

Absolute Maximum Ratings

Characteristic	Symbol	Value	Unit
Maximum Drain voltage ⁽¹⁾	V _{D,MAX}	800	V
Drain Gate voltage (R _{GS} =1MΩ)	V _{DGR}	800	V
Gate source (GND) voltage	V _{GS}	±30	V
Drain current pulsed ⁽²⁾	I _{DM}	24.0	ADC
Single pulsed avalanche energy ⁽³⁾	E _{AS}	455	mJ
Continuous drain current (T _C =25°C)	I _D	6.0	ADC
Continuous drain current (T _C =100°C)	I _D	4.0	ADC
Maximum supply voltage	V _{CC,MAX}	30	V
Input voltage range	V _{FB}	−0.3 to V _{SD}	V
Total power dissipation	P _D (watt H/S)	150	W
	Derating	1.21	W/°C
Operating ambient temperature	T _A	−25 to +85	°C
Storage temperature	T _{STG}	−55 to +150	°C

Note:

1. T_j=25°C to 150°C
2. Repetitive rating: Pulse width limited by maximum junction temperature
3. L=24mH, starting T_j=25 °C

Electrical Characteristics (SFET part)

(Ta = 25°C unless otherwise specified)

Characteristic	Symbol	Test condition	Min.	Typ.	Max.	Unit
Drain source breakdown voltage	BV _{DSS}	V _{GS} = 0V, I _D = 50μA	800	-	-	V
Zero gate voltage drain current	I _{DSS}	V _{DS} = Max., Rating, V _{GS} = 0V	-	-	50	μA
		V _{DS} = 0.8Max., Rating, V _{GS} = 0V, T _C = 125°C	-	-	200	mA
Static drain source on resistance ^(note)	R _{DS(ON)}	V _{GS} = 10V, I _D = 4.0A	-	1.6	2.0	W
Forward transconductance ^(note)	g _{fs}	V _{DS} = 15V, I _D = 4.0A	1.5	2.5	-	S
Input capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 25V, f = 1MHz	-	1600	-	pF
Output capacitance	C _{oss}		-	140	-	
Reverse transfer capacitance	C _{rss}		-	42	-	
Turn on delay time	t _{d(on)}	V _{DD} = 0.5BV _{DSS} , I _D = 6.0A (MOSFET switching time are essentially independent of operating temperature)	-	60	-	nS
Rise time	t _r		-	150	-	
Turn off delay time	t _{d(off)}		-	300	-	
Fall time	t _f		-	130	-	
Total gate charge (gate-source+gate-drain)	Q _g	V _{GS} = 10V, I _D = 6.0A, V _{DS} = 0.5BV _{DSS} (MOSFET switching time are essentially independent of operating temperature)	-	70	-	nC
Gate source charge	Q _{gs}		-	16	-	
Gate drain (Miller) charge	Q _{gd}		-	27	-	

Note:

Pulse test: Pulse width ≤ 300μs, duty cycle ≤ 2%

$$S = \frac{1}{R}$$

Electrical Characteristics (SFET part) (Continued)

(Ta = 25°C unless otherwise specified)

Characteristic	Symbol	Test condition	Min.	Typ.	Max.	Unit
UVLO SECTION						
Start threshold voltage	V _{START}	-	14	15	16	V
Stop operating voltage	V _{STOP}	After turn on	9	10	11	V
OSCILLATOR SECTION						
Initial accuracy	F _{OSC}	Ta = 25°C	18	20	22	kHz
Frequency change with temperature ⁽²⁾	$\Delta F/\Delta T$	-25°C ≤ Ta ≤ +85°C	-	±5	±10	%
Maximum duty cycle	D _{MAX}	-	92	95	98	%
FEEDBACK SECTION						
Feedback source current	I _{FB}	Ta = 25°C, V _{fb} = GND	0.7	0.9	1.1	mA
Shutdown Feedback voltage	V _{SD}	-	6.9	7.5	8.1	V
Shutdown delay current	I _{delay}	Ta = 25°C, 5V ≤ V _{fb} ≤ V _{SD}	1.4	1.8	2.2	μA
SYNC. & SOFT START SECTION						
Soft start voltage	V _{SS}	V _{FB} = 2V	4.7	5.0	5.3	V
Soft start current	I _{SS}	Sync & S/S = GND	0.8	1.0	1.2	mA
Sync threshold voltage ⁽³⁾	V _{SYTH}	V _{fb} = 5V	6.0	6.4	6.8	V
REFERENCE SECTION						
Output voltage ⁽¹⁾	V _{ref}	Ta = 25°C	4.80	5.00	5.20	V
Temperature Stability ⁽¹⁾⁽²⁾	V _{ref} /ΔT	-25°C ≤ Ta ≤ +85°C	-	0.3	0.6	mV/°C
CURRENT LIMIT (SELF-PROTECTION) SECTION						
Peak Current Limit	I _{OVER}	Max. inductor current	3.52	4.00	4.48	A
PROTECTION SECTION						
Thermal shutdown temperature (T _j) ⁽¹⁾	T _{SD}	-	140	160	-	°C
Over voltage protection voltage	V _{OVP}	-	23	25	28	V
TOTAL DEVICE SECTION						
Start Up current	I _{START}	V _{CC} = 14V	0.1	0.3	0.55	mA
Operating supply current (control part only)	I _{OP}	Ta = 25°C	6	12	18	mA
V _{CC} zener voltage	V _Z	I _{CC} = 20mA	30	32.5	35	V

