Notification about the transfer of the semiconductor business

The semiconductor business of Panasonic Corporation was transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. became under the umbrella of the Nuvoton Group, with the new name of Nuvoton Technology Corporation Japan (hereinafter referred to as "NTCJ").

In accordance with this transfer, semiconductor products will be handled as NTCJ-made products after September 1, 2020. However, such products will be continuously sold through Panasonic Corporation.

Publisher of this Document is NTCJ.

If you would find description "Panasonic" or "Panasonic semiconductor solutions", please replace it with NTCJ.

Except below description page
 "Request for your special attention and precautions in using the technical information and semiconductors described in this book"

Nuvoton Technology Corporation Japan

Doc No. TD4-EA-01867 Revision. 1

Panasonic ____

MIP4120MTSCF

種別/	Type	シリコンMC	S形集積回	路/Silicon M	IOSFET 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	е							
等価	回路/Equivalen	t Circuit	添付図	I∕See Figu	re 1						
外形/Out Line DIP7-A1-B			A1−B	マーク記号/マーキング / Marking MIP412							
A. 絶	対最大定格/Ab	solute Maximu	m Ratings(Ta=25℃±3	3°C)						
NO.	項目/Item			記号/ Symbol	定格/Ratings	単位/ Unit	備考/Note				
1	ドレイン端子電圧 DRAIN Voltage			VD	−0.3 ~ 700	٧	※1 下記パ 保証とす	内で <i>0</i>			
2	VCC端子電圧 VCC Voltage			VCC	−0. 3 ~ 45	٧	The guar				
3	VDD端子電圧 VDD Voltage			VDD	-0.3 ~ 9	٧	オン時ブラ				
4	FB端子電圧 FB Voltage			VFB	−0.3 ~ 6	V	十過電源	れ時間 (OCL)			
5	TR端子電圧 TR Voltage			VTR	−0. 4 ~ 10	V					
6	ドレインピーク電流 Drain Peak Current			IDP	2. 4(%1)	Α	_				
7	チャネル部温度 Channel Temperature			Tch	150	°C	-				
8	保存温度 Storage Tem	perature		Tstg	−55 ~ 150	°C					
B. 電	氢的特性/Elec	ctrical Charact	eristics	;	則定条件/Measure Condition (Tc=25	°C±3°C)					
No.	項目/Item			記号/ Symbol	測定条件/Measure Condition (測定図−1 参照/See Figure 1)	Тур.	Lir Min.	mit Max.	Unit		
【コント	ロール機能/C	ontrol Function	ıs: *は設計	保証項目/De	esign Guarantee Item】			•			
1	VDD基準電圧 VDD Voltage			VDD(REG)	VCC=15 V, IFB=-150 μA, TR=OPEN	5.9	5.4	6.4	V		
2	VCC起動電用 VCC Start Volt	age		VCC(ON)	IFB=-150 μ A, TR=OPEN	12.1	11.1	13.1	٧		
3	VCC停止電日 VCC Stop Volta	- 		VCC(OFF)	IFB=-150 μ A, TR=OPEN	7.7	6.7	8.7	٧		
4		C 起動/停止ヒステリシス電圧 C Auto-restart Hysteresis Voltage		VCCHYS	VCC(ON) -VCC(OFF)	4.4	3.4	5.4	٧		
5	回路消費電流 Supply Current				VCC=15 V, IFB=-150 μA	0.6	0.1	1.1	mA		
6	起動前回路消費電流 Supply Current Before Start-up			ICC(SB)	VCC=VCC(ON)-0.2 V, FB,TR=OPEN	0.35	0.1	0.6	mA		
7 A	フィードバック電流 Feedback Threshold Current			IFB1	ON → OFF VCC=15 V	-290	-350	-230	μΑ		
8	フィードバック Feedback Hyste		ンス	IFBHYS	VCC=15 V,	2.0			μΑ		

