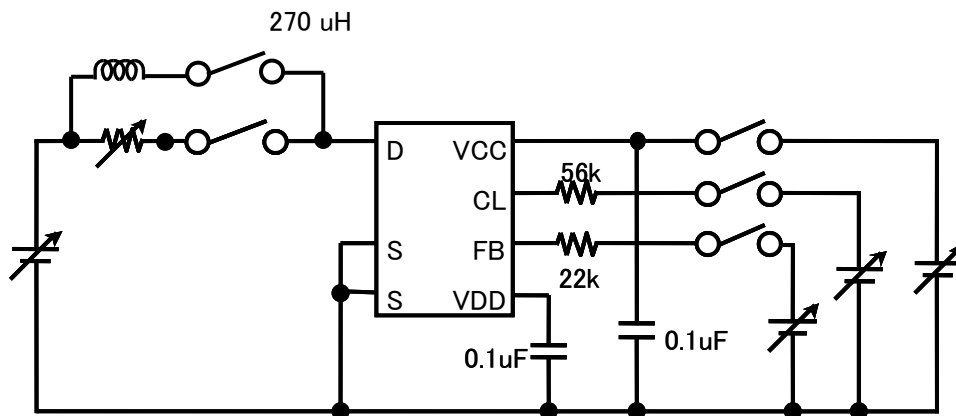


種別/Type	シリコン MOS形集積回路/Silicon MOSFET type Integrated Circuit						
用途/Application	スイッチング電源制御用/For Switching Power Supply Control						
構造/Structure	CMOS形/CMOS type						
等価回路/Equivalent Circuit	添付図/See Figure. 6						
外形/Out Line	DIP7-A1-B		マーク記号/マーキング/Marking		MIP2F2		
A. 絶対最大定格/ABSOLUTE MAXIMUM RATINGS (Ta=25°C±3°C)							
NO.	項目/Item	記号/Symbol	定格/Ratings	単位/Unit	備考/Note		
1	ドレイン電圧 DRAIN Voltage	VD	-0.3 ~ 700	V	※1: 下記パルス幅以内での保証とする (It is guaranteed within the pulse as below.) オン時ブランキング幅 + 過電流保護遅れ時間 Leading Edge Blanking Pulse + Current Limit Delay ton(BLK) + td(OCL)		
2	VCC電圧 VCC Voltage	VCC	-0.3 ~ 45	V			
3	VDD電圧 VDD Voltage	VDD	-0.3 ~ 8	V			
4	フィードバック電圧 FEEDBACK Voltage	VFB	-0.3 ~ 8	V			
5	フィードバック電流 FEEDBACK Current	IFB	500	uA			
6	CL端子電圧 CL Voltage	VCL	-0.3 ~ 8	V			
7	CL端子電流 CL Current	ICL	150	uA			
8	出力ピーク電流 Output Peak Current	IDP	650(※1)	mA			
9	チャネル部温度 Channel Temperature	Tch	150	°C			
10	保存温度 Storage Temperature	Tstg	-55 ~ +150	°C			
B. 電気的特性/ELECTRICAL CHARACTERISTICS							
			測定条件/Measure condition (TC=25°C±2°C)				
No.	項目/Item	記号/Symbol	測定条件/Measure Condition (測定図-1 参照/See Figure 1)	Typ.	Limit		Unit
					Min	Max	
【コントロール機能/CONTROL FUNCTIONS】							
1	出力周波数 Output Frequency	fosc	VCC=15 V, VD=5 V, IFB=20 uA, ICL=50 uA	100	90	110	kHz
		fosc(L)	VCC=15 V, VD=5 V, IFB:OPEN, ICL<ICL1	12	9	15	
2	最大デューティサイクル Maximum Duty Cycle	MAXDC	VCC=15 V, VD=5 V, IFB=20 uA, ICL=50 uA	47.5	45	50	%
3	VDD基準電圧 VDD Voltage	VDD	VCC=15 V, VD=5 V, IFB=20 uA, ICL=50 uA	5.9	5.4	6.4	V
4	VDD停止電圧 UV Lockout Threshold Voltage	VUV	VD=5 V, IFB=20 uA, ICL=50 uA	5.1	4.6	5.6	V

