

MIP2K30MS

Silicon MOS FET type integrated circuit

■ Features

- Built-in jitter function
- Built-in charge protection circuit
- Built-in overheating, loadshorting and overvoltage protection circuits

■ Applications

- Chargers (for DSC, etc.)
- AC adapter

■ Package

- Code
DIP7-A1
- Pin Name

1. VDD	5. DRAIN
2. FB	6. —
3. CL	7. SOURCE
4. VCC	8. SOURCE

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

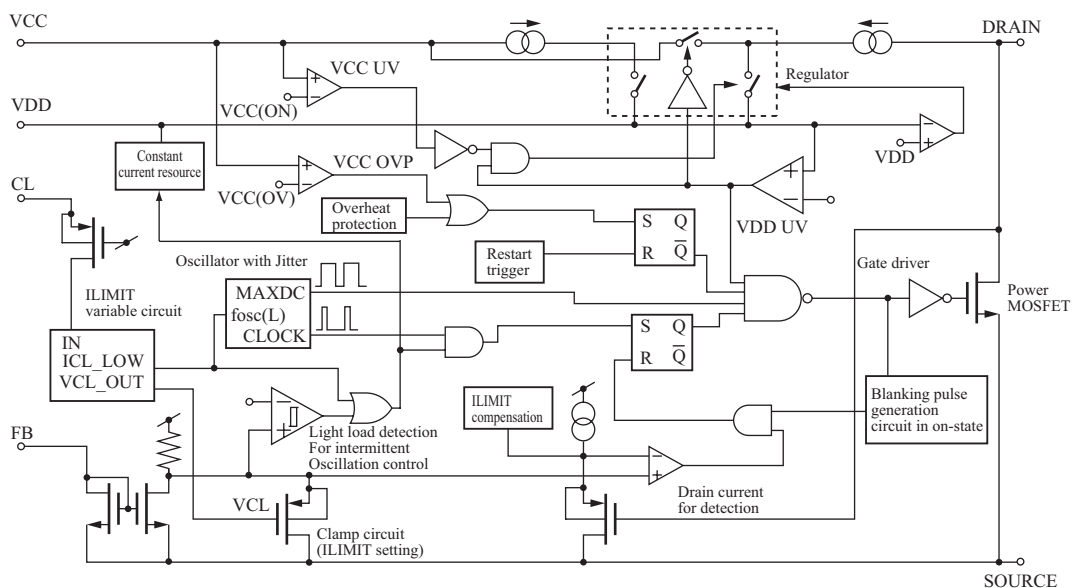
Parameter	Symbol	Rating	Unit
DRAIN voltage	VD	-0.3 to +700	V
VCC voltage	VCC	-0.3 to +45	V
VDD voltage	VDD	-0.3 to +8	V
Feedback voltage	VFB	-0.3 to +8	V
Feedback current	IFB	500	μA
CL pin voltage	VCL	-0.3 to +8	V
CL pin current	ICL	150	μA
Output peak current *	IDP	1.5	A
Channel temperature	Tch	150	$^{\circ}\text{C}$
Storage temperature	Tstg	-55 to +150	$^{\circ}\text{C}$

■ Marking Symbol: MIP2K3

Note) *: The guarantee within the following pulse width.

$$\text{Leading edge blanking delay} + \text{Current limit delay} \quad t_{on}(\text{BLK}) + t_d(\text{OCL})$$

