



# TN6Q04 — ExPD (Excellent Power Device) 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 <sub>DSS</sub>	3-5	650	V
Drain Current (DC)	I <sub>D</sub>	3-5	5.5	A
Drain Current (Pulse)	I <sub>DP</sub>	3-5 PW≤10μs, duty cycle≤1%	16.5	A
V <sub>DD</sub> Pin Applied Voltage	V <sub>DD</sub>	4-5	-0.3 to 16.7	V
FB Pin Applied Voltage	V <sub>FB</sub>	1-5	-0.3 to V <sub>DD</sub> +0.3	V
EDGE Pin Applied Voltage	V <sub>EDGE</sub>	2-5	-0.3 to V <sub>DD</sub> +0.3	V
Allowable Power Dissipation	P <sub>D</sub>		2	W
		T <sub>C</sub> =25°C	35	W
Operating Temperature	T <sub>opr</sub>		-25 to +125	°C
Junction Temperature	T <sub>J</sub>		150	°C
Storage Temperature	T <sub>stg</sub>		-55 to +150	°C
Avalanche Energy (Single Pulse) *1	E <sub>AS</sub>	3-5	155	mJ
Avalanche Current *2	I <sub>AV</sub>	3-5	5.5	A

\*1 V<sub>DD</sub>=50V, L=10mH, I<sub>AV</sub>=5.5A

\*2 L≤10mH, single pulse

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# TN6Q04

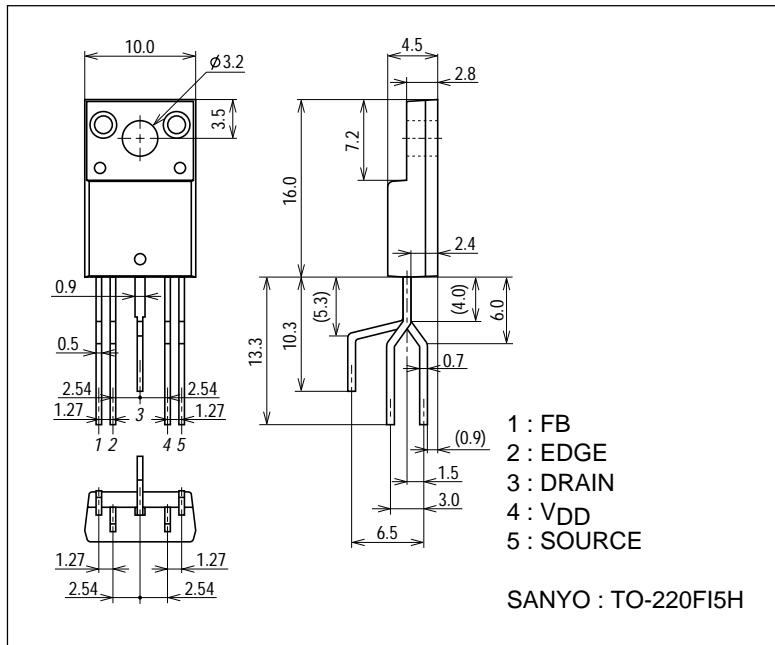
## Electrical Characteristics at Ta=25°C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
[MOSFET]						
Drain-to-Source Breakdown Voltage	V(BR)DSS	3-5 ID=1mA, VDD=0	650			V
Zero-Gate Voltage Drain Current	IDSS	3-5 VDS=650V, VDD=0			1	mA
Static Drain-to-Source On-State Resistance	RDS(on)	3-5 ID=2.8A, VDD=15V		1.2	1.6	Ω
Input Capacitance	Ciss	VDS=20V, f=1MHz		1450		pF
Output Capacitance	Coss	VDS=20V, f=1MHz		250		pF
[IC]						
Power Supply Line Breakdown Voltage	V(BR)DD	4-5 IDD=1mA, VFB=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 VEDGE=VDD	15.2	16.0	16.8	V
Burst Mode Stop Threshold Voltage	VBoff	4-5 VEDGE=VDD	14.6	15.4	16.2	V
Burst Mode Hysteresis Voltage	ΔVB	4-5 VEDGE=VDD		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	VFB	1-5	0.58	0.70	0.82	V
Edge Signal Release Threshold Voltage	VEDGE-H	2-5	2.3	2.6	2.9	V
Edge Signal Detection Threshold Voltage	VEDGE-L	2-5	1.6	1.9	2.2	V
Edge Signal Hysteresis Voltage	ΔVEDGE	2-5		0.7		V
Reference Oscillation Frequency	fosc	3-5 VEDGE=0	30	35	40	kHz
Maximum Oscillation Frequency	fmax	3-5	150	180	210	kHz
Power Supply Current (at start-up)	IDD(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		VDD-5.7		V

