Ordering number : ENN8294

SANYO Semiconductors
DATA SHEET

ExPD (Excellent Power Device)

TN6Q04 — Quasi-Resonant Switching Power Supply ExPD

Features

- Quasi-resonant type original control IC.
- High voltage power MOSFET with current sense.
- Low input voltage protection (self reset)
- Overvoltage protection (latch).
- Overcurrent protection (pulse-by-pulse).

Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	unit
[All voltage parameters are absolute voltage referenced to GND]				
Drain-to-Source Voltage	V_{DSS}	3-5	650	V
Drain Current (DC)	I_D	3-5	5.5	A
Drain Current (Pulse)	I_{DP}	3-5 PW≤10μs, duty cycle≤1%	16.5	A
V_{DD} Pin Applied Voltage	V_{DD}	4-5	−0.3 to 16.7	V
FB Pin Applied Voltage	V_{FB}	1-5	−0.3 to V_{DD}+0.3	V
EDGE Pin Applied Voltage	V_{EDGE}	2-5	−0.3 to V_{DD}+0.3	V
Allowable Power Dissipation	P_D		2	W
		Tc=25°C	35	W
Operating Temperature	Topr		−25 to +125	°C
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		−55 to +150	°C
Avalanche Energy (Single Pulse) *1	E_{AS}	3-5	155	mJ
Avalanche Current *2	I_{AV}	3-5	5.5	A

*1 V_{DD}=50V, L=10mH, I_{AV}=5.5A

*2 L≤10mH, single pulse

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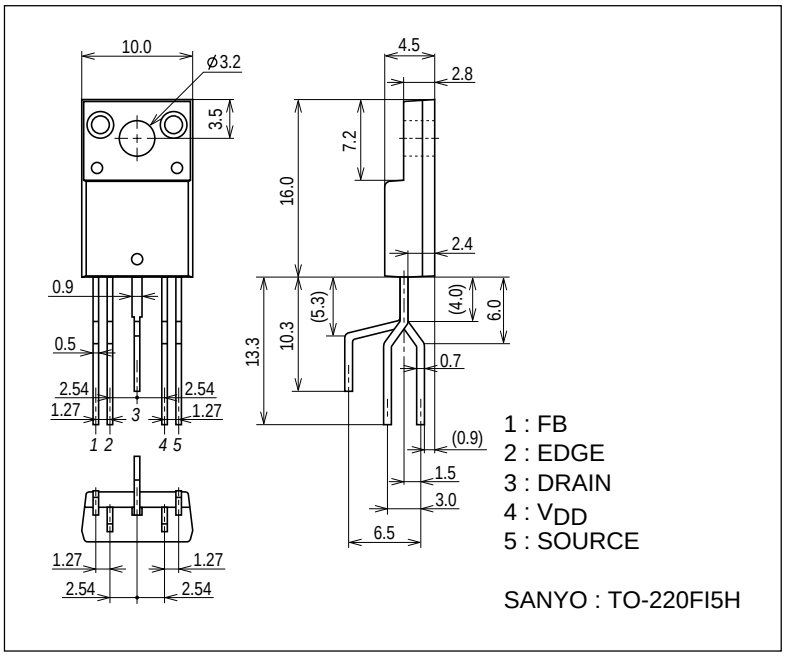
Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	3-5 I_D=1mA, V_{DD}=0	650			V
Zero-Gate Voltage Drain Current	I_{DSS}	3-5 V_{DS}=650V, V_{DD}=0			1	mA
Static Drain-to-Source On-State Resistance	R_{DS}(on)	3-5 I_D=2.8A, V_{DD}=15V		1.2	1.6	Ω
Input Capacitance	Ciss	V_{DS}=20V, f=1MHz		1450		pF
Output Capacitance	Coss	V_{DS}=20V, f=1MHz		250		pF
[IC]						
Power Supply Line Breakdown Voltage	$V_{(BR)DD}$	4-5 I_{DD}=1mA, V_{FB}=0	16.7			V
Overvoltage Input Latch Shutdown Threshold Voltage	OVP	4-5	15.7	16.5	17.3	V
Burst Mode Start Threshold Voltage	VBon	4-5 V_{EDGE}=V_{DD}	15.2	16.0	16.8	V
Burst Mode Stop Threshold Voltage	VBoff	4-5 V_{EDGE}=V_{DD}	14.6	15.4	16.2	V
Burst Mode Hysteresis Voltage	ΔVB	4-5 V_{EDGE}=V_{DD}		0.6		V
Low Voltage Protection ReleaseThreshold Voltage (Latch Reset Threshold Voltage)	UVH	4-5	9.1	9.9	10.7	V
Low Voltage Protection Operation Threshold Voltage	UVL	4-5	8.0	8.8	9.6	V
Low Voltage Protection Hysteresis Voltage	ΔUV	4-5		1.1		V
Feedback Detection Threshold Voltage	V_{FB}	1-5	0.58	0.70	0.82	V
Edge Signal Release Threshold Voltage	V_{EDGE}-H	2-5	2.3	2.6	2.9	V
Edge Signal Detection Threshold Voltage	V_{EDGE}-L	2-5	1.6	1.9	2.2	V
Edge Signal Hysteresis Voltage	ΔV_{EDGE}	2-5		0.7		V
Reference Oscillation Frequency	fosc	3-5 V_{EDGE}=0	30	35	40	kHz
Maximum Oscillation Frequency	fmax	3-5	150	180	210	kHz
Power Supply Current (at start-up)	I_{DD}(on)	4-5		200		μA
Minimum ON Time	ton(min)	3-5		300		ns
Step Drive Voltage	tstep	3-5		200		ns
Step Drive Gate Voltage	VGstep	3-5		V_{DD}-5.7		V