■ Block Diagram



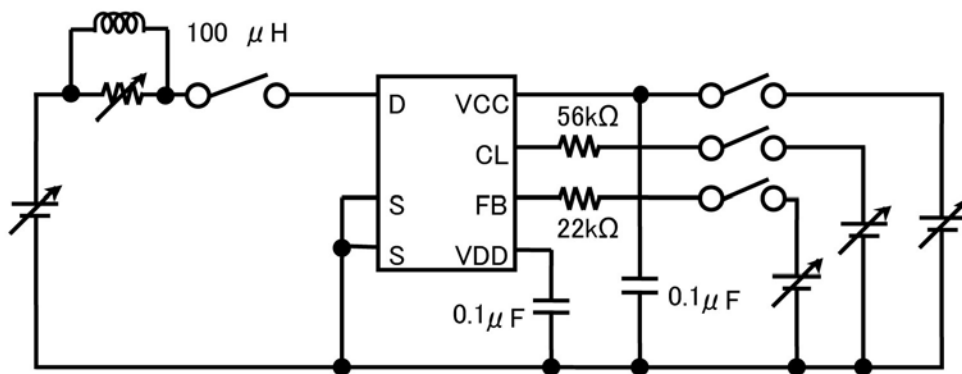
■ Electrical Characteristics $T_C = 25^\circ\text{C} \pm 2^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Control functions						
Output frequency	fosc	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA	90	100	110	kHz
	fosc(L)	VCC = 15 V, VD = 5 V, IFB: Open, ICL < ICL1	9	12	15	kHz
Jitter frequency deviation	Δf	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA		5.5		kHz
Jitter frequency modulation rate	fM	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA		260		Hz
Maximum duty cycle	MAXDC	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA	45	47.5	50	%
VDD voltage	VDD	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA	5.4	5.9	6.4	V
UV lockout threshold voltage	VUV	VD = 5 V, IFB = 20 μA , ICL = 50 μA	4.6	5.1	5.6	V
VCC start voltage	VCC(ON)	VD = 5 V, IFB = 20 μA , ICL = 50 μA	5.9	6.9	7.9	V
VCC charge stop threshold voltage	VCC1	VD = 40 V, FB: Open, CL: Open	10	11	12	V
Feedback threshold voltage	IFB1	ON \rightarrow OFF VCC = 15 V, VD = 5 V, ICL = 50 μA	24.6	41	57.4	μA
Feedback hysteresis current	IFBHYS	VCC = 15 V, VD = 5 V, ICL = 50 μA		2		μA
FB pin current at heavy load	IFB0	ICC0 \rightarrow ICC VCC = 15 V, VD = 5 V, ICL = 50 μA	6	9.5	13	μA
FB pin voltage	VFB	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA	0.7	1.0	1.3	V
Supply current	ICC	VCC = 15 V, VD = 5 V, IFB = 20 μA , ICL = 50 μA	0.25	0.40	0.50	mA
Supply current at light load	ICC(OFF)	VCC = 15 V, VD = 5 V, IFB = IFB1 + 5 μA , ICL = 50 μA	0.26	0.36	0.46	mA
Supply current at heavy load	ICC0	VCC = 15 V, VD = 5 V, IFB: Open, ICL = 50 μA	0.45	0.60	0.75	mA
VDD charging current	Ich1	VDD = 0 V, VD = 40 V, FB: Open, CL: Open	-7.5	-5.5	-3.5	mA
	Ich2	VDD = 4 V, VD = 40 V, FB: Open, CL: Open	-3.0	-2.0	-1.0	mA
CL pin voltage	VCL	VCC = 15 V, VD = 5 V, FB: Open, ICL = ICL1	2.0	2.3	2.6	V
Dropped fosc CL pin current *2	ICL1	fosc \rightarrow fosc(L) VCC = 15 V, VD = 5 V, FB: Open	16.5	22	27.5	μA
CL pin hysteresis current *2	ICLHYS	VCC = 15 V, VD = 5 V, FB: Open		1.5		μA