Note:

1. These parameters, although guaranteed, are not 100% tested in production
2. These parameters, although guaranteed, are tested in EDS(water test) process
3. The amplitude of the sync. pulse is recommended to be between 2V and 3V for stable sync. function.

Typical Performance Characteristics (control part)

(These characteristic graphs are normalized at $T_a = 25^\circ\text{C}$)

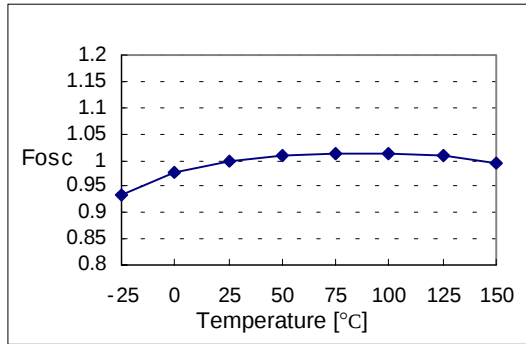


Figure 1. Operating Frequency

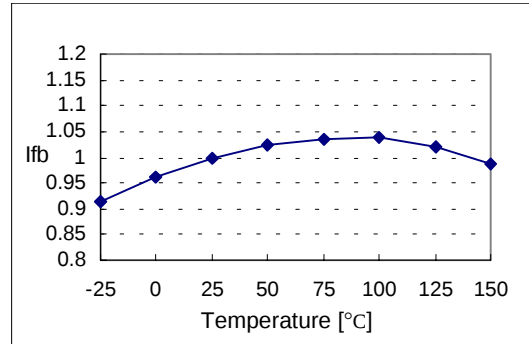


Figure 2. Feedback Source Current

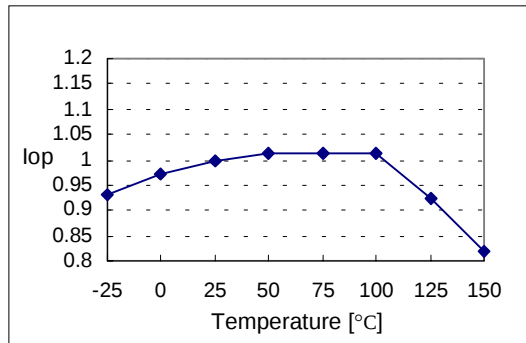


Figure 3. Operating Supply Current

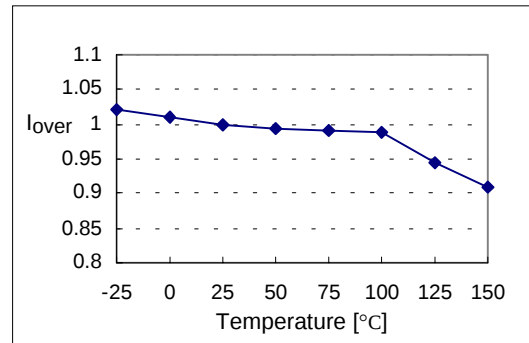


Figure 4. Peak Current Limit

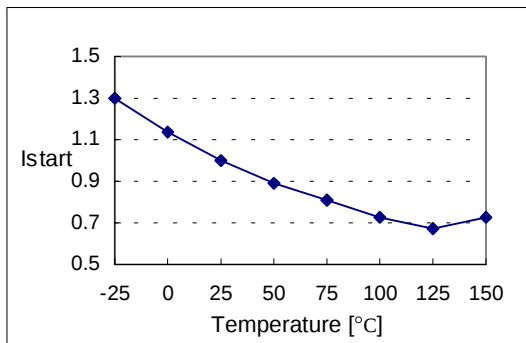


