

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
		T _c =25°C	35	W
Operating Temperature	T _{opr}		-25 to +125	°C
Junction Temperature	T _j		150	°C
Storage Temperature	T _{stg}		-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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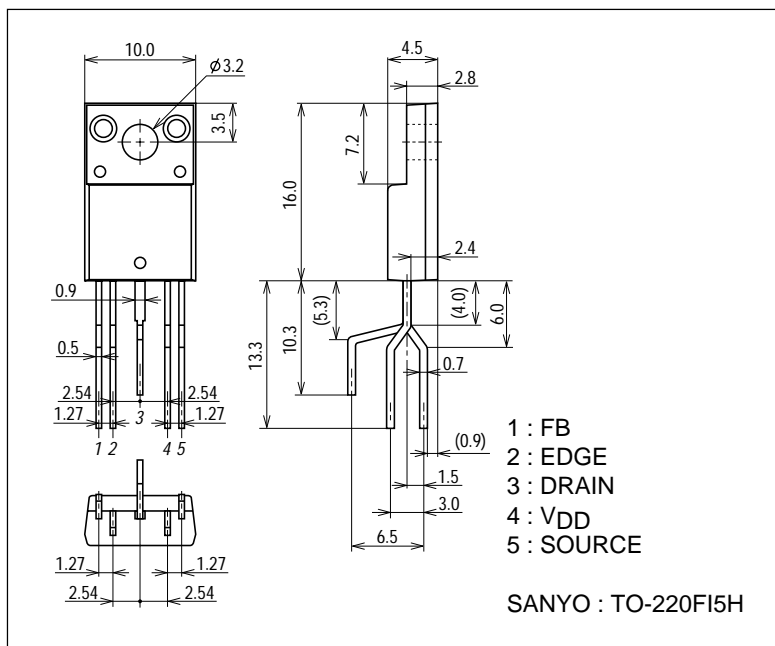
Electrical Characteristics at Ta=25°C

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	C_{iss}	$V_{DS}=20V, f=1MHz$		1450		pF
Output Capacitance	C_{oss}	$V_{DS}=20V, f=1MHz$		250		pF
[IC]						
Power Supply Line Breakdown Voltage	$V_{(BR)DD}$	4-5 $I_{DD}=1mA, V_{FB}=0$	16.7			V
Overshoot Input Latch Shutdown Threshold Voltage	OVP	4-5	15.7	16.5	17.3	V
Burst Mode Start Threshold Voltage	V_{Bon}	4-5 $V_{EDGE}=V_{DD}$	15.2	16.0	16.8	V
Burst Mode Stop Threshold Voltage	V_{Boff}	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 Release Threshold 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	f_{osc}	3-5 $V_{EDGE}=0$	30	35	40	kHz
Maximum Oscillation Frequency	f_{max}	3-5	150	180	210	kHz
Power Supply Current (at start-up)	$I_{DD(on)}$	4-5		200		μA
Minimum ON Time	$t_{on(min)}$	3-5		300		ns
Step Drive Voltage	t_{step}	3-5		200		ns
Step Drive Gate Voltage	V_{Gstep}	3-5		$V_{DD}-5.7$		V

