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.

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※ 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

Panasonic

MIP2G40MTSCF

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 a Switching Power Supply Control		
構造／Structure	CMOS形／CMOS type		
等価回路／Equivalent Circuit	付図／See Figure		
外形／Out Line	DIP7-A1-B	マーク記号／マーキング／Marking	MIP2G4

A. 絶対最大定格／ABSOLUTE MAXIMUM RATINGS（Ta＝25℃±3℃）

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)
2	VCC電圧 VCC Voltage	VCC	−0.3 ～ 45	V	
3	VDD電圧 VDD Voltage	VDD	−0.3 ～ 10	V	
4	フィードバック電圧 FEEDBACK Voltage	VFB	−0.3 ～ 8	V	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)
5	CL端子電圧 CL Voltage	VCL	−0.3 ～ 8	V	
6	出力ピーク電流 Output Peak Current	IDP	2.5（※1）	A	
7	チャネル部温度 Channel Temperature	Tch	150	℃	
8	保存温度 Storage Temperature	Tstg	−55 ～ +150	℃	

B. 電気的特性／ELECTRICAL CHARACTERISTICS

測定条件／Measure condition（TC=25℃±3℃）

No.	項目／Item	記号／Symbol	測定条件／Measure Condition （測定図-1 参照／See Figure 1）	Typ.	Limit Min	Limit Max	Unit
【コントロール機能／CONTROL FUNCTIONS】							
1	出力周波数 Output Frequency	fosc	VCC=15V, VD=5V, IFB=−50uA, CL:OPEN	100	90	110	kHz
2	最大デューティサイクル Maximum Duty Cycle	MAXDC	VCC=15V, VD=5V, IFB=−50uA, CL:OPEN	47.5	45	50	%
3	VDD基準電圧 VDD Voltage	VDD	VCC=15V, VD=5V, IFB=−50uA, CL:OPEN	5.8	5.3	6.4	V
4	VDD停止電圧 UV Lockout Threshold Voltage	VUV	VCC=15V, VD=5V, IFB=−50uA, CL:OPEN	4.9	4.3	5.4	V
5	VCC起動電圧 VCC Start Voltage	VCC(ON)	VD=5V, IFB=−50uA, CL:OPEN	7.3	6.4	8.0	V
6	VCC充電停止電圧 VCC Charge Stop Threshold Voltage	VCC1	VD=40V, IFB<IFB1, CL:OPEN	12.0	10.5	13.5	V
7	フィードバック電流 Feedback Threshold Current	IFB1	ON → OFF ※Figure 2 VCC=15V, VD=5V, CL:OPEN	−170	−230	−120	uA
8	フィードバック電流ヒステリシス Feedback Hysteresis Current	IFBHYS	※Figure 2 VCC=15V, VD=5V, CL:OPEN	6.0			uA

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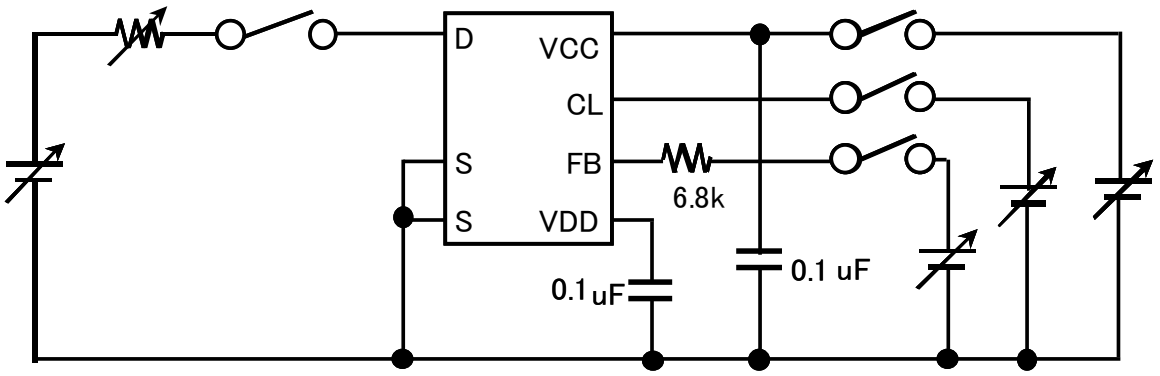
Panasonic MIP2G40MTSCF