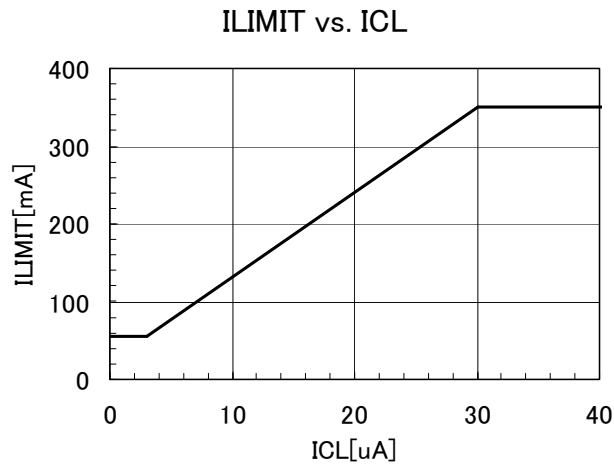
No.	項目/Item	記号/ Symbol	測定条件/Measure Condition (測定図-1 参照/See Figure 1)	Typ.	Limit		Unit
					Min	Max	
【コントロール機能/CONTROL FUNCTIONS】							
5	VCC起動電圧 VCC Start Voltage	VCC(ON)	VD=5 V, IFB=20 μ A, ICL=50 μ A	7.5	6.5	8.5	V
6	VCC充電停止電圧 VCC Charge Stop Threshold Voltage	VCC1	VD=40 V, FB:OPEN, CL:OPEN	12	11	13	V
7	フィードバック電流 Feedback Threshold Current	IFB1	ON \rightarrow OFF VCC=15 V, VD=5 V, ICL=50 μ A	45	25	65	μ A
8	フィードバック電流ヒステリシス Feedback Hysteresis Current	IFBHYS	VCC=15 V, VD=5 V, ICL=50 μ A	2			μ A
9	重負荷時FB端子電流 FB Pin Current at Heavy Load	IFB0	ICC0 \rightarrow ICC VCC=15 V, VD=5 V, ICL=50 μ A	11	7	15	μ A
10	FB端子電圧 FB Pin Voltage	VFB	VCC=15 V, VD=5 V, IFB=20 μ A, ICL=50 μ A	1.0	0.7	1.3	V
11	回路消費電流 Supply Current	ICC	VCC=15 V, VD=5 V, IFB=20 μ A, ICL=50 μ A	0.35	0.25	0.45	mA
12	軽負荷時回路消費電流 Supply Current at Light Load	ICC(OFF)	VCC=15 V, VD=5 V IFB=IFB1+5 μ A, ICL=50 μ A	0.25	0.18	0.32	mA
13	重負荷時回路消費電流 Supply Current at Heavy Load	ICC0	VCC=15 V, VD=5 V, IFB=OPEN, ICL=50 μ A	0.54	0.4	0.68	mA
14	VDD充電電流 VDD Charging Current	Ich1	VDD=0 V, VD=40 V, FB:OPEN, CL:OPEN	3	1	4.6	mA
		Ich2	VDD=4 V, VD=40 V, FB:OPEN, CL:OPEN	1.0	0.3	1.7	mA
15	CL端子電圧 CL Pin Voltage	VCL	VCC=15 V, VD=5 V, FB:OPEN, ICL=15 μ A	2.3	2.0	2.6	V
16	fosc 低下時CL端子電流 Dropped fosc CL Pin Current	ICL1	fosc \rightarrow fosc(L) ※Figure 3 VCC=15 V, VD=5 V, FB:OPEN	11	8	14	μ A
17	fosc 低下時CL端子電流ヒステリシス CL Pin Hysteresis Current	ICLHYS	※Figure 3 VCC=15 V, VD=5 V, FB:OPEN	1.0			μ A
【保護機能/CIRCUIT PROTECTIONS: *は設計保証項目/Design Guarantee Item】							
18	過電流保護検出 Self Protection Current Limit	ILIMIT	※Figure 2/Figure 4 VCC=15 V, FB:OPEN, ICL=50 μ A, DUTY=30%	0.35	0.315	0.385	A
19	ILIMIT 補正係数 ILIMIT modified coefficient	R_slope	※Figure 2/Figure 4 VCC=15 V, FB:OPEN, ICL=50 μ A	28			mA/us
20	最小ILIMIT Minimum ILIMIT	ILIMITmin	Ton=3 μ sec VCC=15 V, FB:OPEN, ICL=0 μ A	55	20	100	mA
*	軽負荷時ドレイン電流 Drain Current at Light Load	ID(OFF)	Ton=3 μ sec VCC=15 V, IFB=IFB1+IFBHYS, ICL=50 μ A	90	30	150	mA
*	オン時ブランキング幅 Leading Edge Blanking Delay	ton(BLK)	VCC=15 V, FB:OPEN, ICL=50 μ A	240	170	310	Ns
*	過電流保護遅れ時間 Current Limit Delay	td(OCL)		150	100	200	Ns
24	過電圧保護検出 Over Voltage Protection	VCC(OV)	VDD=5 V, FB:OPEN, ICL=50 μ A	24	21	27	V
*	過熱保護温度 Thermal Shutdown Temperature	TOTP		140	130	150	$^{\circ}$ C

