AUK Semiconductor

SQ6601PT

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).

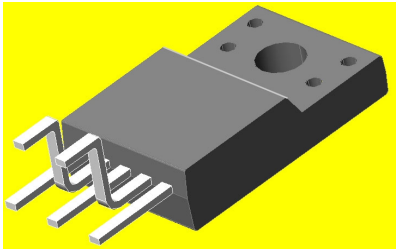
Features

- 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

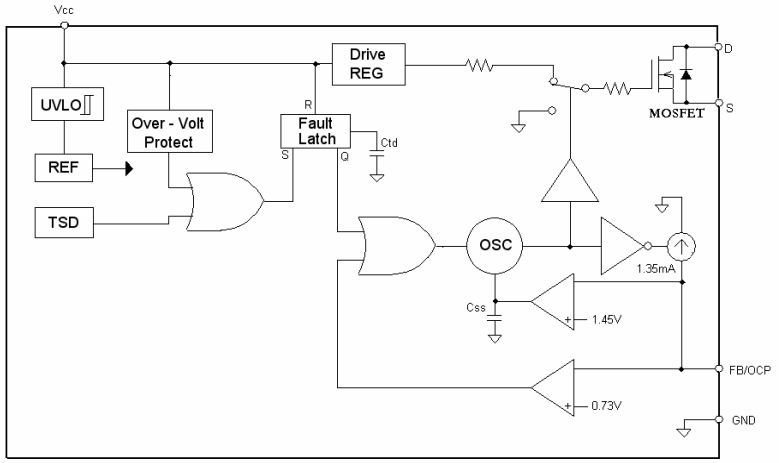
Type NO.	Marking	Package Code
SQ6601PT	SQ6601PT	TO-220F-5FL

Package Outline



TO-220 Fullpack (5 Lead)