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

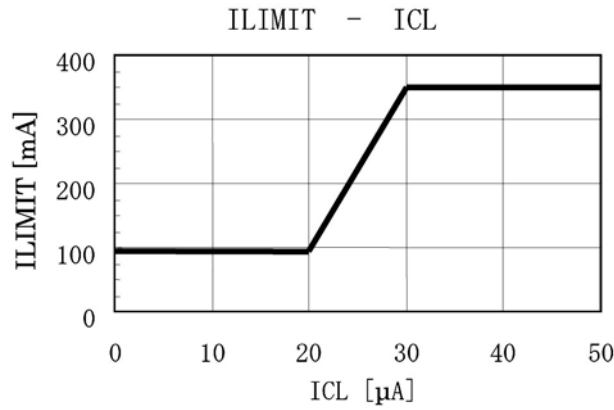
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Circuit protections						
Self protection current limit *1,3	ILIMIT	VCC = 15 V, FB: Open, ICL = 50 μA , DUTY = 30%	0.45	0.50	0.55	A
ILIMIT modified coefficient *1,3	R_slope	VCC = 15 V, FB: Open, ICL = 50 μA		40		mA/ μs
Minimum ILIMIT	ILIMITmin	Ton = 3 μs , VCC = 15 V, FB: Open, ICL = 0 μA	52	115	178	mA
Drain current at light load	ID(OFF)	Ton = 3 μs , VCC = 15 V, IFB = IFB1 + IFBHYS, ICL = 50 μA	45	110	165	mA
Leading edge blanking delay	ton(BLK)	VCC = 15 V, FB: Open, ICL = 50 μA	230	290	350	ns
Current limit delay	td(OCL)		100	150	200	ns
Over voltage protection	VCC(OV)	VD = 5 V, FB: Open, ICL = 50 μA	21	23.5	26	V
Thermal shutdown temperature	TOTP		130	140	150	$^{\circ}\text{C}$
Output						
Power up reset threshold voltage	VDDreset		1.8	2.6	3.5	V
ON state resistance	RDS(ON)	ID = 100 mA		10	13	Ω
OFF state current	IDSS	VCC = 26 V, VD = 650 V, FB: Open, CL: Open		10	20	μA
Breakdown voltage	VDSS	VCC = 26 V, ID = 100 μA , FB: Open, CL: Open	700			V
Rise time *4	tr	VCC = 15 V, VD = 5 V, FB: Open, ICL = 50 μA		100		ns
Fall time *4	tf	VCC = 15 V, VD = 5 V, FB: Open, ICL = 50 μA		25		ns
Supply voltage characteristics						
Drain supply voltage	VD(MIN)	VCC: Open, FB: Open, CL: Open	50			V

Note) 1. Measurement circuit

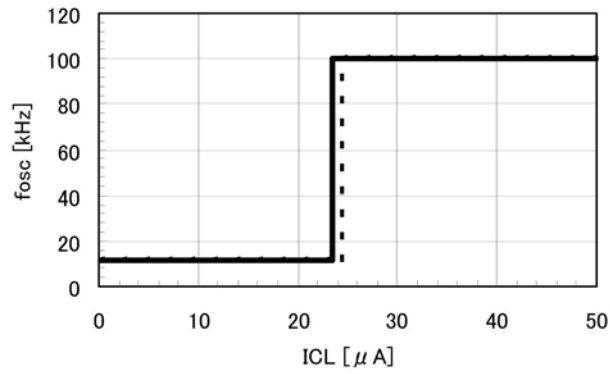


■ Electrical Characteristics (continued) $T_C = 25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

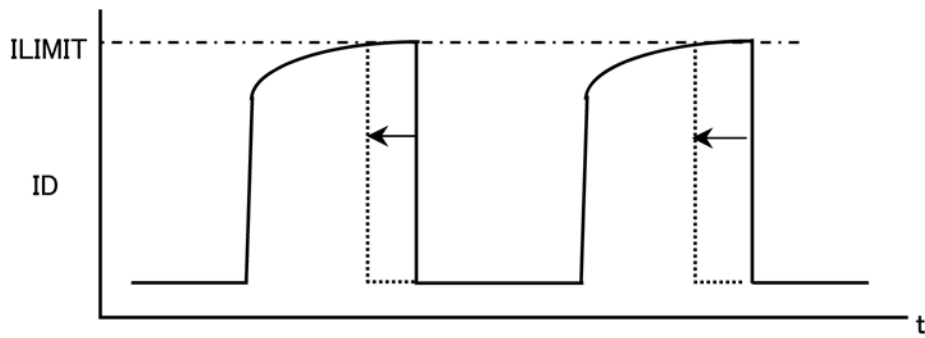
2. *1: ILIMIT vs. ICL Typical characteristic