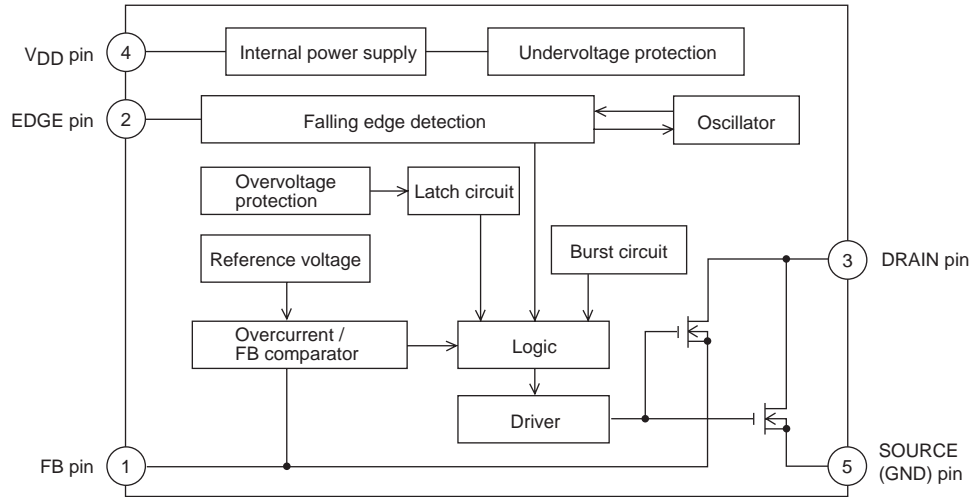
## Package Dimensions

unit : mm

2249



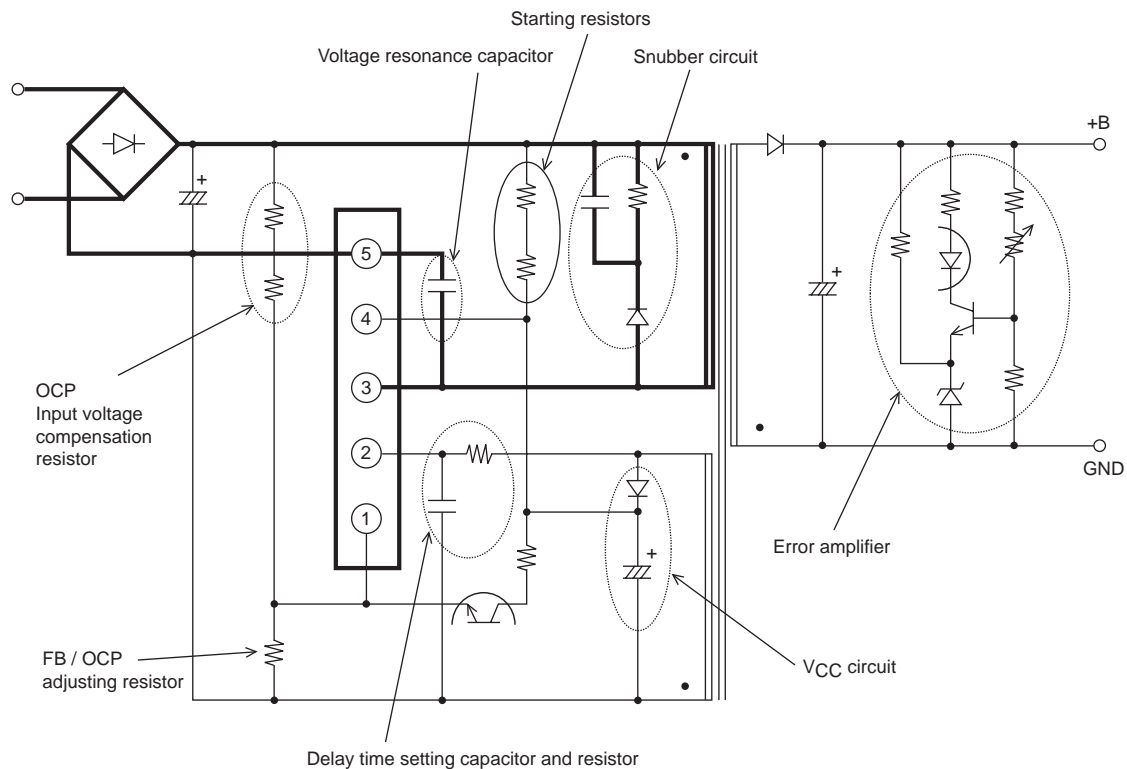
## Block Diagram

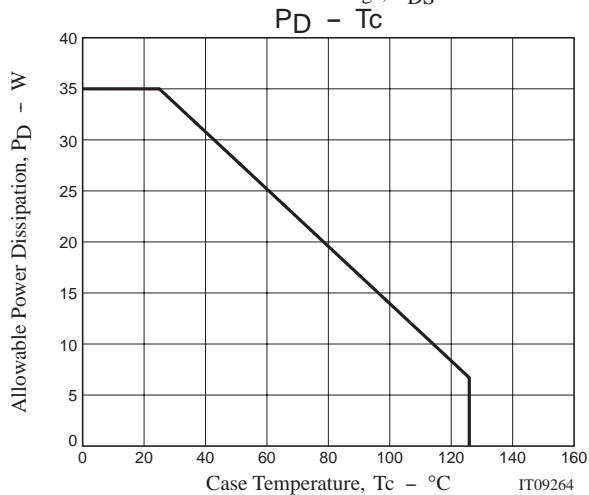
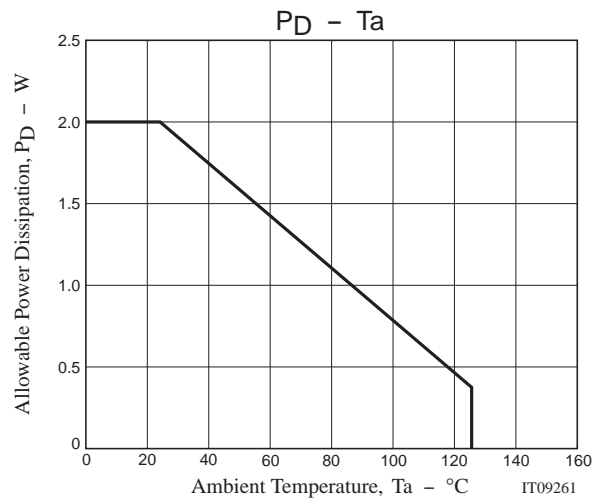
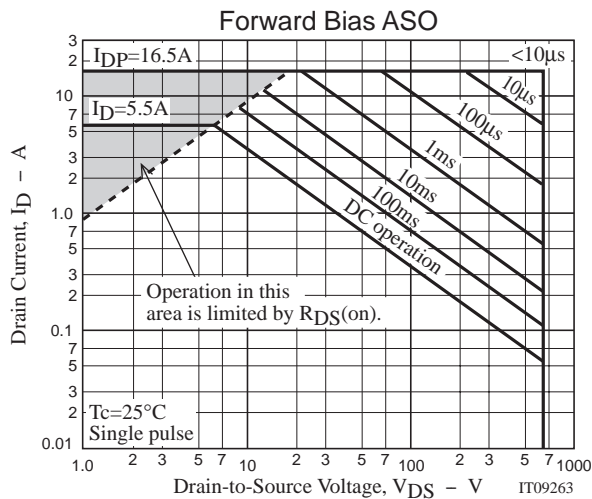


## Pin Definitions and Functions

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

## Sample Application Circuit





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