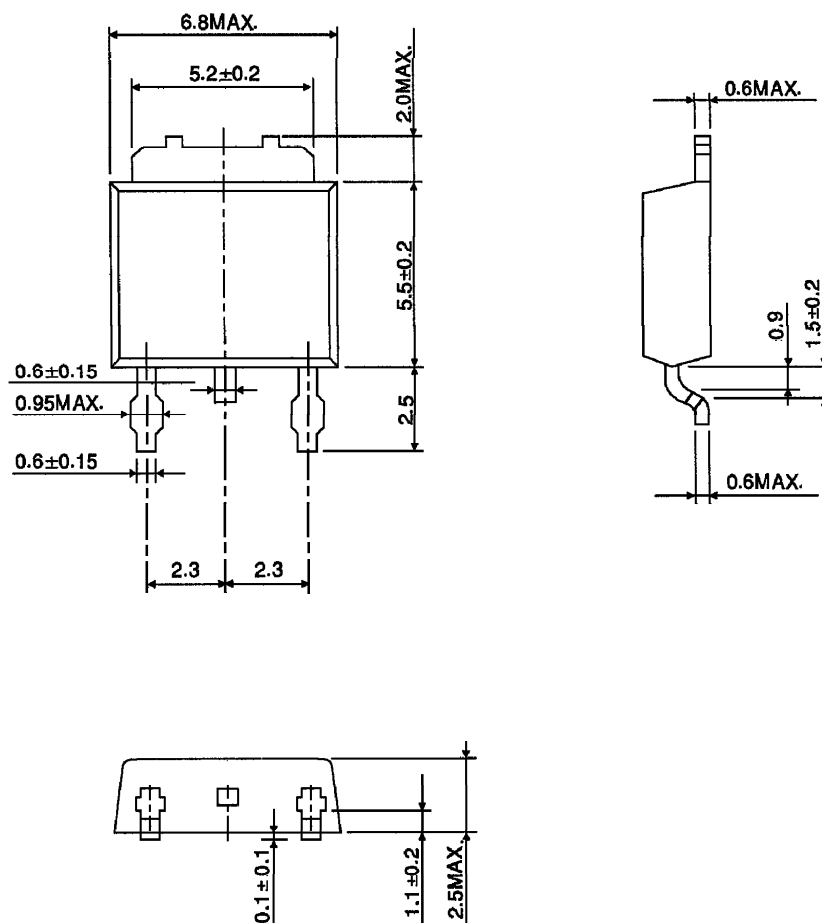
Unit : mm



Weight : 0.36 g (Typ.)

OUTLINE DRAWING HSOP3-P-2.30A

Unit : mm



Weight : 0.28 g (Typ.)