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】							
9	VFB=0V 時FB端子電流 FB Pin Current at VFB=0V	IFB0	VFB=0V ※Figure 3 VCC=15V, VD=5V, CL:OPEN	−450	−600	−300	uA
10	FB端子電圧 FB Pin Voltage	VFB1	IFB=IFB1,VCC=15V, VD=5V, CL:OPEN	1.6	1.0	2.2	V
		VFB	IFB=−50uA,VCC=15V, VD=5V, CL:OPEN	1.8	1.2	2.4	V
11	回路消費電流 Supply Current	ICC	VCC=15V, VD=5V, IFB=−50uA, CL:OPEN	0.6	0.3	1.0	mA
12	回路最大消費電流 Maximum Supply Current	ICC(MAX)	IFB=IFB1+5uA VCC=15V, VD=5V,CL:OPEN	0.8	0.3	1.2	mA
13	軽負荷時回路消費電流 Supply Current at Light Load	ICC(OFF)	IFB=IFB1−5uA VCC=15V, VD=5V,CL:OPEN	0.55	0.3	0.9	mA
14	VDD充電電流 VDD Charging Current	Ich1	VDD=0V, VD=40V, FB:OPEN, CL:OPEN	2.7	1	5	mA
		Ich2	VDD=5V, VD=40V, FB:OPEN, CL:OPEN	1.7	0.5	3	mA
15	ﾘﾓｰﾄ OFF 時CL端子電流 CL Pin Current at Remote Off	ICLrm1	ON→OFF VCC=15V, VD=5V, IFB=−50uA	−400	−460	−340	uA
16	ﾘﾓｰﾄ OFFCL端子電流ヒステリシス CL Pin Hysteresis Current	ICLrmHYS	VCC=15V, VD=5V, IFB=−50uA	30	5	60	uA
17	VCL=0V 時CL端子電流 CL Pin Current at VCL=0V	ICL0	VCL=0V VCC=15V, VD=5V, IFB=−50uA	−550	−700	−400	uA
18	CL端子電圧 CL Pin Voltage	VCL	ICL=−50uA VCC=15V, VD=5V, IFB=−50uA	1.3	0.7	1.9	V
19	ﾘﾓｰﾄ OFF 時CL端子電圧 CL Pin Voltage at Remote Off	VCL1	ICL=ICLrm1 VCC=15V, VD=5V, IFB=−50uA	1.0	0.4	1.6	V
【保護機能／CIRCUIT PROTECTIONS:*は設計保証項目/Design Guarantee Item】							
20	FB過負荷保護電圧 FB Over Load Protection	VFB(OLP)	※Figure 3 VCC=15V, CL:open	4.7	4.0	5.4	V
21	過負荷時 FB 充電電流 FB Charging Current at Over Load	IFB(OLP)	※Figure 3 VCC=15V, VFB=4V, CL:open	−20	−35	−5	uA
22	過電流保護検出 Self Protection Current Limit	ILIMIT	※Figure 4 VCC=15V, FB:poen ,CL:open ,	1.0	0.9	1.1	A
23	最小ILIMIT Minimum ILIMIT	ILIMITmin	※Figure 5 VCC=15V, FB:open, ICL<ICL_L	0.75	0.6	0.9	A
* 24	ILIMIT 低下時 ICL CL Pin Current at ILMITmin.	ICL_H	VCC=15V, FB:open ※Figure 5	−80		−50	uA
		ICL_L	VCC=15V, FB:open ※Figure 5	−90	−130		uA
* 25	ICL_H−ICL_L	ΔICL_HL	※Figure 5 VCC=15V, FB:open	10		50	uA
* 26	軽負荷時ドレイン電流 Drain Current at Light Load	ID(OFF)	VCC=15V, IFB=IFB1, ICL=30uA	0.15			mA
* 27	オン時ブランキング幅 Leading Edge Blanking Delay	ton(BLK)1	VCC=15V, IFB=IFB1, CL:open	100			ns
		ton(BLK)2	VCC=15V, IFB=−50uA, CL:open	400			ns

