

# MIP708

## Silicon MOS IC

### ■ Features

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

### ■ Applications

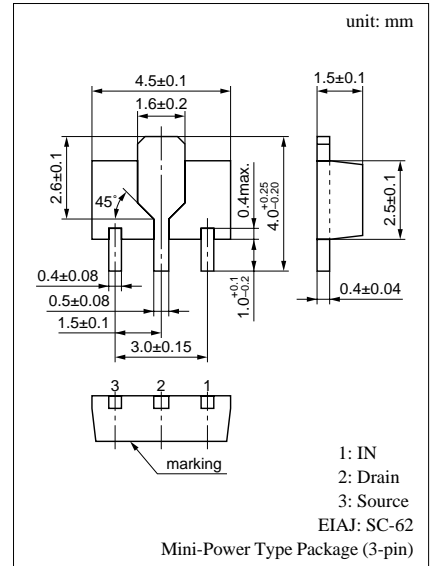
- For lamp and solenoid drive

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

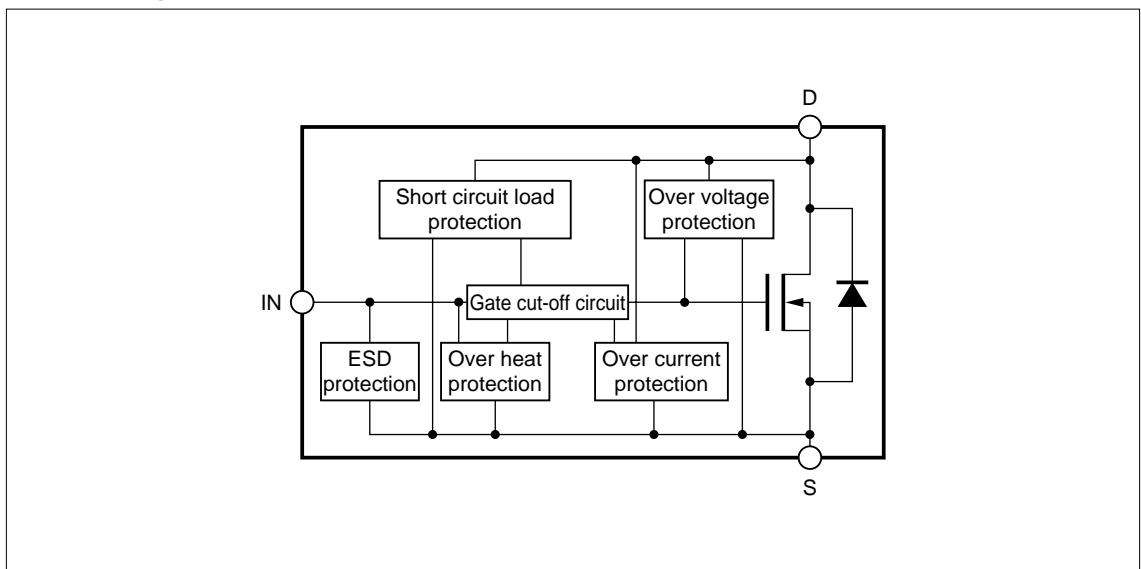
Parameter	Symbol	Ratings	Unit
Output voltage	$V_{DS}$	40	V
Output peak current	$I_{OP}$	$\pm 3$	A
Output current	$I_O$	$\pm 1$	A
Input voltage	$V_{IN}$	-0.5 to 6	V
Input current	$I_{IN}$	$\pm 5$	mA
Drain clamp energy	$E_{CLP}$	24 <sup>*1</sup>	mJ
Allowable power dissipation	Ta = 25°C	$P_{D1}$	1 <sup>*2</sup> W
	Tc = 25°C	$P_{D2}$	2 W
Operating ambient temperature	$T_{opr}$	-40 to +125	°C
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

<sup>\*1</sup> L = 10mH,  $I_L = 2.19A$ ,  $V_{DD} = 20V$ , 1pulse,  $T_C = 25^\circ C$

<sup>\*2</sup> Mounting on the PCB (the copper foil of the drain portion has a area of 100mm<sup>2</sup> or more and the thickness of glass epoxy board is 1.7mm.)



### ■ Block Diagram



■ Electrical Characteristics ( $T_C = 25 \pm 3^\circ\text{C}$ )

Parameter	Symbol	Conditions	min	typ	max	Unit
Drain to Source ON-resistance	$R_{DS(on)}$	$V_{IN} = 5\text{V}, I_{DS} = 1\text{A}$		0.5	0.8	$\Omega$
Drain to Source ON-voltage	$V_{DS(on)}$	$V_{IN} = 5\text{V}, I_{DS} = 1\text{A}$		0.5	0.8	V
Drain clamp voltage	$V_{DS(CLIP)}$	$V_{IN} = 0, I_{DS} = 3\text{mA}$	40	49		V
Drain OFF current (1)	$I_{DS(off)1}$	$V_{IN} = 0, V_{DS} = 12\text{V}$		50	100	$\mu\text{A}$
Drain OFF current (2)	$I_{DS(off)2}$	$V_{IN} = 0, V_{DS} = 16\text{V}$		70	140	mA
Input voltage (High)	$V_{IN(H)}$	$I_{DS} = 1\text{A}$	4			V
Input voltage (Low)	$V_{IN(L)}$	$I_{DS} = 1\text{mA}$			0.8	V
Input current	$I_{IN(on)}$	$V_{IN} = 5\text{V}, V_{DS} = 0$		0.15	1	mA
Over current protection limit	$I_{OCP}$	$V_{IN} = 5\text{V}$	2	3		A
Short circuit load protection limit	$V_{DS(SHT)}$	$V_{IN} = 5\text{V}$	2	4		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.

■ Electrical Characteristics ( $T_C = 25 \pm 2^\circ\text{C}$ )

Parameter	Symbol	Conditions	min	typ	max	Unit
Over heat protection temperature	$T_{SHD}$	$V_{IN} = 5\text{V}$	160	190		$^\circ\text{C}$
Turn on delay time	$t_{d(on)}$	$V_{IN} = 5\text{V}, I_{DS} = 1\text{A}$		1		$\mu\text{s}$
Turn-on time	$t_{on}$			5.5		$\mu\text{s}$
Turn off delay time	$t_{d(off)}$	$V_{DD} = 12\text{V}, R_L = 12\Omega$		3.4		$\mu\text{s}$
Turn-off time	$t_{off}$			7.2		$\mu\text{s}$

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.

■ Timing Chart

