

MIP704

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

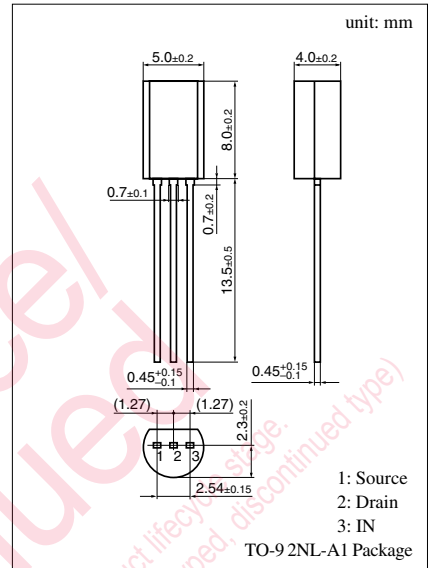
■ Absolute Maximum Ratings (Ta = 25°C)

Parameter	Symbol	Ratings	Unit
Drain to Source voltage	V_{DS}	60	V
Output peak current	I_{OP}	± 5	A
Output current	I_O	-1 to 2 ^{*1}	A
Input voltage	V_{IN}	-0.5 to 6	V
Input current	I_{IN}	± 10	mA
Drain clamp energy	EAS	55 ^{*2}	mJ
Allowable power dissipation	P_D	1 ^{*3}	W
Operating ambient temperature	T_{opr}	-40 to +85	°C
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

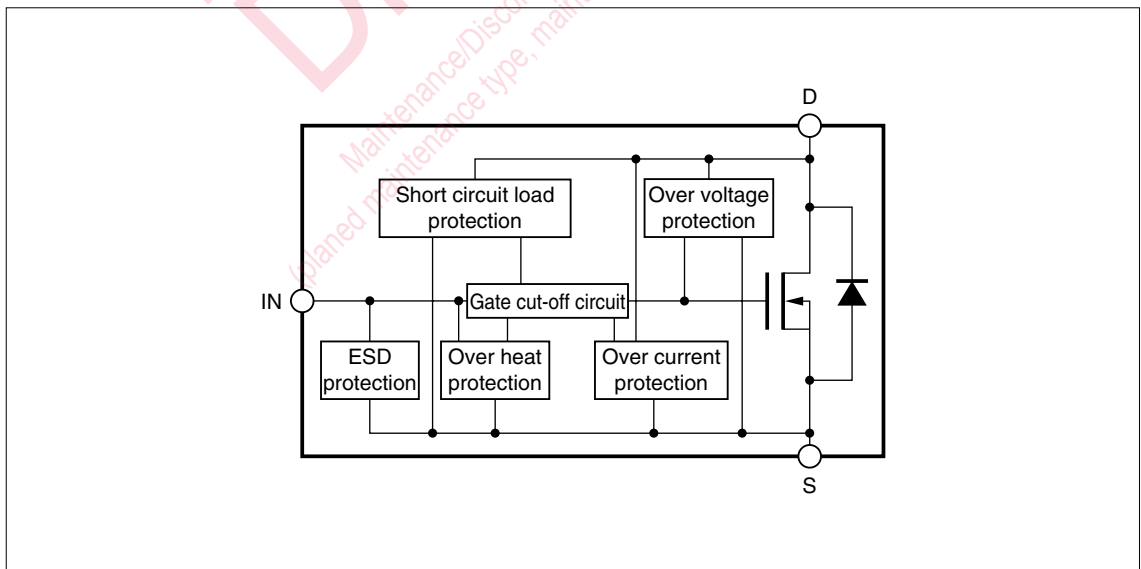
*1 Maximum load current, not the average current.

*2 L = 10mH, $I_L = 3.32A$, $V_{DD} = 30V$, 1pulse, $T_C = 85^\circ C$

*3 Mounting on the PCB (Glass epoxy board, the size of 100mm × 100mm), (Ta = 25°C)



■ Block Diagram



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

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

■ Operating condition

Parameter	Symbol	min	typ	max	Unit
Operating supply voltage	V_{DD}			40	V

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

Parameter	Symbol	Conditions	min	typ	max	Unit
Over heat protection temperature	T_{SHD}	$V_{IN} = 5V$	170	205	240	$^\circ\text{C}$
Turn on delay time	$t_{d(on)}$	$V_{IN} = 5V, I_{DS} = 1.5A$ $V_{DD} = 12V, R_L = 8.2\Omega$		3		μs
Rise time	t_r			18		μs
Turn off delay time	$t_{d(off)}$			12		μs
Fall time	t_f			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.

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Attached table "IPD availability by customer"

Parts No.			Companies/areas to which products can be sold	Companies/areas to which products cannot be sold	Application
MIP13□ MIP14□ MIP15□ MIP16□	MIP17□ MIP18□ MIP01□□ MIP02□□	MIP2□□□ MIP3□□□ MIP4□□□ MIP9A□□	· Japanese companies in Japan · Japanese companies in Asia (50% or more owned)	· Companies in European and American countries · Asian companies in Asia · Other local companies	· For power supply · For DC-DC converter
MIP10□ MIP11□ MIP803/804/806 MIP9E□□	MIP811/812 MIP814/815/816 MIP82□ MIP55□		· Japanese companies in Japan · Japanese companies in Asia (50% or more owned) · Asian companies in Asia	· Companies in European and American countries · Other local companies	· For power supply · For EL driver · For LED lighting driver
MIP50□ MIP51□	MIP7□□		· No restrictions in terms of contract	· No restrictions in terms of contract	· For lamp driver/ car electronics accessories

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