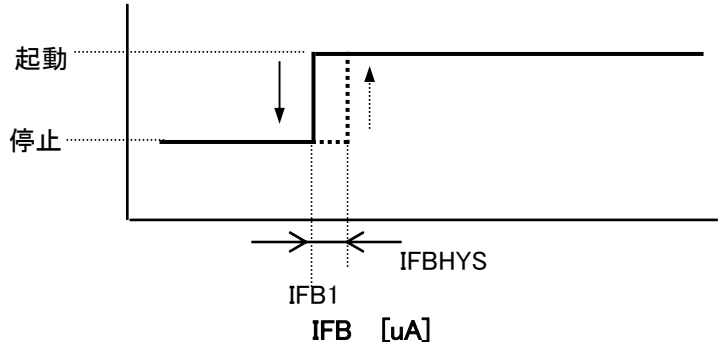
Panasonic MIP2G40MTSCF

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	
* 28	過電流保護遅れ時間 Current Limit Delay	td(OCL)		150			ns
29	VCC 過電圧保護検出 VCC Over Voltage Protection	VCC(OVP)	VD=5V, IFB=-50uA, CL:open	30	25	35	V
30	VDD 過電圧保護検出 VDD Over Voltage Protection	VDD(OVP)	VD=5V, IFB=-50uA, CL:open	7.5	6.5	9.0	V
31	VDD 過電圧保護検出時 IDD 電流 IDD Current at VDD OVP	IDD(OVP)	VDD=VDD(OV) VD=5V, IFB=-50uA, CL:open	4.5	2.5	10	mA
* 32	過熱保護温度 Thermal Shutdown Temperature	TOTP		140	130	150	℃
33	ラッチリセット電圧 Power-up Reset Threshold Voltage	VDDreset		2.7	1.8	3.5	V
【出力／OUTPUT】							
34	オン抵抗 ON-State Resistance	RDS(ON)	ID=0.3A	5.2		6.7	Ω
35	オフ時ドレイン端子リーク電流 OFF-State Current	IDSS	VCC=15V,VD=650V, VFB=0V, CL:OPEN	10		20	uA
36	ドレイン耐圧 Breakdown Voltage	VDSS	VCC=15V,ID=100uA, VFB=0V, CL:OPEN		700		V
37	立ち上がり時間 Rise Time	tr	※Figure 6 VCC=15V, VD=5V, IFB=-50uA,CL:OPEN	300			ns
38	立ち下がり時間 Fall Time	tf	※Figure 6 VCC=15V, VD=5V, IFB=-50uA,CL:OPEN	50			ns
【電源電圧／SUPPLY】							
39	最小ドレイン電圧 Drain Supply Voltage	VD(MIN)	VCC：OPEN, FB:OPEN, CL:OPEN		50		V