Figure 5. Start up Current

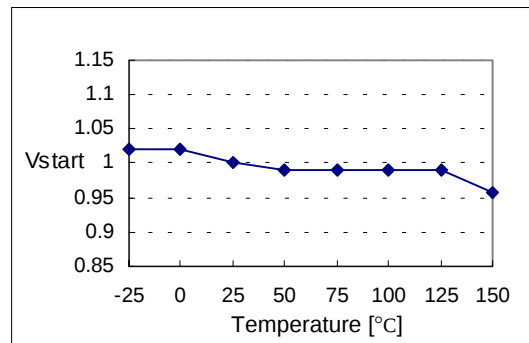


Figure 6. Start Threshold Voltage

Typical Performance Characteristics (continued)

(These characteristic graphs are normalized at Ta = 25°C)

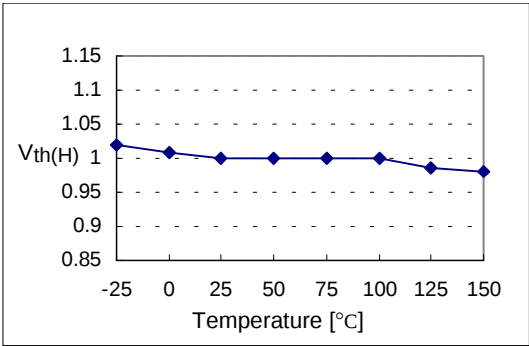


Figure 7. Stop Threshold Voltage

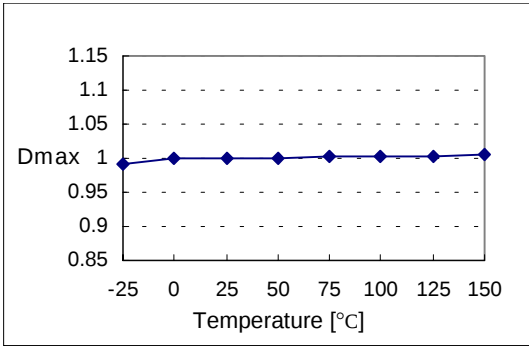


Figure 8. Maximum Duty Cycle



Figure 9. VCC Zener Voltage

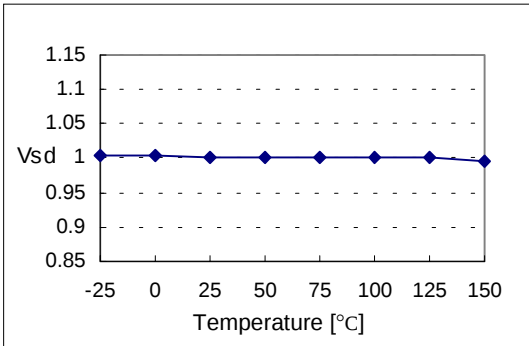


Figure 10. Shutdown Feedback Voltage



Figure 11. Shutdown Delay Current

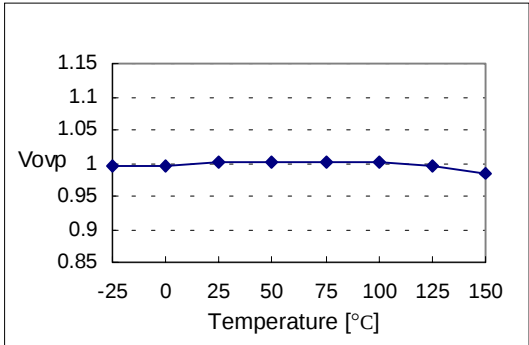


Figure 12. Over Voltage Protection

Typical Performance Characteristics (continued)

(These characteristic graphs are normalized at $T_a = 25^\circ\text{C}$)