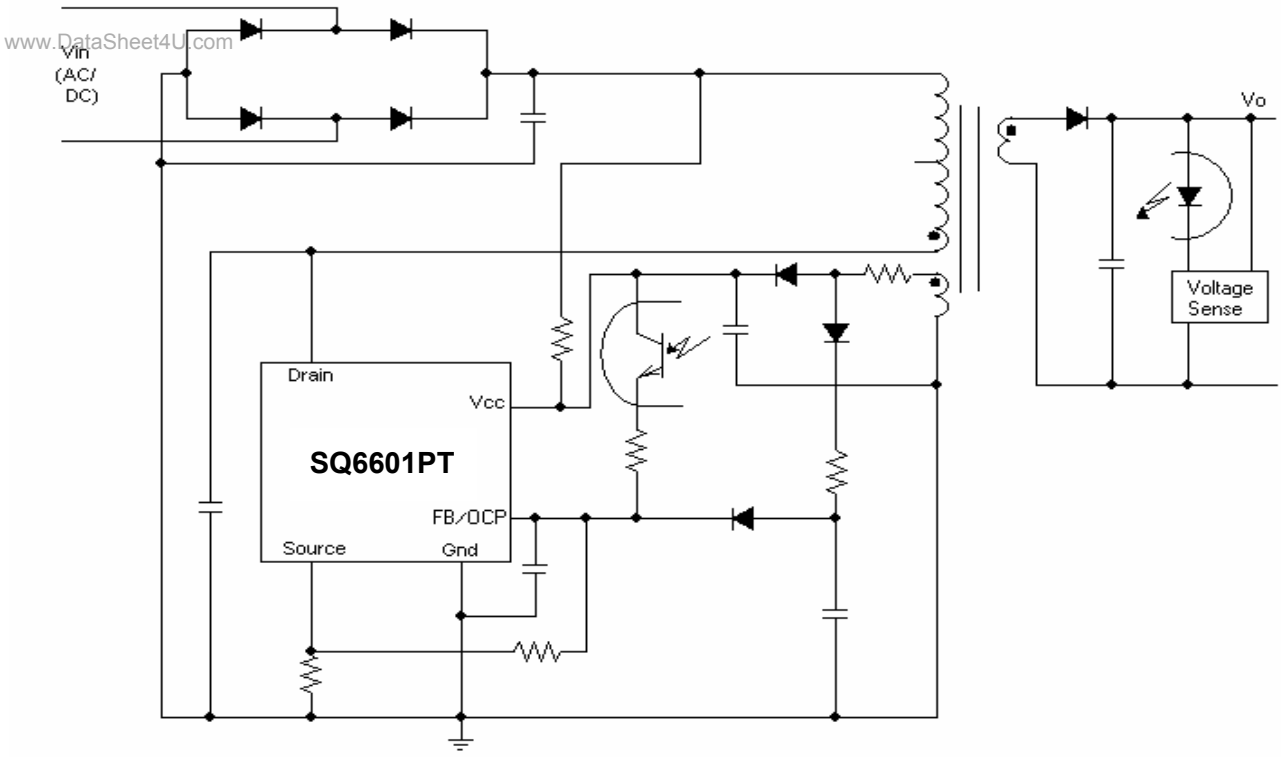
Internal Block Diagram



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

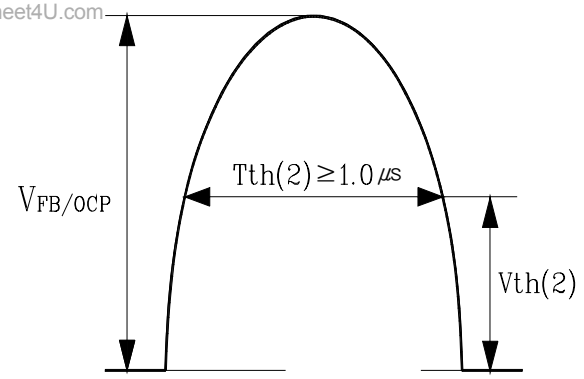
(Ta=25°C, Unless otherwise specified)

Characteristic	Symbol	Ratings	Unit	Note
Drain Source Voltage	V_{DS}	650	V	-
Drain Current	I_D	7	A	T_C = 25℃
Peak Drain Current	I_{DP}	28	A	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	T_J	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.	Typ.	Max.	Units
Start Threshold Voltage	$V_{TH(ST)}$	V_{CC} Increasing	8.5	9.5	10.5	V
Stop Threshold Voltage	$V_{TH(SP)}$	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	-	-	℃
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

