AUK Semiconductor

Off-Line Quasi-Resonance Flyback Switching Regulator

Description

The SQ6601PT is a hybrid IC consists from power MOSFET and a controller IC, designed for Indirect feed-back Quasi-Resonant (including low frequency PRC)fly-back converter type SMPS (Switching Mode Power Supply) applications. this IC realizes high efficiency, low noise, downsizing and standardizing of a power supply system reducing external components count and simplifying the circuit designs. the device is provided in a five pin over-molded TO-220 style package, affording dielectric isolation without compromising thermal characteristics. (Note). PRC is abbreviation of "Pulse Ratio Control" (On-width control with fixed OFF-time).

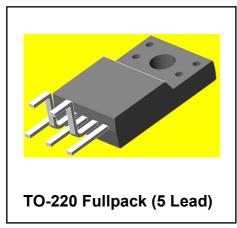
Features

- Quasi-Resonant Operation
- Low-loss, Pulse-Ration-Control standby mode
- Under-voltage lockout with Hysteresis
- Adjustable switching speed for EMI control
- Low start-up circuit current (100uA max)
- Active low-pass filter for stabilizing the operation in case of light load
- Avalanche Energy Guaranteed MOSFET with high VDSS
- Built-in constant voltage drive circuit
- Built-in step drive circuit
- Built-in low frequency PRC mode (≒20kHz)
- Pulse-by-pulse Overcurrent Protection (OCP)
- Overvoltage Protection with latch mode (OVP)
- Thermal Shutdown with latch mode (TSD)
- Over-molded Five-Pin Package

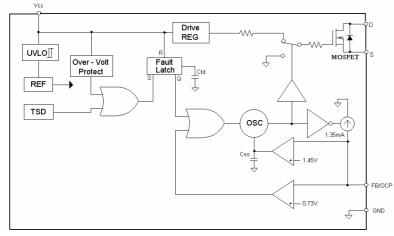
Ordering Information

Type NO.	Marking	g Package Code	
SQ6601PT	SQ6601PT	TO-220F-5FL	

Package Outline



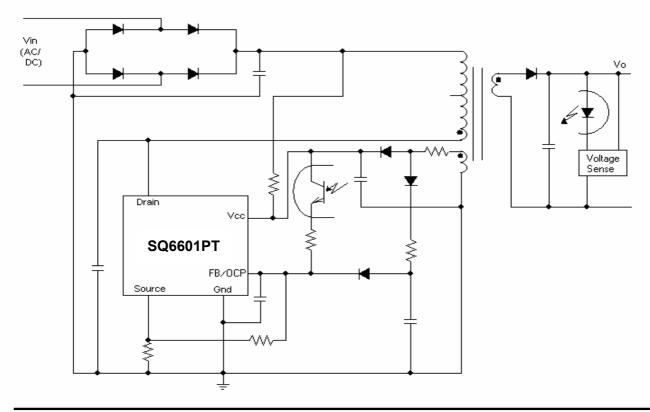
Internal Block Diagram



Pin Function

Pin Number	Pin Name	Pin Function	
1	Drain	Power Switch MOSFET Drain Part	
2	Source	Power Switch MOSFET Source Part	
3	GND	Ground of the Control Section	
4	Vcc	Supply Voltage of Output Drive & Control Section	
5	FB/OCP	Voltage Mode Control Feedback Signal & Over Current Detection	

Typical Connection Diagram



Absolute maximum ratings

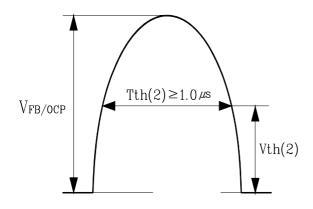
(Ta=25°C, Unless otherwise specified)

Characteristic	Symbol	Ratings Uni		Note
Drain Source Voltage	V _{DS}	650	V	-
Drain Current	I _D	7	А	T _C = 25 ℃
Peak Drain Current	I _{DP}	28	А	Single Pulse
Single Pulsed Avalanche Energy	E _{AS}	640	mJ	L=23mH,V _{DD} =100V, I _{DP} =7.0A
Control Supply Voltage	V _{cc}	20	V	-
FB/OCP Voltage Range	FB/OCP	-0.3 ~ +6	V	-
Power Dissipation	P _D	40	W	With infinite heatsink
Thermal Resistance, Junction to Case	R _{thJC}	3.12	°C /W	-
Junction Temperature	TJ	150	°C	-
Operating Temperature Range	T _{opr}	-25 ~ +125	°C	-
Storage Temperature Range	T _{stg}	-55 ~ +150	°C	-

Recommended Operating Conditions

Time for input of quasi resonant signals.