No.	項目/Item	記号/ Symbol	測定条件/Measure Condition (測定図-1 参照/See Figure 1)	Typ.	Limit		Unit
					Min	Max	
【出力/OUTPUT】							
26	ラッチリセット電圧 Power-up Reset Threshold Voltage	VDDreset		2.6	1.8	3.5	V
27	オン抵抗 ON-State Resistance	RDS(ON)	ID=50 mA	20		27	Ω
28	オフ時ドレイン端子リーク電流 OFF-State Current	IDSS	VCC=27 V, VD=650 V, FB:OPEN, CL:OPEN	10		20	μA
29	ドレイン耐圧 Breakdown Voltage	VDSS	VCC=27 V, ID=100 μA, FB:OPEN, CL:OPEN		700		V
30	立ち上がり時間 Rise Time	tr	※Figure 5 VCC=15 V, VD=5 V, FB:OPEN, ICL=50 μA	100			Ns
31	立ち下がり時間 Fall Time	tf	※Figure 5 VCC=15 V, VD=5 V, FB:OPEN, ICL=50 μA	50			Ns
【電源電圧/SUPPLY】							
32	最小ドレイン電圧 Drain Supply Voltage	VD(MIN)	VCC:OPEN, FB:OPEN, CL:OPEN		50		V

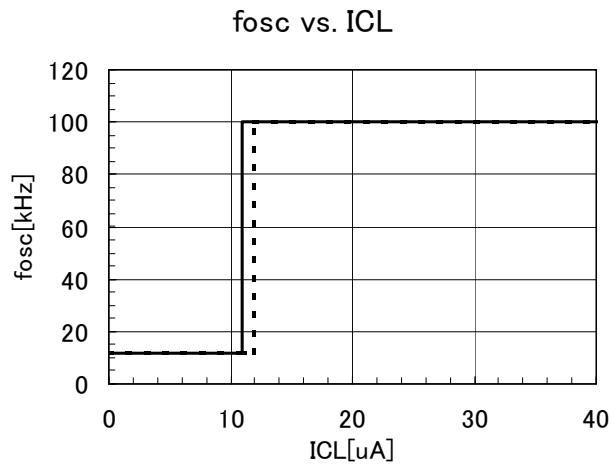
【Fig. 1: 測定回路図/Measure Circuit】



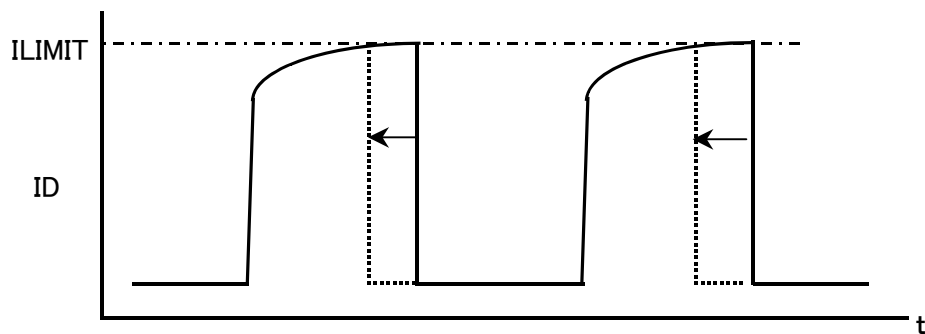
【Fig. 2: ILIMIT vs. ICL Typical Characteristic】