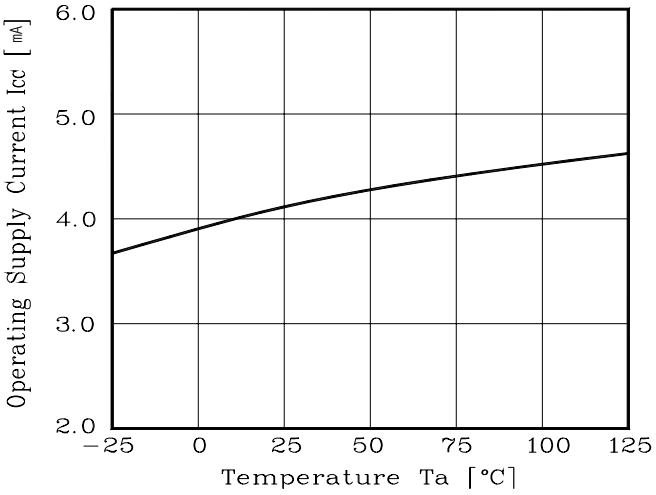


Fig. 2 $V_{TH(SP)}$ vs. Ta

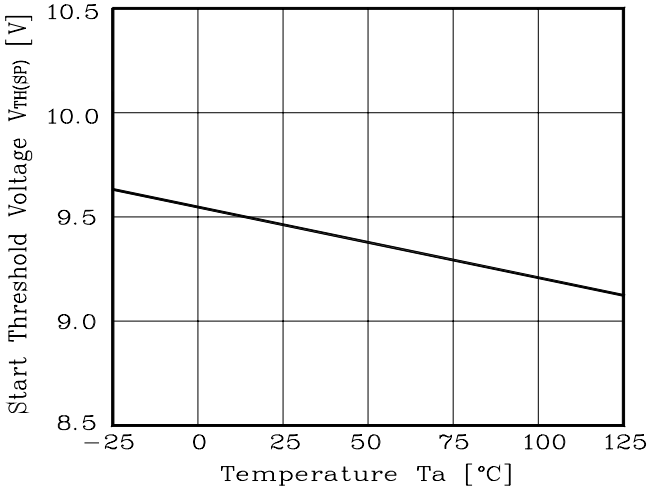


Fig. 3 I_{ST} vs. Ta

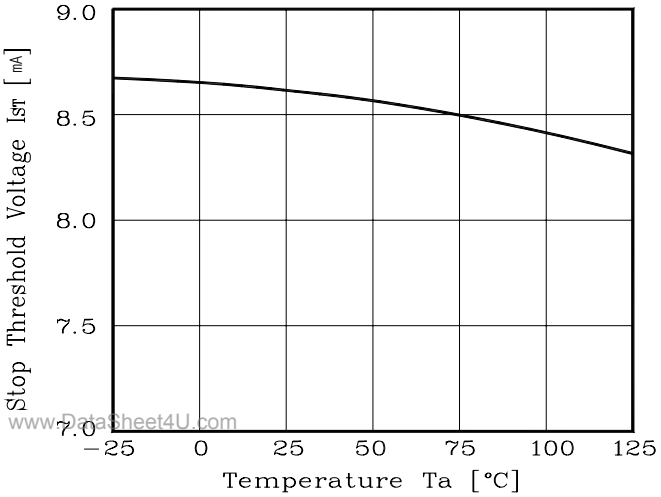


Fig. 4 V_{FB} vs. Ta

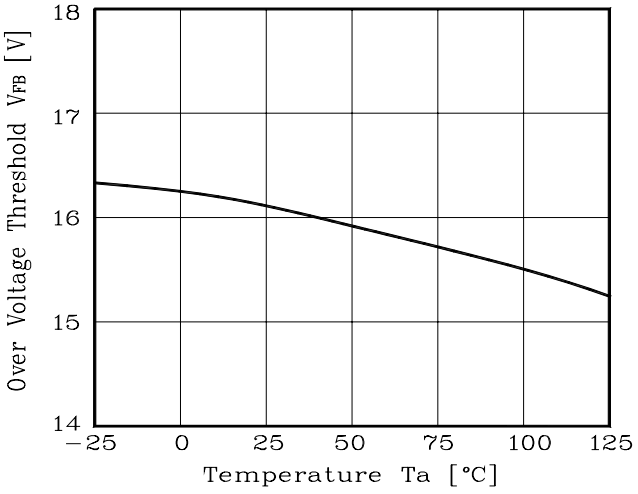


Fig. 5 $V_{TH(ST)}$ vs. Ta

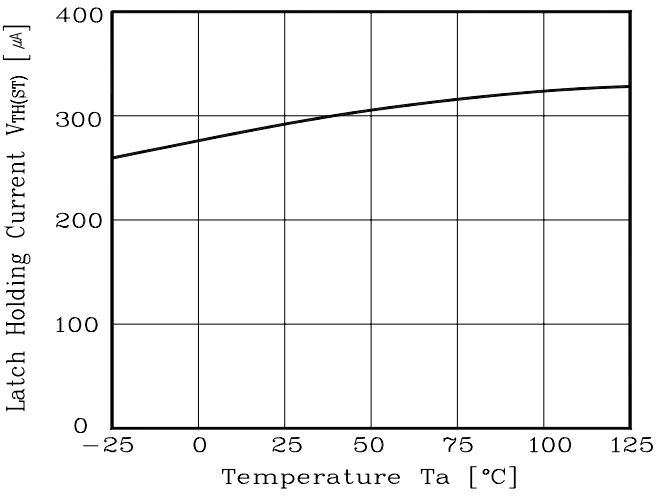
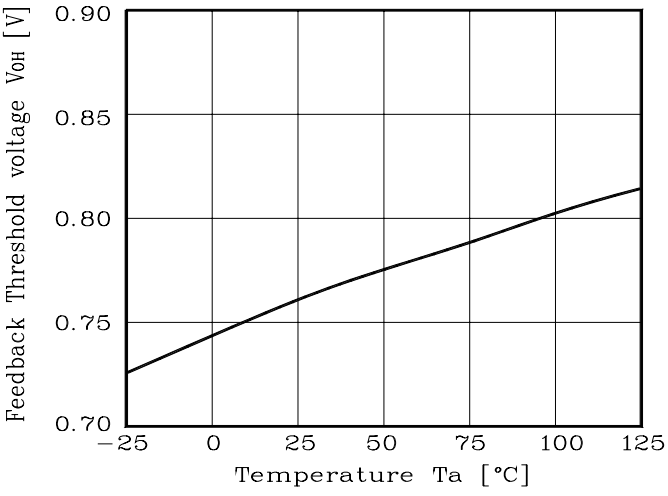