For the Quasi resonant signal inputted to the $V_{FB/OCP}$ terminal at the time of quasi resonant operation, the signal should be wider than Tth(2)



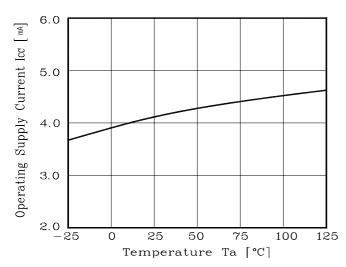
Electrical Characteristics

(V_{CC} = 11V, Ta = 25°C ; Unless otherwise specified)

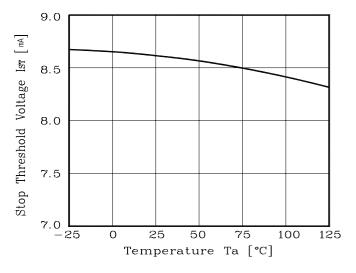
Characteristic	Symbol	Test Conditions	Min.	Тур.	Max.	Units
Start Threshold Voltage	V _{TH(ST)}	V _{cc} Increasing	8.5	9.5	10.5	V
Stop Threshold Voltage	$V_{\text{TH}(\text{SP})}$	V _{CC} decreasing after turn on start threshold voltage	7.2	8	8.8	V
Start up Supply Current	I _{ST}	$V_{CC} = V_{TH(ST)} - 0.1V$	-	-	100	μA
Operating Supply Current	I _{cc}	V _{FB} = 1V	-	3	7	mA
Dynamic Operating Supply Current	I _{DCC}	-	-	4	10	mA
Maximum Off Time	t_{MAX}	Drain waveform high	30	-	60	μs
Minimum Off Time	t _{MIN}	Drain waveform high	-	-	1.5	μs
Minimum Input Pulse Width	t _{MIN(W)}	Drain waveform high	-	-	1.0	μs
Over Voltage Threshold	V _{OVP}	V _{CC} Increasing until shut down output	15.3	17	18.7	V
Latch Release Voltage	V_{RE}	V _{CC} decreasing until latch releasing	2.5	-	6.0	V
Latch Holding Current	I _{CC(RE)}	-	-	-	400	μA
Feedback Threshold Voltage	V _{FB}	-	0.68	0.73	0.78	V
Css Snchronized Voltage	V _{SYNC}	-	1.3	1.45	1.6	V
Feedback Sink Current	I _{SINK}	V _{FB} = 1V	1.2	1.35	1.5	mA
Thermal Shutdown Activation Temperature	T _{J(TSD)}	-	140	-	-	Ĉ
Drain-to-Source Breakdown Voltage	V _{DS}	I _D = 300uA	650	-	-	V
Drain Leakage Current	I _{DS}	V _{DS} = 650V	-	-	300	μA
On-State Resistance	R _{DS(ON)}	I _D = 3.5A	-	-	1.2	Ω
Rise Time	tr	10% to 90%	-	-	250	ns