Feedback Hysteresis Current

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		記号/ Symbol	測定条件/Measure Condition (測定図-1 参照/See Figure 1)	Тур.	Limit		
No.	項目/Item				Min.	Max.	Unit
【コント	・ロール機能/Control Functions: *は設計	保証項目/De	esign Guarantee Item]				
9	FB端子電圧 FB Pin Voltage	VFB	VCC=15 V, IFB=-150 μA, TR=OPEN	1.8	1.5	2.1	V
10	FB端子短絡電流 FB Pin Short-Circuit Current	IFB0	VCC=15 V, VFB=0 V, TR=OPEN	-490	-640	-340	μΑ
11	軽負荷時回路消費電流 Supply Current at Light Load	ICC(OFF)	VCC=15 V, IFB=IFB1-5 μA, TR=OPEN	0.85		1.35	mA
12	トランスリセット電圧 Trans Reset Voltage	VTH(TR)	VCC=15 V, IFB=-150 μA	0	-0.1	0.1	٧
*13	トランスリセット検出遅れ時間 Trans Reset Delay Time	td(TR)	VCC=15 V, IFB=-150 μA	220			ns
14	タイマ間欠動作時間比 Auto-restart Duty Cycle	TSW/TTIM	VCC=15 V, FB=OPEN	13.5			%
15	間欠動作周波数 Auto-restart Frequency	fTIM	VCC=15 V, FB=OPEN	0.68			Hz
16	VCC 充電電流 VCC Charging Current	ICCH1	VCC=0 V, VD=40 V, FB,VDD=OPEN VCC=10 V, VD=40 V, FB,VDD=OPEN	−3.7 −1.3	-5.7 -2.8	-1.7 -0.5	mA
17	VDD充電電流	IDCH1	VDD=0 V, VD=40 V, FB,VCC=OPEN	-3.3 -1.8	-5.3 -3.3	-1.3 -0.5	mA
*18	VDD Charging Current ターンオフ後マスク時間 Mask Time after Turn-off	td(OFF)	VDD=5 V, VD=40 V, FB,VCC=OPEN VCC=15 V, IFB=-150 μA	8.0	-3.3	-0.5	μ s
*19	間欠停止時TR検出時間 TR detection Time at Intermittent Mode	Toff(TR)	VCC=15 V	10.0			μs
【保護	機能/Circuit Protections:*は設計保証項	目/Design G	uarantee Item]				
20	過電流保護検出 Self Protection Current Limit	ILIMIT		0.6	0.54	0.66	Α
*21	軽負荷時ドレイン電流 Drain Current at Light Load	ID(OFF)	VCC=15 V, IFB=IFB1+IFBHYS	100			mA
*22	オン時ブランキング幅 Leading Edge Blanking Delay	ton(BLK)	VCC=15 V, VFB=3 V	500			ns
*23	過電流保護遅れ時間 Current Limit Delay	td(OCL)	VCC=15 V, VFB=3 V	150			ns
24	過電圧保護検出 Over Voltage Protection	VCC(OV)	IFB=-150 μA	31.5	28.5	34.5	٧
25	VDD 過電圧保護検出電流 VDD Over Voltage Protection Detection Current	IDD(OV)	VCC=15 V, IFB=-150 μA	9.5	6.5	12.5	mA
26	VDD 端子クランプ電圧 VDD Clamp Voltage	VDD(OV)	VCC=15 V, IDD=IDD(OV), IFB=-150 μ A	6.6	VDD(REG)	7.6	٧
27	過負荷保護検出FB電圧 Over Load Protection Detection FB Voltage	VFB(OL)	VCC=15 V, IFB < IFB(OL)	4.4	3.9	4.9	٧
28	過負荷保護検出FB電流	IFB(OL)	VCC=15 V, VFB=3.5 V	-62	-82	-42	μΑ

Over Load Protection Detection FB Current

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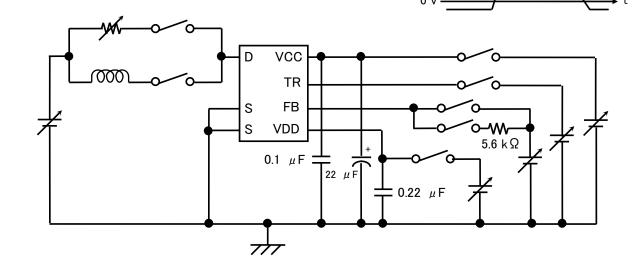
No.	項目/Item	記号/ Symbol	測定条件/Measure Condition (測定図-1 参照/See Figure 1)	Тур.	Limit		11.5
	項目/ Item				Min	Max	Unit
【保護	機能/Circuit Protections:*は設計保証項	[目/Design G	Guarantee Item】				
27	最大才ン時間 Maximum ON time	MAX(ON)	VD=5 V, VCC=15 V, FB=-150 μA	25	18	32	μs
*28	過熱保護温度 Thermal Shutdown Temperature	TOTP		140	130	150	°C
*29	ラッチリセット電圧 Power-up Reset Threshold Voltage	VDDreset		2.7	1.7	3.7	٧
【出力·	·····································						
30	オン抵抗 ON-State Resistance	RDS(ON)	VCC=15 V, ID=300 mA, VFB=3 V	4.9		6.7	Ω
31	オフ時ドレイン端子リーク電流 Off-State Drain Pin Leakage Current	IDSS	VCC=35 V, VD=650 V FB,TR=OPEN	6.0		20	μΑ
32	ドレイン耐圧 Breakdown Voltage	VDSS	VCC=35 V, ID=100 μ A, FB,TR=OPEN		700		٧
33	立ち上がり時間 Rise Time	tr		80			ns
34	立ち下がり時間 Fall Time	tf	※ Figure 3 VCC=15 V, FB=-150 μA, VD=5 V	40			ns
【電源	部/SUPPLY VOLTAGE CARACTERISTIC	s]					
35	最小ドレイン電圧 DRAIN Supply Voltage	VD(MIN)	VCC,FB,TR=OPEN		50		٧