Fig. 6 V_{OH} vs. Ta



Electrical Characteristic Curves

Fig. 7 V_{OL} vs Ta

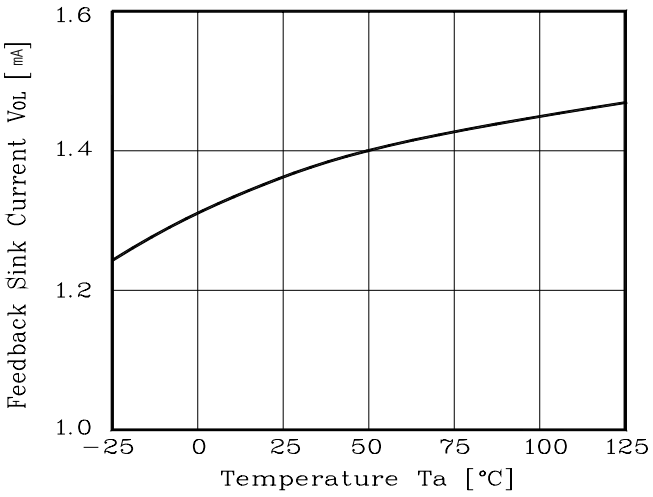


Fig. 8 I_{CC} vs V_{th}

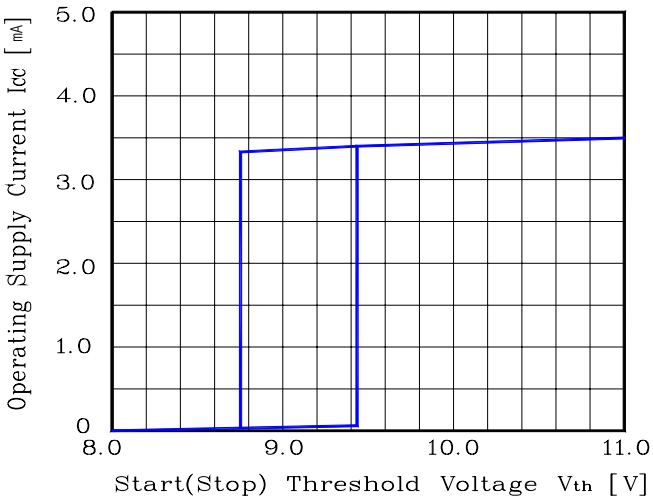