【Fig. 3: fosc vs. ICL Typical Characteristic】

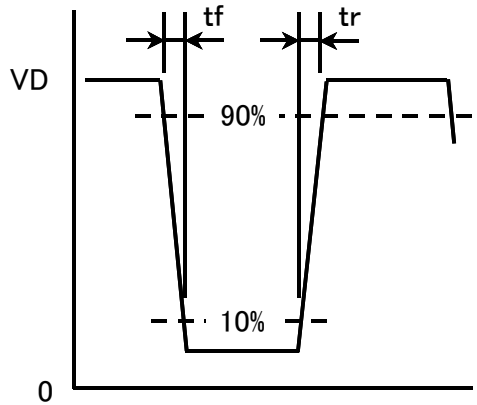


【Fig. 4: ILIMIT Measurement】

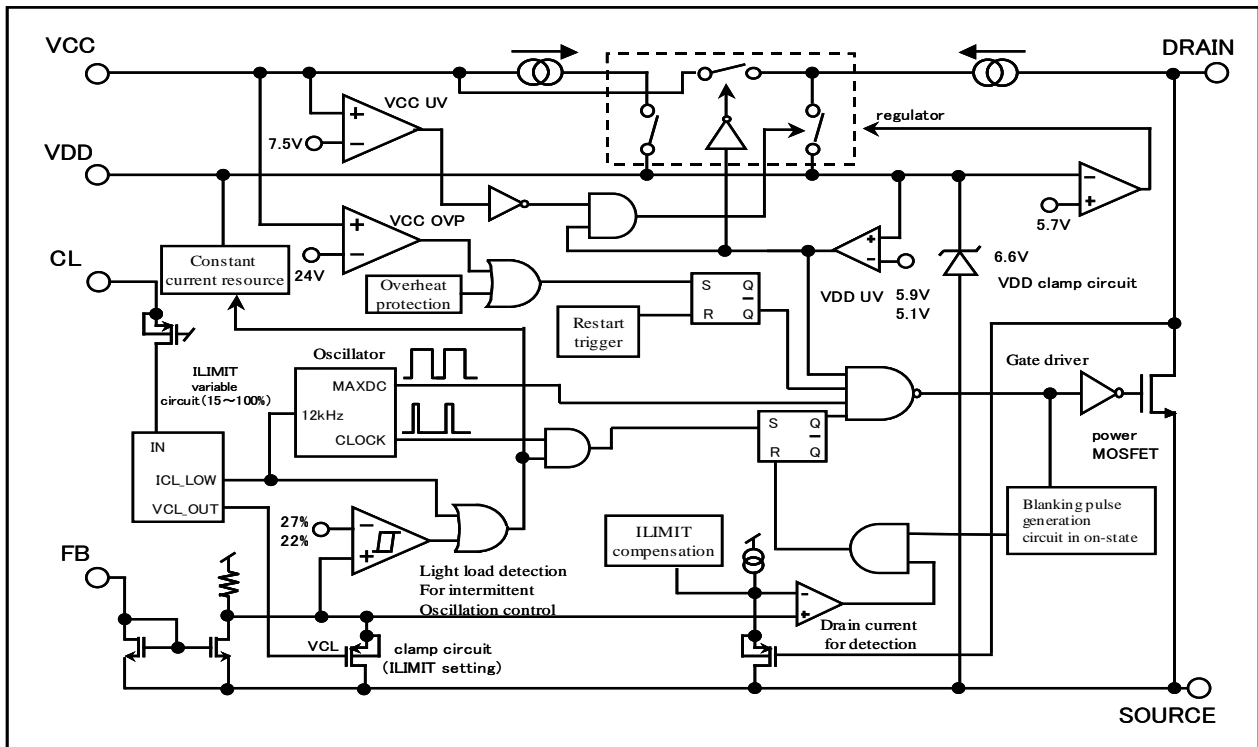


$$R_{\text{slope}} ; \{(\text{ILIMIT at Duty}=30\%) - (\text{ILIMIT at Duty}=10\%)\} / \{(\text{Ton at Duty}=30\%) - (\text{Ton at Duty}=10\%)\}$$

【Fig. 5 : tr, tf Measurement】



【Fig. 6 : Block Diagram】



【使用上の注意1／Precautions for Use 1】

VDD 端子ーGND間には、0.1 μ Fのセラミックコンデンサを使用してください。
Connect a 0.1 μ F ceramic capacitor between VDD pin and GND.

【使用上の注意2／Precautions for Use 2】

以下のような条件では破損し、場合によっては破裂、発煙の可能性があります。以下の使用は避けてください。
The IPD has risks for break-down or burst or giving off smoke in following conditions. Avoid the following use.

- (1) DRAIN 端子と VDD 端子を逆にして、電源基板へ挿入する。
Reverse the DRAIN pin and VDD pin connection to the power supply board.
- (2) DRAIN 端子と VDD 端子をショートする。
DRAIN pin short to VDD pin.
- (3) DRIN端子と FB 端子をショートする。
DRAIN pin short to FB pin.
- (4) DRIN端子とCL端子をショートする。
DRAIN pin short to CL pin.
- (5) DRIN端子と VCC 端子をショートする。
DRAIN pin short to VCC pin.
- (6) VCC 端子と VDD 端子をショートする。
VCC pin short to VDD pin.
- (7) VCC 端子と CL 端子をショートする。
VCC pin short to CL pin.
- (8) VCC 端子と FB 端子をショートする。
VCC pin short to FB pin.

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