

## **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

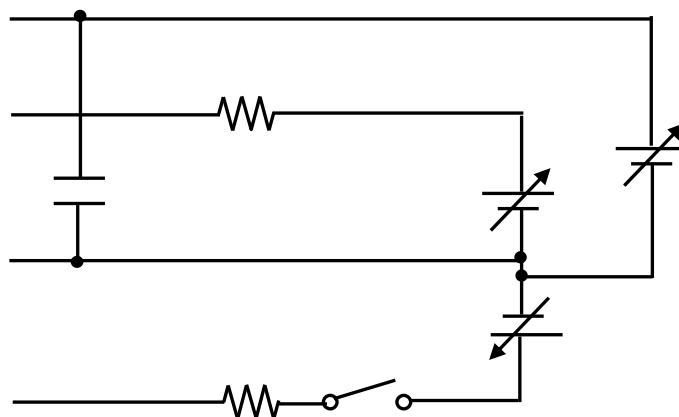
"Request for your special attention and precautions in using the technical information and semiconductors described in this book"

**Nuvoton Technology Corporation Japan**

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	ブロック図 / See Figure 2						
外形 / Out Line	DIP7 - A1 - B	マーク記号 / マーキング / Marking	MIP291				
<b>A. 絶対最大定格 / ABSOLUTE MAXIMUM RATINGS (Ta = 25 ± 3 )</b>							
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  オン時ブランキング幅 + 過電流保護遅れ時間 ton(BLK) + td(OCL)		
2	バイパス電圧 BYPASS Voltage	VB	- 0.3 ~ 7	V			
3	フィードバック電圧 FEEDBACK Voltage	VF	- 0.3 ~ 7	V			
4	出力ピーク電流 Output Peak Current	IDP	420 ( 1 )	mA			
5	チャネル部温度 Channel Temperature	Tch	150				
6	保存温度 Storage Temperature	Tstg	- 55 ~ + 150				
<b>B. 電気的特性 / ELECTRICAL CHARACTERISTICS</b>				測定条件 / Measure condition (TC=25 ± 2 )			
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	VBypass=VCC+0.2 V,FB:OPEN	44	40	48	kHz
2	最大デューティサイクル Maximum Duty Cycle	MAXDC	VBypass=VCC+0.2 V,FB:OPEN	68	65	71	%
3	フィードバックしきい値電流 Feedback Threshold Current	IFB	VBypass=VCC+0.2 V	-50	-85	-30	uA
4	フィードバックヒステリシス電流 Feedback Hysteresis Current	IHYS	VBypass=VCC+0.2 V	12	5	18	uA
5	フィードバック端子電圧 Feedback Pin Voltage	VFB	VBypass=VCC+0.2 V,iFB=-25 uA	1.5	1.1	1.9	V
6	バイパスコンデンサ電圧 Bypass Capacitor Voltage	VCC	VD=VD(MIN),FB:OPEN	5.8	5.4	6.1	V
7	バイパス供給電流 Bypass Supply Current	IS	VBypass=VCC+0.2 V,VFB=0 V	180	90	300	uA
			VBypass=VCC+0.2 V,FB:OPEN	160	70	280	uA
8	バイパスコンデンサ充電電流 Bypass Capacitor Charge Current	Ich	VD=130 V,VBypass=0 V,FB:OPEN	-2.5	-5	-1.25	mA
			VD=130 V,VBypass=4 V,FB:OPEN	-1.5	-3	-0.5	mA
9	フィードバック短絡電流 Feedback Shortcircuit Current	IFB0	VBypass=VCC+0.2 V,VFB=0 V	-40	-75	-20	uA
10	低電圧停止しきい値電圧 UV Lockout Threshold Voltage	VUV	VFB=1.5 V	5.1	4.7	5.5	V