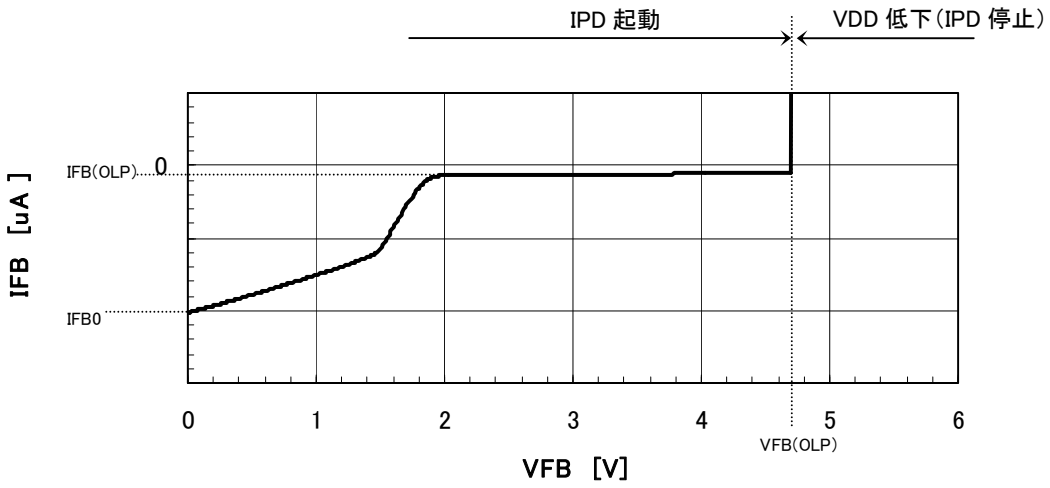
【Fig. 1：測定回路図／Measure Circuit】



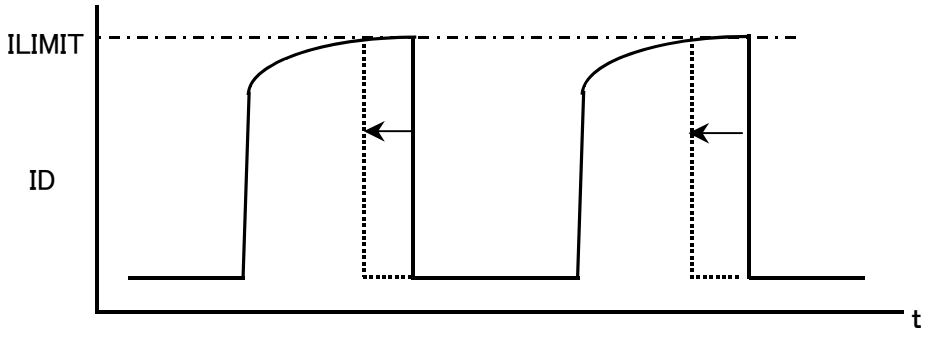
【Fig. 2： IFB Typical Characteristic】



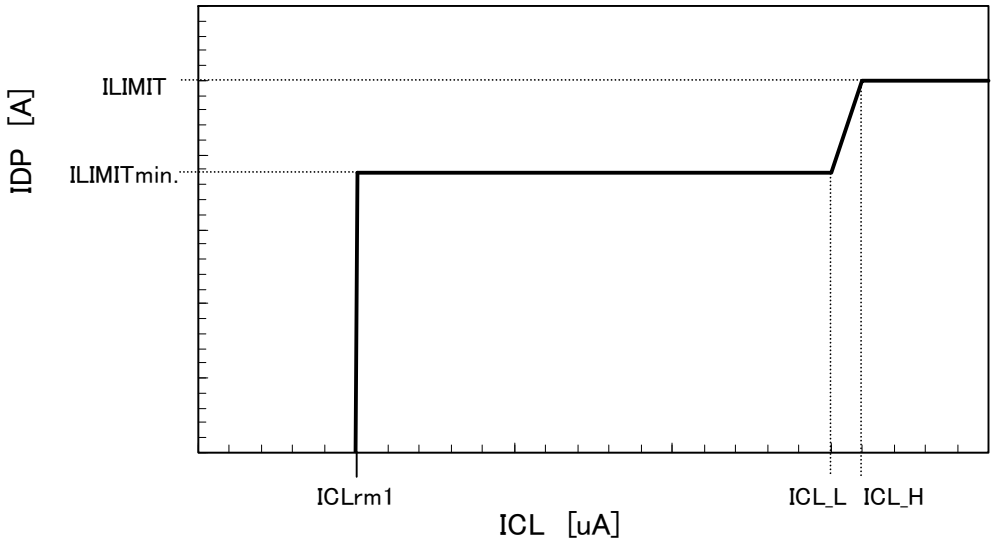
【Fig. 3：VFB vs. IFB Typical Characteristic】