Fig. 8 Safe Operating Area

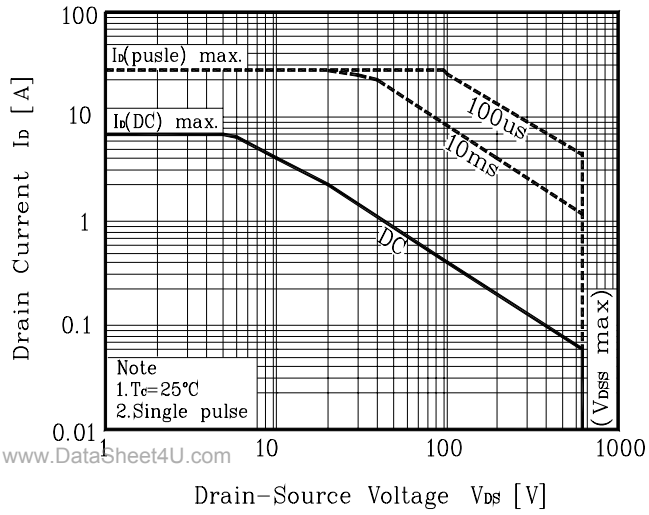


Fig. 9 P_D vs Tc

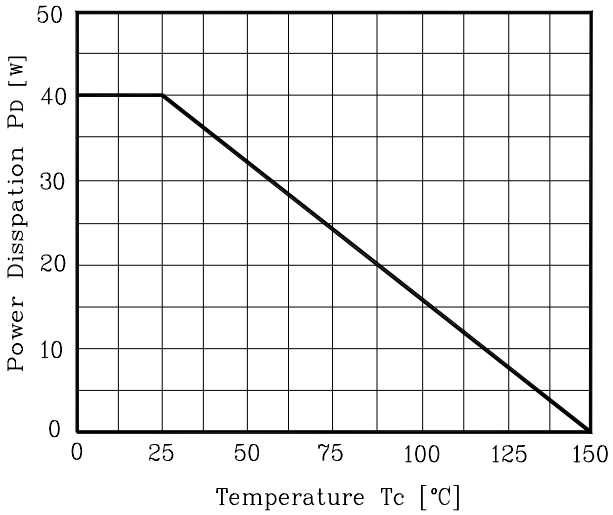
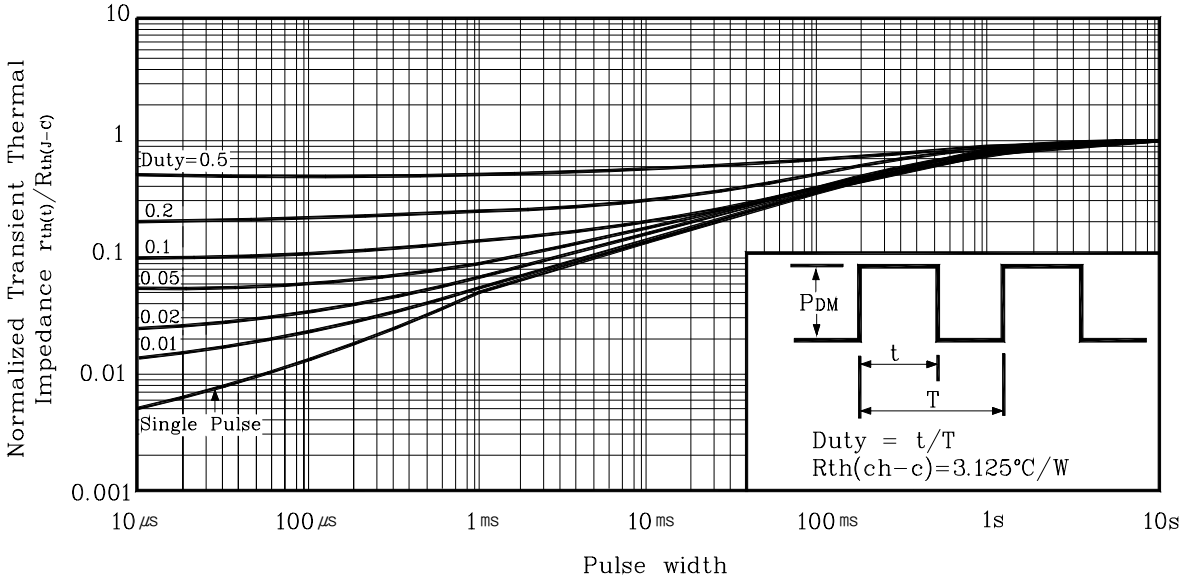