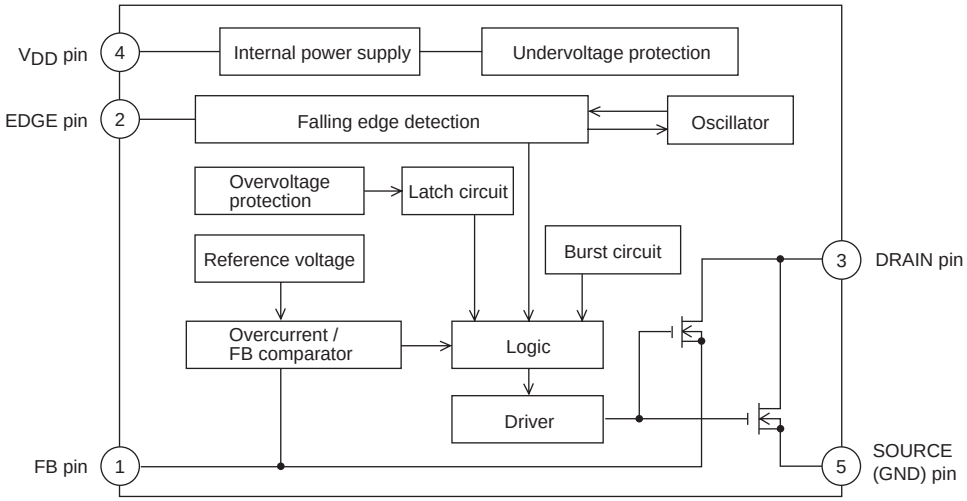
Package Dimensions

unit : mm

2249



Block Diagram



Pin Definitions and Functions

Pin No.	Symbol	Name	Function
1	FB	Overcurrent / feedback terminal	Overcurrent detection / voltage control input
2	EDGE	EDGE dtection terminal	Delay EDGE voltage input
3	DRAIN	DRAIN terminal	Power MOSFET drain
4	V_{DD}	Power supply terminal	Input for start-up voltage and drive voltage
5	SOURCE (GND)	Source (Ground) terminal	Power MOSFET source (ground)

Sample Application Circuit