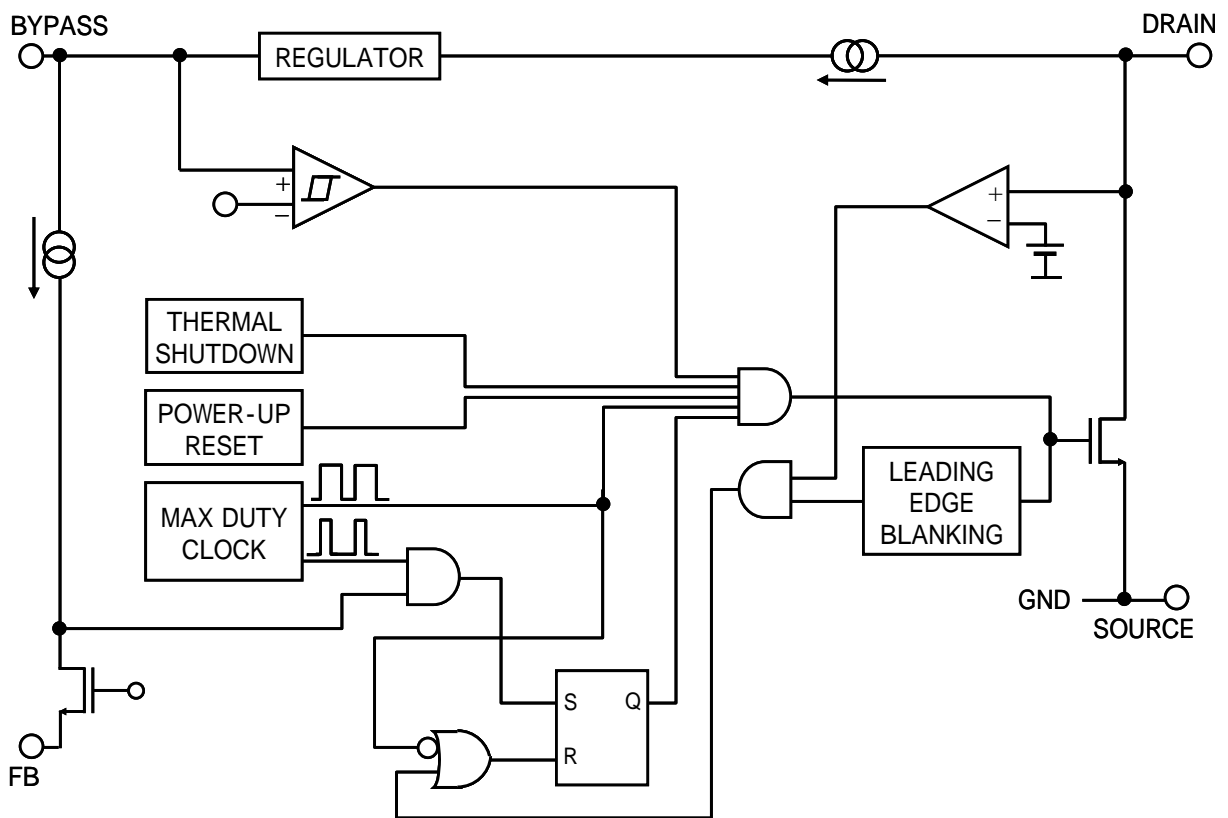
【保護機能 / CIRCUIT PROTECTIONS: *は設計保証項目 / Design Guarantee Item】							
11	過電流保護検出 Self-Protection Current Limit	ILIMIT	V <sub>Bypass</sub> =V <sub>CC</sub> +0.2 V, V <sub>FB</sub> =1.5 V	0.22	0.20	0.24	A
* 12	オン時ブランキング幅 Leading Edge Blanking Delay	ton(BLK)		200			ns
* 13	過電流保護遅れ時間 Current Limit Delay	td(OCL)		100			ns
* 14	過熱保護温度 Thermal Shutdown Temperature	TOTP		140	130	150	
* 15	過熱保護温度ヒステリシス Thermal Shutdown Hysteresis	OTP		70			
【出力 / OUTPUT】							
16	オン抵抗 ON-State Resistance	RDS(ON)	I <sub>D</sub> =25mA	31.2		36	
17	オフ時ドレイン端子リーク電流 OFF-State Current	IDSS	V <sub>Bypass</sub> =V <sub>CC</sub> +0.2 V V <sub>FB</sub> =0 V, V <sub>DS</sub> =650 V	20		200	uA
18	ドレイン耐圧 Breakdown Voltage	VDSS	V <sub>Bypass</sub> =V <sub>CC</sub> +0.2 V V <sub>FB</sub> =0 V, I <sub>DS</sub> =100 uA		700		V
19	立ち上がり時間 Rise Time	tr		100			ns
20	立ち下がり時間 Fall Time	tf		40			ns
【電源電圧 / SUPPLY】							
21	最小ドレイン電圧 Drain Supply Voltage	VD(MIN)			50		V
* 22	熱抵抗 Thermal Resistance	R <sub>th(j-a)</sub>	エポキシ基板 (3 cm × 3 cm) 実装時 Ta=25 Surface Mounted on Epoxy Board	90			