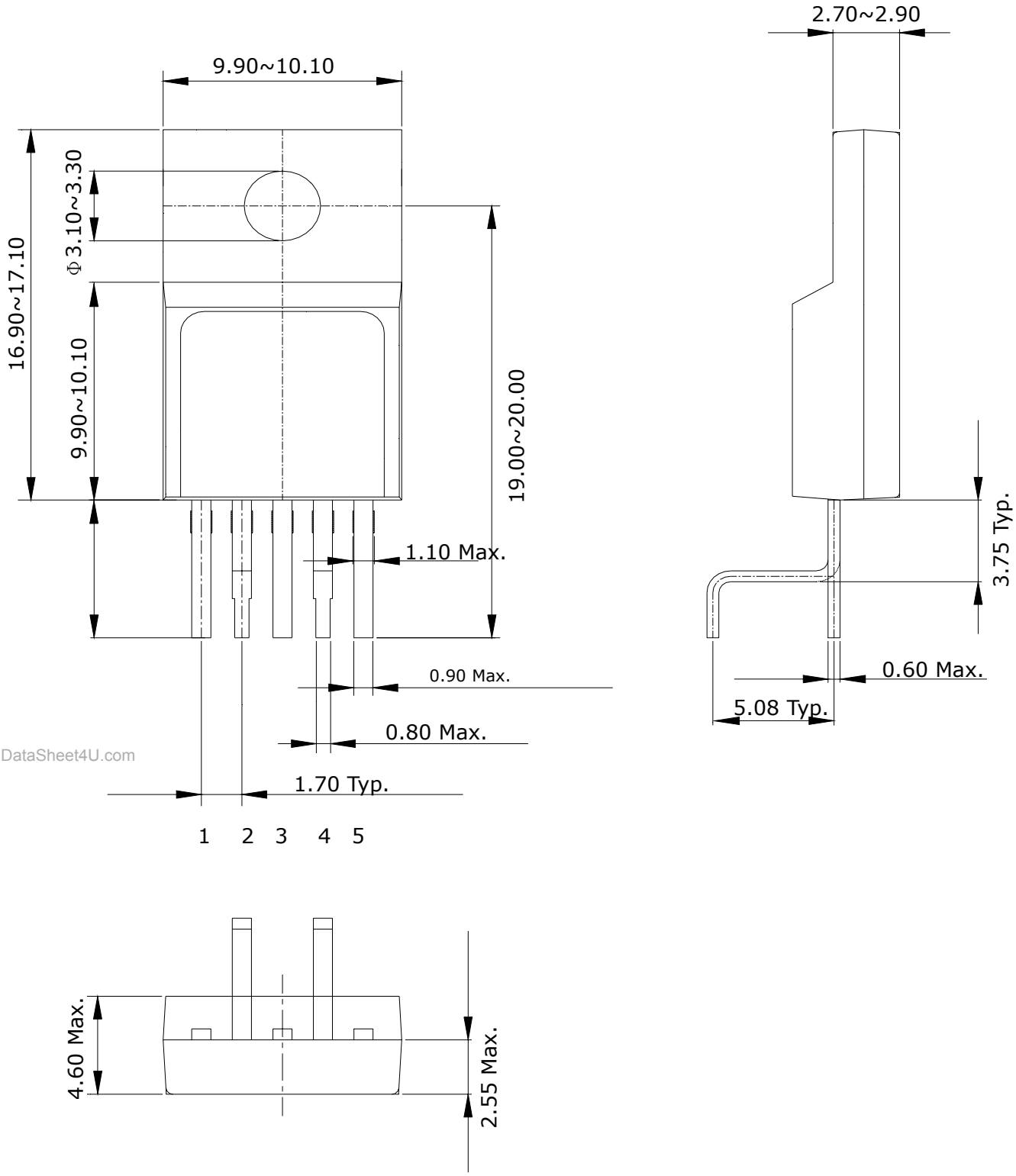


Fig. 10 Thermal Response



Outline Dimensions

unit : mm



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