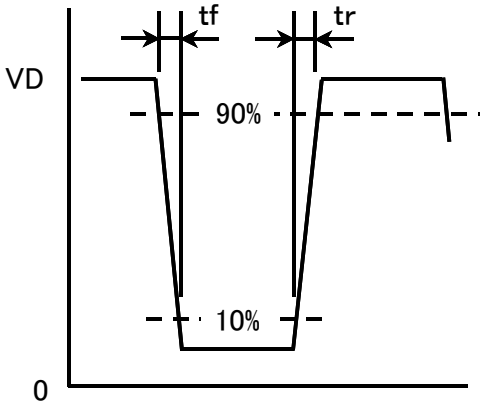
【Fig. 4】



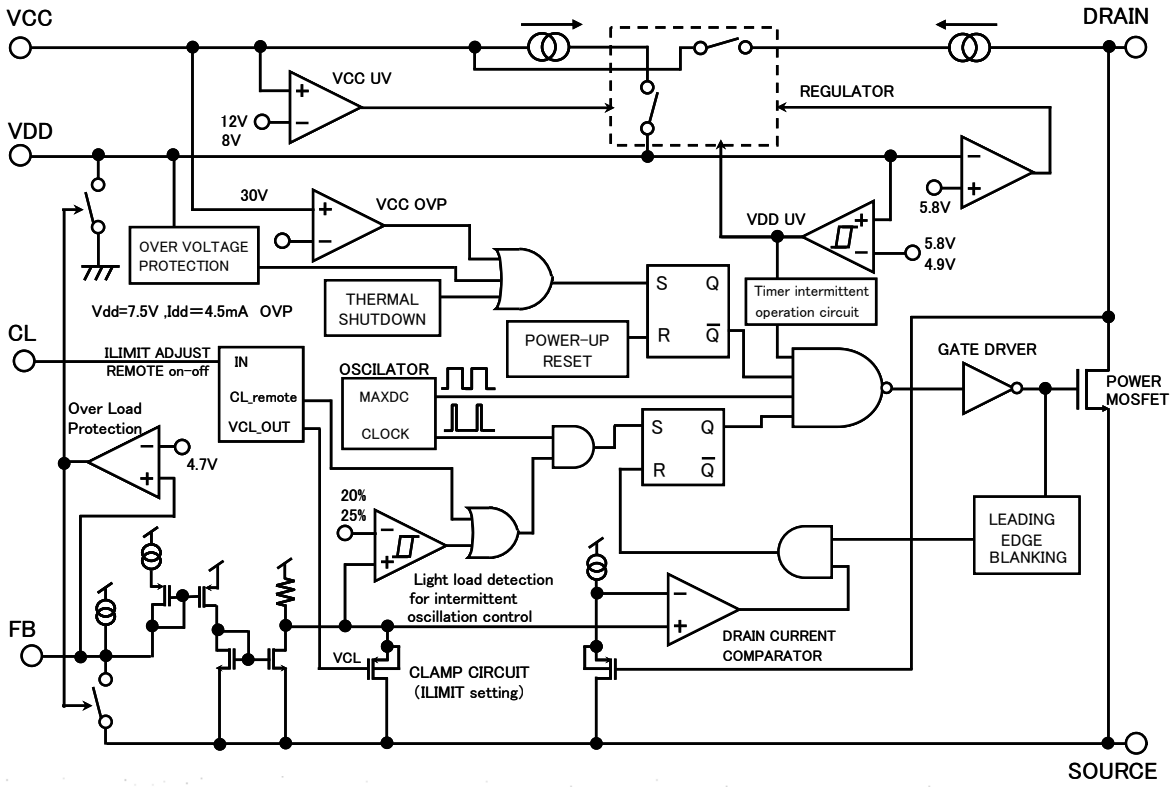
【Fig. 5:ICL vs. ID Typical Characteristic】



【Fig. 6】



【Fig. 6: Block Figure 】



【使用上の注意1／Precautions for Use 1】
VDD 端子ーGND間には、0. 1uFのセラミックコンデンサを使用してください。
Connect a 0.1uF 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 is possibility of break-down or burst or giving off smoke as follows. Avoid the following use.

(1) DRAIN 端子と VDD 端子をショートする。
DRAIN pin short to VDD pin.

(2) DRAIN端子と FB 端子をショートする。
DRAIN pin short to FB pin.

(3) DRAIN 端子と CL 端子をショートする。
DRAIN pin short to CL pin.

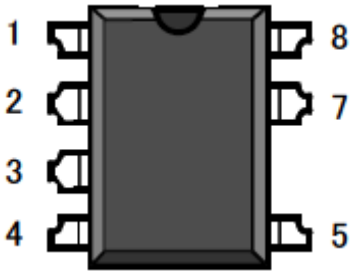
(4) DRAIN端子と VCC 端子をショートする。
DRAIN pin short to VCC pin.

(5) VCC 端子と VDD 端子をショートする。
VCC pin short to VDD pin.

(6) VCC 端子と FB 端子をショートする。
VCC pin short to FB pin.

(7) VCC 端子と CL 端子をショートする。
VCC pin short to CL pin.

【Fig. 8:Pin Alignment】



Pin No.	Pin name
1	VDD
2	FB
3	CL
4	VCC
5	Drain
6	—
7	Source
8	Source

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