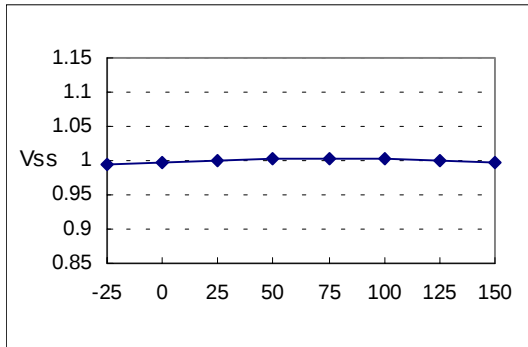


Figure13. Soft Start Voltage

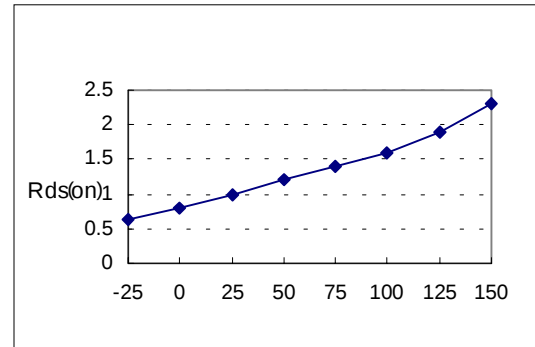
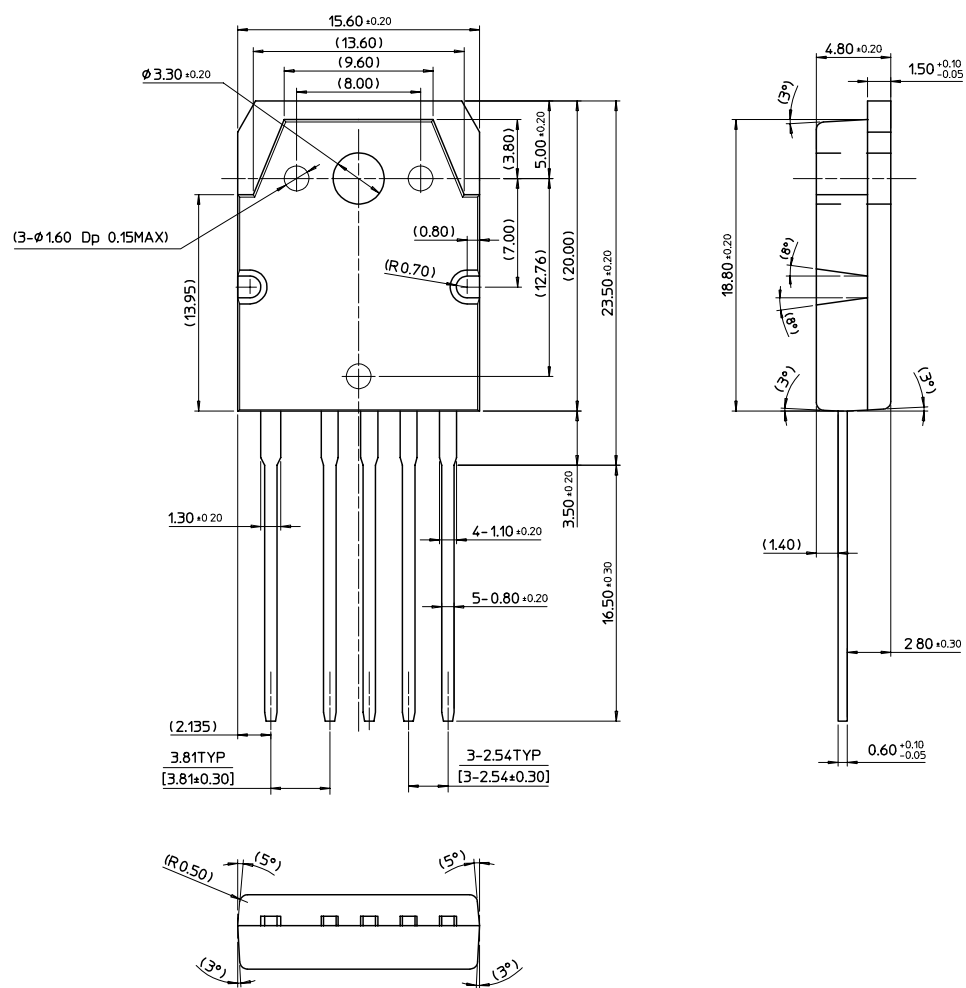