Electrical Characteristic Curves

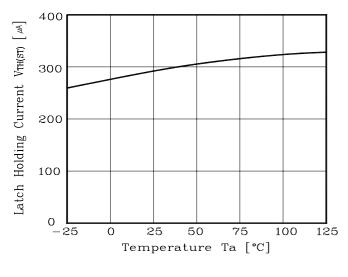
Fig. 1 I_{cc} vs. Ta



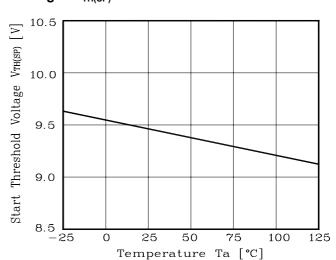




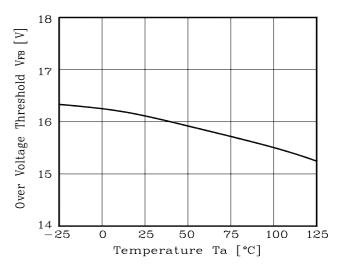


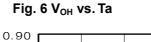


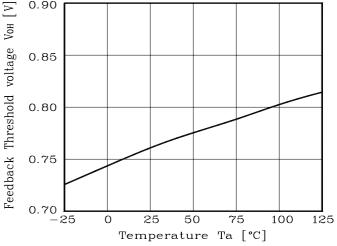












Electrical Characteristic Curves

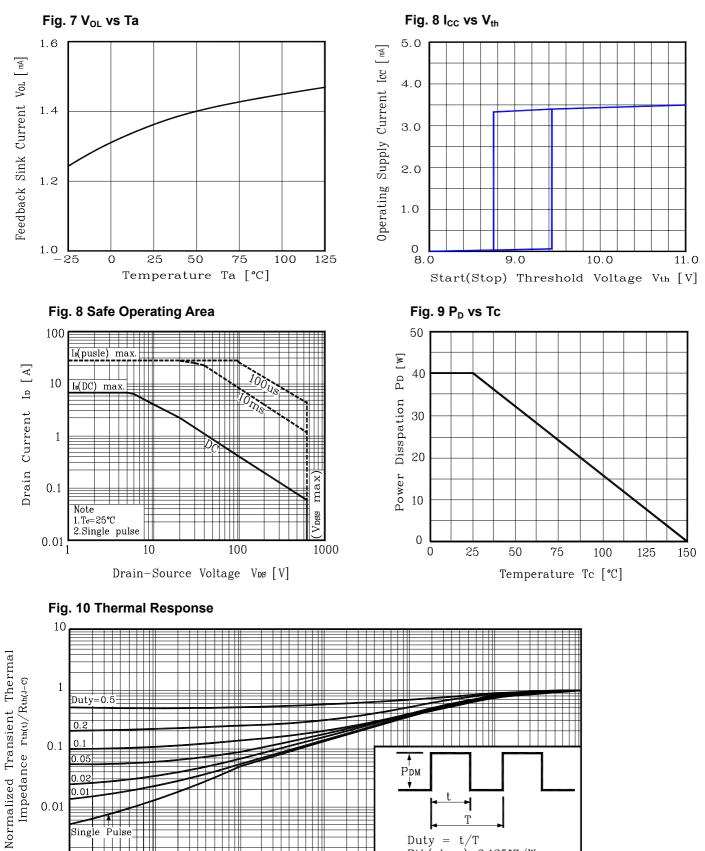
0.0

Single Pulse

100 µs

0.01

0.001 10*µ*s



10 ms

Pulse width

1 ms

т

Rth(ch-c)=3.125°C/W

1s

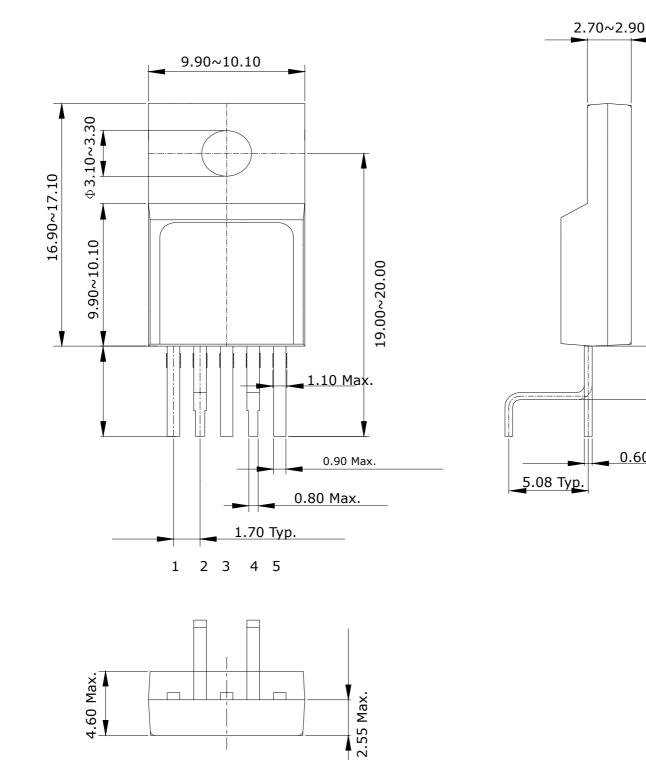
10s

Duty = t/T

100 ms

KSD-I0U001-000

Outline Dimensions



SQ6601PT

unit : mm

3.75 Typ.

0.60 Max.

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