Package Dimensions

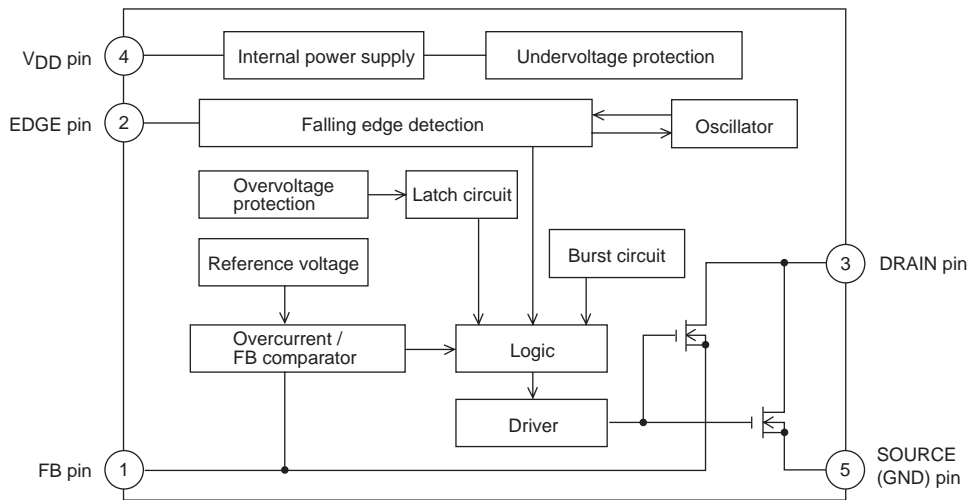
unit : mm

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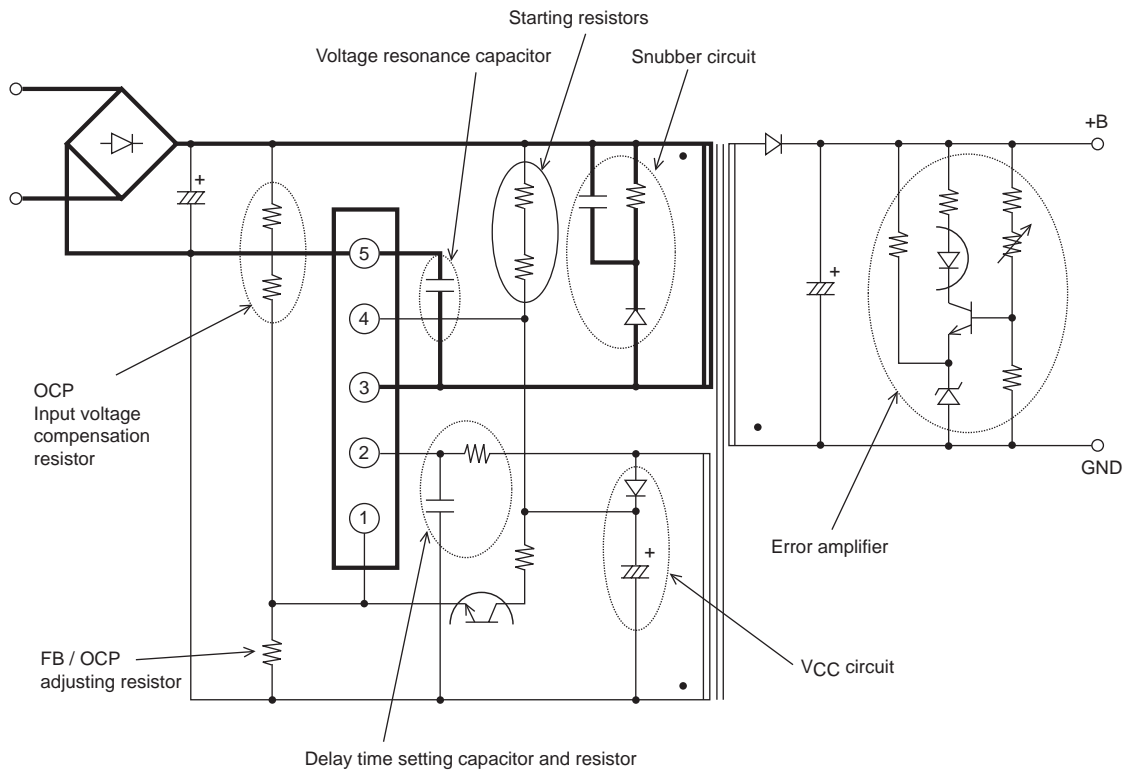
Block Diagram



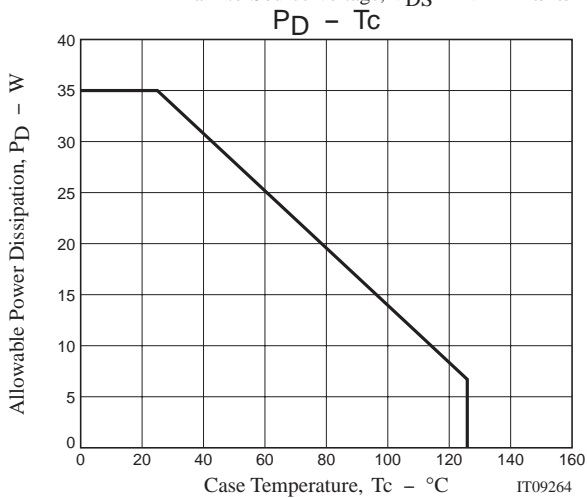
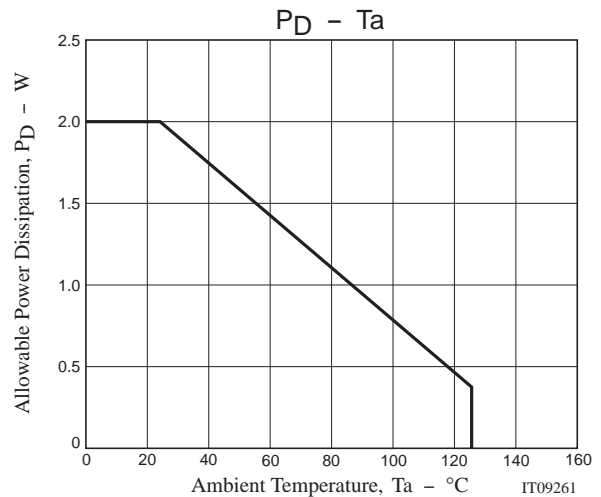
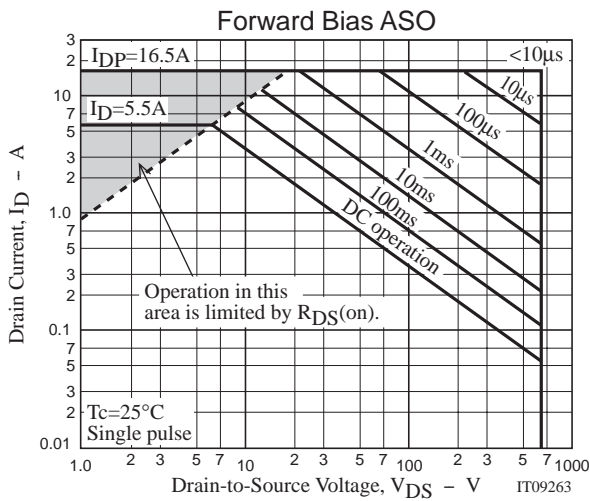
Pin Definitions and Functions

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	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



TN6Q04



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