Figure 14. Static Drain-Source on Resistance

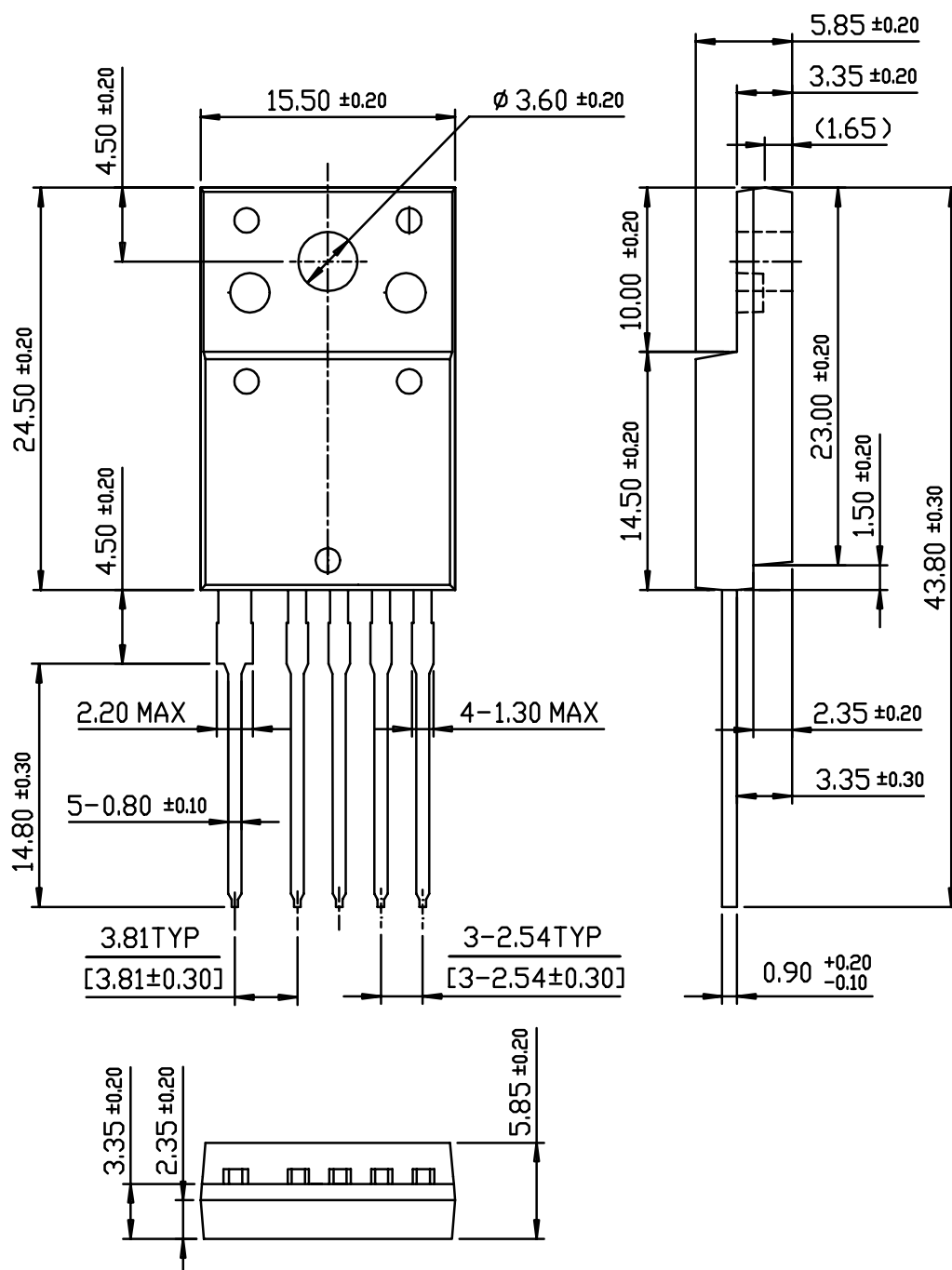
Package Dimensions

TO-3P-5L



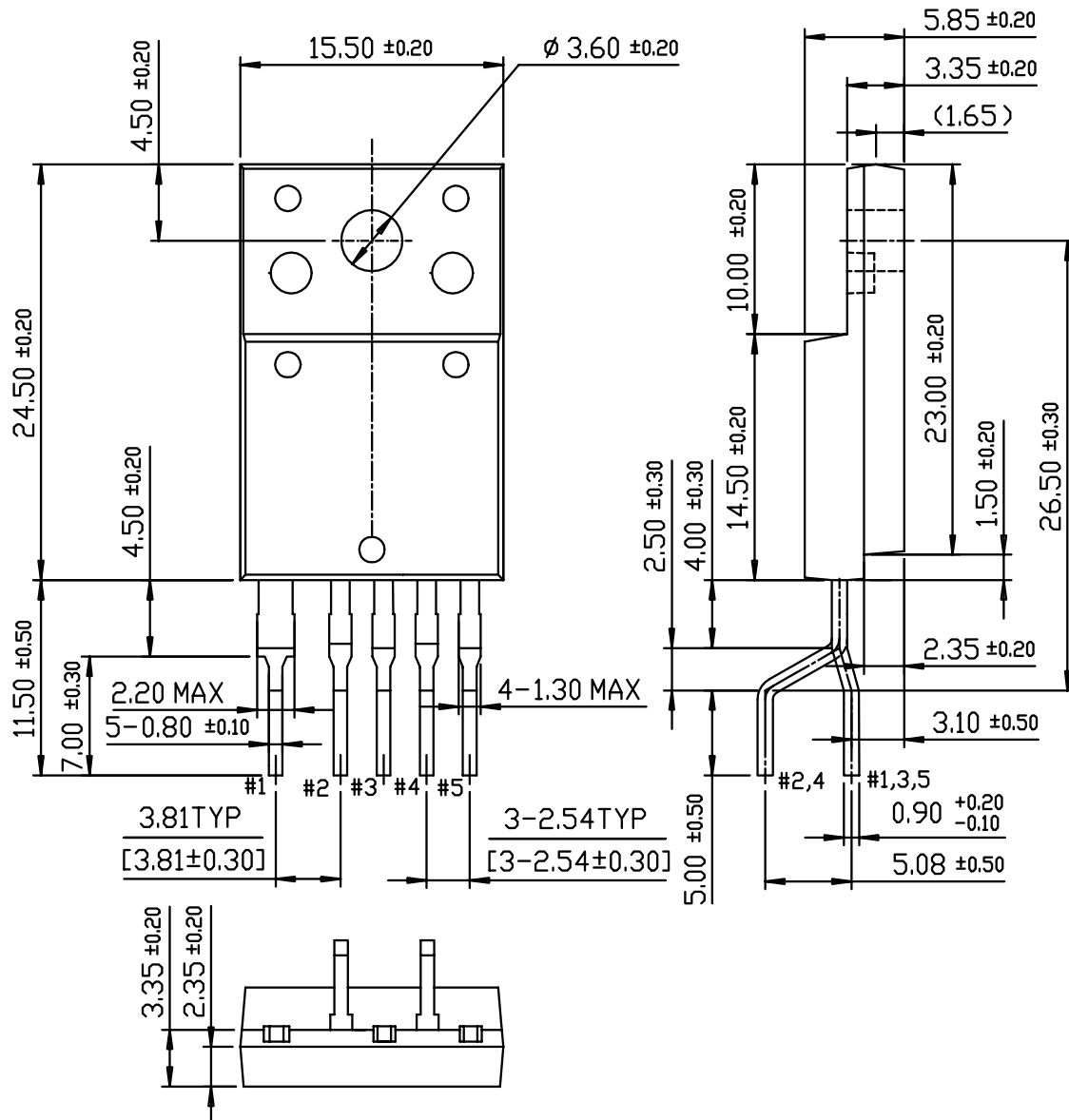
Package Dimensions (Continued)

TO-3PF-5L



Package Dimensions (Continued)

TO-3PF-5L(Forming)



Ordering Information

Product Number	Package	Operating Temperature
KA3S0680RB-TU	TO-3P-5L	-25°C to +85°C
KA3S0680RB-YDTU	TO-3P-5L(Forming)	
KA3S0680RFB-TU	TO-3PF-5L	-25°C to +85°C
KA3S0680RFB-YDTU	TO-3PF-5L(Forming)	

TU : Non Forming Type

YDTU : Forming Type

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