

# MIP705

## Silicon MOS IC

### ■ Features

- 3-pin intelligent power device
- Five protective functions (over-current, over-voltage, short circuit load, over heat, ESD) are integrated
- Acceptable both AC and DC power supply

### ■ Applications

- For automotive electric equipment

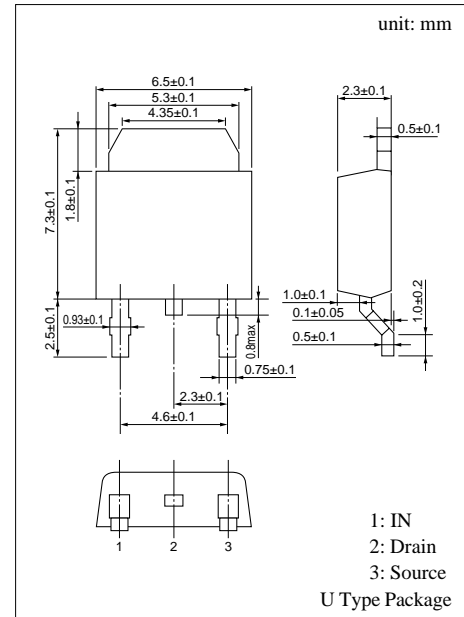
### ■ Absolute Maximum Ratings (Ta = 25 ± 3°C)

Parameter	Symbol	Ratings	Unit
Drain to Source voltage	V <sub>DS</sub>	60	V
Output peak current	I <sub>OP</sub>	±5	A
Output current	I <sub>O</sub>	-1 to 2* <sup>1</sup>	A
Input voltage	V <sub>IN</sub>	-0.5 to 6	V
Input current	I <sub>IN</sub>	±10	mA
Drain clamp energy	EAS	55* <sup>2</sup>	mJ
Allowable power dissipation	P <sub>D</sub>	1	W
		10* <sup>3</sup>	
Operating ambient temperature	T <sub>opr</sub>	-40 to +85	°C
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

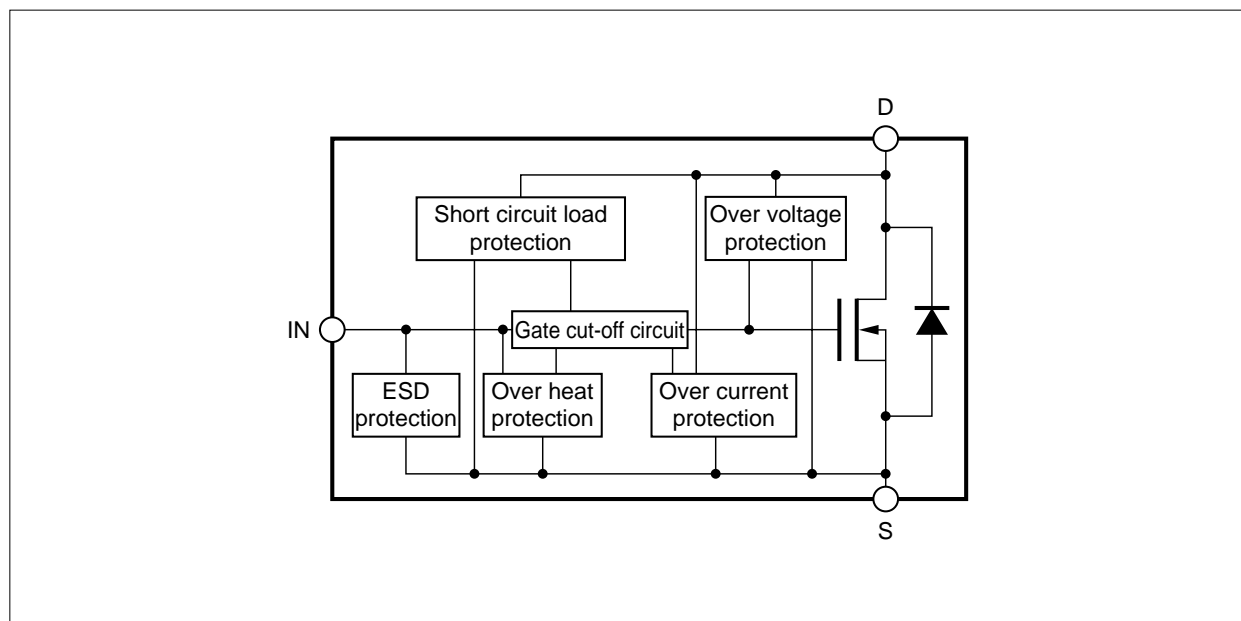
\*1 Maximum load current, not the average current.

\*2 L = 10mH, I<sub>L</sub> = 3.32A, V<sub>DD</sub> = 30V, 1pulse, T<sub>C</sub> = 25°C

\*3 T<sub>C</sub> = 25°C



### ■ Block Diagram



■ Electrical Characteristics (T<sub>C</sub> = 25 ± 2°C)

Parameter	Symbol	Conditions	min	typ	max	Unit
Drain to Source ON-resistance	R <sub>DS(on)</sub>	V <sub>IN</sub> = 5V, I <sub>DS</sub> = 1.5A		0.38	0.5	Ω
Drain to Source ON-voltage	V <sub>DS(on)</sub>	V <sub>IN</sub> = 5V, I <sub>DS</sub> = 1.5A		0.57	0.75	V
Drain clamp voltage	V <sub>DS(CLIP)</sub>	V <sub>IN</sub> = 0, I <sub>DS</sub> = 3mA	60	72		V
Drain OFF current (1)	I <sub>DS(off)1</sub>	V <sub>IN</sub> = 0, V <sub>DS</sub> = 12V		50	80	μA
Drain OFF current (2)	I <sub>DS(off)2</sub>	V <sub>IN</sub> = 0, V <sub>DS</sub> = 16V		65	140	μA
Input voltage (High)	V <sub>IN(H)</sub>	I <sub>DS</sub> = 2A	4			V
Input voltage (Low)	V <sub>IN(L)</sub>	I <sub>DS</sub> = 0.1mA			0.8	V
Input current	I <sub>IN(on)</sub>	V <sub>IN</sub> = 5V, V <sub>DS</sub> = 0		0.15	0.25	mA
Over current protection limit	I <sub>OCP</sub>	V <sub>IN</sub> = 5V	3.8	5	7.5	A
Short circuit load protection limit	V <sub>DS(SHT)</sub>	V <sub>IN</sub> = 5V	3			V

Note: The oscillation of the output current is caused when the drain voltage exceeds the short circuit load detection voltage under the ON state of output.

■ Operating condition

Parameter	Symbol	min	typ	max	Unit
Operating supply voltage	V <sub>DD</sub>			40	V

■ Electrical Characteristics (T<sub>C</sub> = 25 ± 2°C)

Parameter	Symbol	Conditions	min	typ	max	Unit
Over heat protection temperature	T <sub>SHD</sub>	V <sub>IN</sub> = 5V	170	205	240	°C
Turn on delay time	t <sub>d(on)</sub>	V <sub>IN</sub> = 5V, I <sub>DS</sub> = 1.5A V <sub>DD</sub> = 12V, R <sub>L</sub> = 8.2Ω		3		μs
Rise time	t <sub>r</sub>			18		μs
Turn off delay time	t <sub>d(off)</sub>			12		μs
Fall time	t <sub>f</sub>			20		μs

Note 1: The above values of characteristics are not guaranteed values and are only references for designing.

Note 2: If the chip temperature exceeds the "Over Heat Protection Temperature", output current is shut down.