*2: fosc vs. ICL Typical characteristic

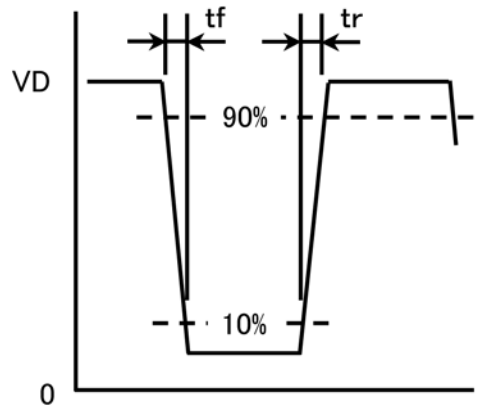


*3: ILIMIT Measurement



$$R_{\text{slope}} ; \{(\text{ILIMIT at Duty}=30\%) - (\text{ILIMIT at Duty}=10\%)\} / \{(\text{Ton at Duty}=30\%) - (\text{Ton at Duty}=10\%)\}$$

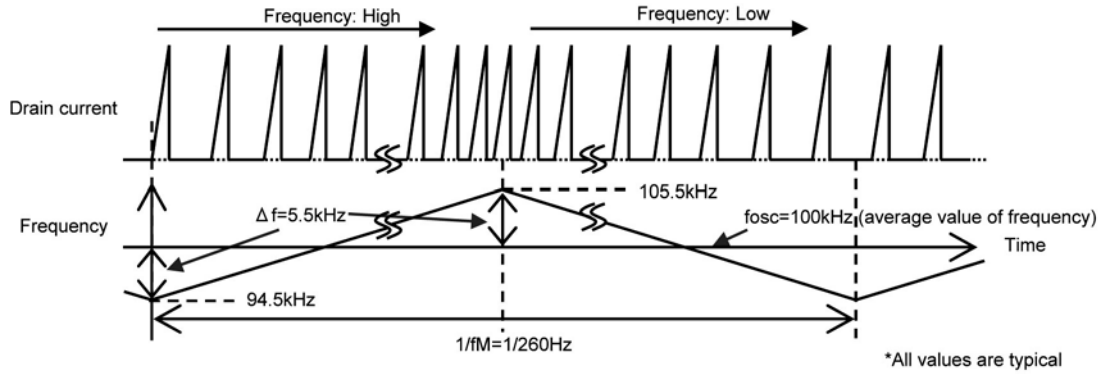
*4: tr, tf Measurement



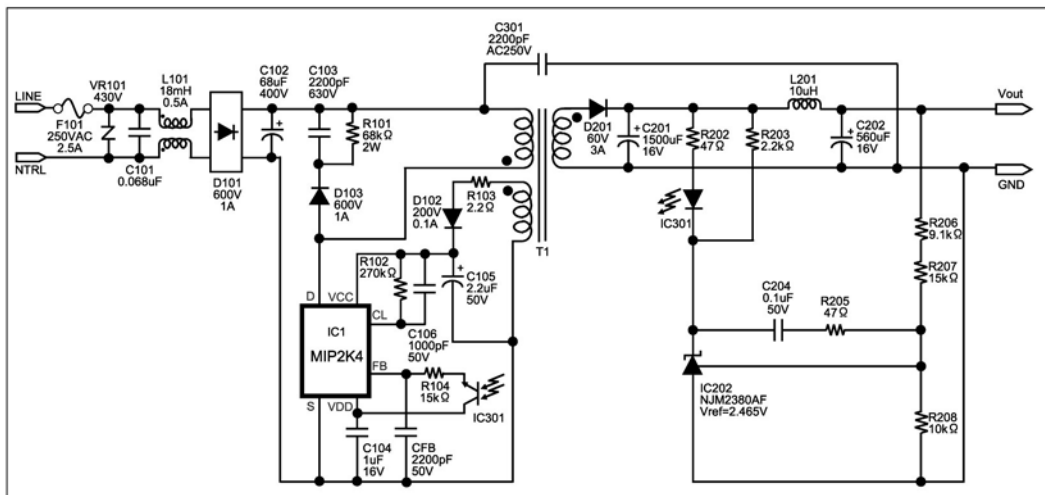
■ Frequency jitter function

By frequency jitter function, frequency jitter variation(Δf) changes periodically, by frequency of frequency jitter modulation factor (f_M) as shown below.

$f_{osc} = 100 \text{ kHz (typ.)}$, $\Delta f = 5.5 \text{ kHz (typ.)}$, $f_M = 260 \text{ Hz (typ.)}$

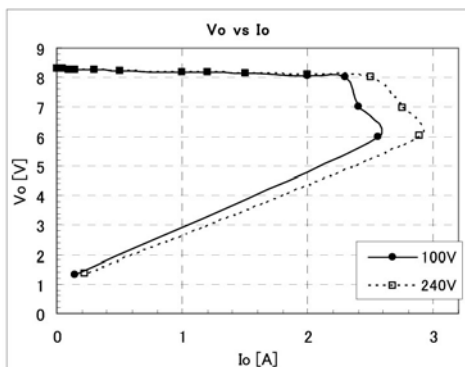


■ Adapter circuit sample (MIP2K4)

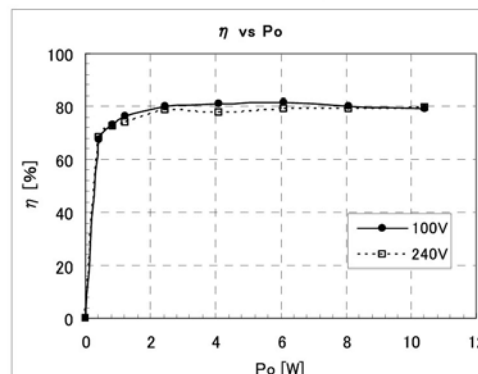


■ Electric characteristics (MIP2K4 : Worldwide input, 8.3V/1.5A output)

VI characteristics of adapter circuit



Power efficiency



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Attached table "IPD availability by customer"

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MIP01** MIP2** MIP9A**	MIP02** MIP3** MIP9L**	MIP1** MIP4**	<ul style="list-style-type: none"> · Japanese companies in Japan · Japanese companies in Asia (50% or more owned) 	<ul style="list-style-type: none"> · Companies in European and American countries · Asian companies in Asia · Other local companies 	<ul style="list-style-type: none"> · For power supply · For DC-DC converter
MIP00** MIP55** MIP816/826	MIP52** MIP56** MIP9E**	MIP53** MIP803/804	<ul style="list-style-type: none"> · Japanese companies in Japan · Japanese companies in Asia (50% or more owned) · Asian companies in Asia 	<ul style="list-style-type: none"> · Companies in European and American countries · Other local companies 	<ul style="list-style-type: none"> · For power supply · For EL driver · For LED lighting driver
MIP50**	MIP51**	MIP7**	<ul style="list-style-type: none"> · No restrictions in terms of contract 	<ul style="list-style-type: none"> · No restrictions in terms of contract 	<ul style="list-style-type: none"> · For lamp driver/ car electronics accessories

Note) For details, contact our sales division.