※ VD、TRの測定条件について、特に記述なき場合は、VDには、ILIMIT が機能する 以上の電圧を印加し、VTR はパワーMOSFET がオンできる状態とします。

When there is especially no description about the measurement conditions of VD and VTR, VD is applied more than voltage which ILIMIT operate and VTR is taken as the state which Power MOSFET can be turned on.

パワーMOSFETオン信号 Power MOSFET ON Signal

VTR

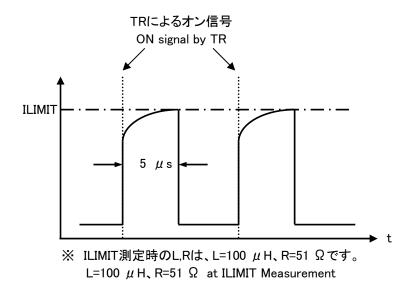


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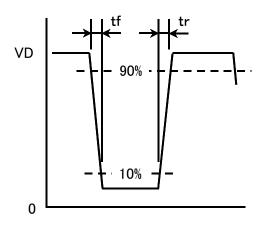
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【Figure 2:ILIMIT 測定/ILIMIT Measurement】



【Figure 3:tr、tf 測定/tr、tf Measurement】

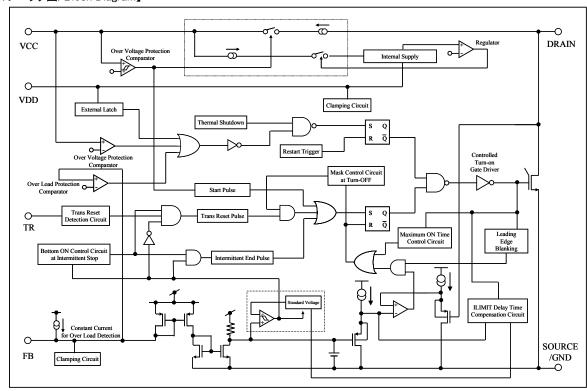


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【Fig. 4:ブロック図/Block Diagram】



【使用上の注意1/Precautions for Use 1】

VDD-SOURCE 間には、必ず端子のすぐ近くに(0.1 μF以上の)セラミックコンデンサを接続して下さい。 Connect a Ceramic Capacitor(over 0.1 μF) between VDD and SOURCE.

【使用上の注意2/Precautions for Use 2】

VCC 端子に接続する電解コンデンサのオープン試験に対する二次側出力上昇の保護として、VCC-SOURCE 間に 0.1uF 以上のセラミックコンデンサを接続することを推奨します。

Connect a ceramic capacitor over 0.1uF between VCC and SOURCE. As protection of a secondary side OUTPUT rise against the open test of the electrolytic capacitor connected to VCC pin

【使用上の注意3/Precautions for Use】

以下のような使用条件では、IPDが破損し、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。 IPD has danger of breaking-down, and then bursting or getting off smoke under the use of the following conditions. Do not use at such conditions.

- 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) DRAIN端子と FB 端子をショートする。 / DRAIN pin short to FB pin.
- (4) DRAIN端子とTR端子をショートする。 / DRAIN pin short to TR pin.
- (5) DRAIN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 FB 端子をショートする。 / VCC pin short to FB pin.
- (8) VCC 端子と TR 端子をショートする。 / VCC pin short to TR pin.

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