【Fig. 1: 測定回路図 / Measure Circuit】



端子説明 / Pin explanation  
 : BYPASS  
 : FB  
 、 、 、 : SOURCE  
 : DRAIN

[Fig.2: Block Figure ]



【Note: グローバルコードについて / Global code number】

No.1 包装コード / Classification of packing

No.2 リードフォーミングコード / Classification of lead forming

【使用上の注意1 / Precautions for Use 1】

BYPASS 端子 - GND間には、0.1  $\mu$ 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  $\mu$ F ceramic capacitor between BYPASS pin and GND.

【使用上の注意2 / Precautions for Use 2】

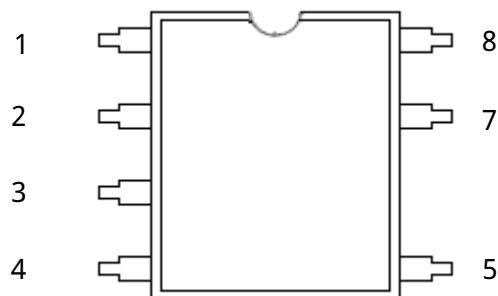
以下のような条件では破損し、場合によっては破裂、発煙の可能性があります。以下の使用は避けてください。  
The IPD has risks for break-down or burst or giving off smoke in following conditions. Avoid the following use.

- (1) DRAIN 端子とFB端子を逆にして、電源基板へ挿入する。  
Reverse the DRAIN pin and FB pin connection to the power supply board.
- (2) DRAIN 端子とBYPASS 端子をショートする。  
Short DRAIN pin to BYPASS pin.
- (3) DRAIN端子とFB 端子をショートする。  
Short DRAIN pin to FB pin.

端子配置図 / Pin Layout

<パッケージコード / Package code : DIP7-A1-B>

対象品種 / Objective Product Category : MIP series (IPD)



Pin No.	端子名 / Terminal name						
	MIP025*ST** MIP28**MT** MIP29**MT** MIP38**MT**	MIP024*ST**	MIP022*ST** MIP2E**MT** MIP3E**MT**	MIP2A**MT** MIP2C**MT** MIP2D**MT** MIP2G**MT** MIP2F**MT**	MIP2H**MT**	MIP2J**MT**	MIP41**MT**
1	BYPASS	Multi Function	Source	VDD	VDD	VDD	VDD
2	Source	Source	Source	FB	FB	NC	FB
3	Source	Source	Source	CL	OLP	TR	TR
4	FB	Control	Control	VCC	VCC	VCC	VCC
5	Drain	Drain	Drain	Drain	Drain	Drain	Drain
6	-	-	-	-	-	-	-
7	Source	Source	Source	Source	Source	Source	Source
8	Source	Source	Source	Source	Source	Source	Source

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