

# MIP517

## Silicon MOSFET type integrated circuit

### ■ Features

- Built-in five protection functions. (over-current, over-voltage, load-short-circuit, over heat, ESD)
- Driving directly from CMOS (microcomputer) is possible.
- Although it is a small package, it has resistance of low heat. (When mounted in a substrate.)

### ■ Applications

- Lamp-Solenoid, driver
- Motor driver

### ■ Absolute Maximum Ratings $T_C = 25^\circ\text{C} \pm 3^\circ\text{C}$

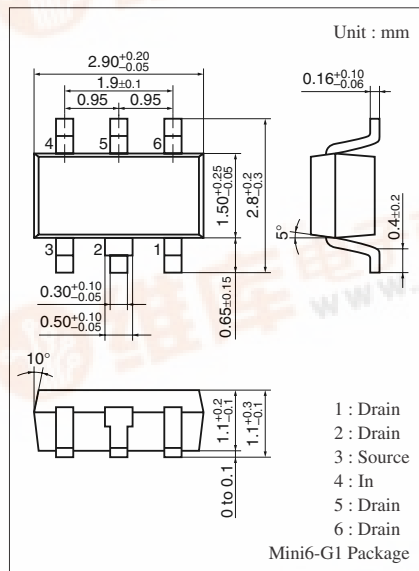
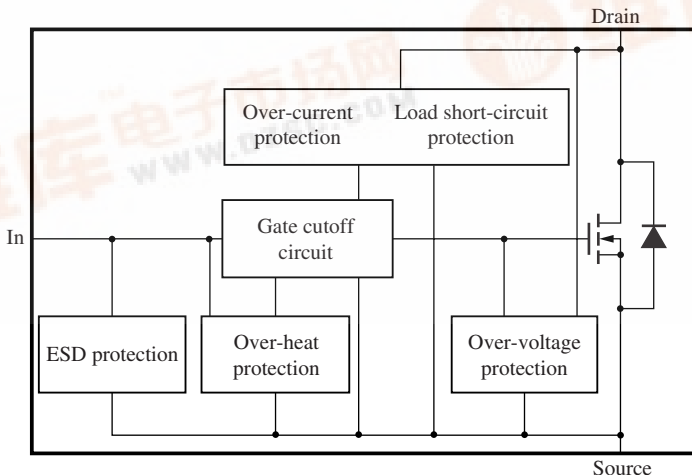
Parameter	Symbol	Rating	Unit
Drain-source voltage	$V_{DS}$	- 0.5 to +45	V
Output current	$I_O$	0.7	A
Input voltage	$V_{IN}$	- 0.5 to +6.0	V
Input current	$I_{IN}$	$\pm 2$	mA
Drain clamp energy endurance *1	$E_{CLP}$	1.8	mJ
Power dissipation 1 *2	$P_{D1}$	0.2	W
Power dissipation 2 *3	$P_{D2}$	0.8	W
Operating ambient temperature	$T_{opr}$	-40 to +85	$^\circ\text{C}$
Channel temperature	$T_{ch}$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

Note) \*1:  $L = 10 \text{ mH}$ ,  $I_L = 0.6 \text{ A}$ ,  $V_{DD} = 20 \text{ V}$ , 1 pulse,  $T_C = 25^\circ\text{C}$

\*2: Single unit

\*3: Mounting on the PCB (40 mm<sup>2</sup>, thickness 1.7mm glass epoxy substrate) ( $T_a = 25^\circ\text{C}$ )

### ■ Block Diagram



Marking Symbol: MC



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

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Drain-source ON resistance	$R_{DS(on)}$	$V_{IN} = 5\text{ V}, I_{DS} = 0.5\text{ A}$		1.1	1.65	$\Omega$
Drain-source voltage	$V_{DS(on)}$	$V_{IN} = 5\text{ V}, I_{DS} = 0.5\text{ A}$		1.1	1.65	V
Drain clamp voltage	$V_{DS(CLIP)}$	$V_{IN} = 0\text{ V}, I_{DS} = 3\text{ mA}$	45	52		V
Drain-source cutoff current 1	$I_{DS(off)1}$	$V_{IN} = 0\text{ V}, V_{DS} = 12\text{ V}$		0.01	5	$\mu\text{A}$
Drain-source cutoff current 2	$I_{DS(off)2}$	$V_{IN} = 0\text{ V}, V_{DS} = 25\text{ V}$		0.02	8	
Drain-source cutoff current 3	$I_{DS(off)3}$	$V_{IN} = 0\text{ V}, V_{DS} = 40\text{ V}$		0.08	10	
Input voltage high-level	$V_{IN(H)}$	$I_{DS} = 0.5\text{ A}$	4			V
Input voltage low-level	$V_{IN(L)}$	$I_{DS} = 1\text{ mA}$			0.8	V
Input current (normal)	$I_{IN(on)}$	$V_{IN} = 5\text{ V}, V_{DS} = 0\text{ V}$		0.2	0.5	mA
Input current (act on protection) *	$I_{IN(PROT)}$	$V_{IN} = 5\text{ V}$		0.75	1.10	mA
Over current protection limit	$I_{OCP}$	$V_{IN} = 5\text{ V}$	0.7	1.1		A
Short circuit load protection limit	$V_{DS(SHT)}$	$V_{IN} = 5\text{ V}$	1.0	1.6		V
Input voltage of act on protection	$V_{IN(PROT)}$		4.0	5.0		V

- Note) 1. At on-state when drain voltage exceeds the "Short circuit load protection voltage", output current begin to oscillate.  
 2. When drain voltage exceeds the "drain clamp voltage" output MOS turn on, so drain voltage are clamped before the drain-source junction become breakdown  
 3. \*: State of short circuit load protection and over heat protection (designed guarantee).

### ■ Electrical Characteristics (Reference value: Non guarantee value)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Cutoff temperature at overheat	$T_{SHD}$	$V_{IN} = 5\text{ V}$		140		$^\circ\text{C}$
Turn-on time	$t_{ON}$	$V_{DD} = 30\text{ V}, R_L = 60\ \Omega$		3		$\mu\text{s}$
Turn-off time	$t_{OFF}$	$I_{DS} = 0.5\text{ A}, V_{IN} = 5\text{ V}$		7		

- Note) If the chip temperature exceeds the "over heat protection temperature", output current is shut down. And if the chip cool down, the protection will operate automatically again.

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