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## Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Maximum Drain voltage <sup>(1)</sup>	V <sub>D,Max</sub>	800	V
Drain-Gate voltage (R <sub>GS</sub> =1MΩ)	V <sub>DGR</sub>	800	V
Gate-source (GND) voltage	V <sub>GS</sub>	±30	V
Drain current pulsed <sup>(2)</sup>	I <sub>DM</sub>	32.0	ADC
Single pulsed avalanche energy <sup>(3)</sup>	E <sub>AS</sub>	810	mJ
Avalanche current <sup>(4)</sup>	I <sub>AS</sub>	15	A
Continuous drain current (T <sub>C</sub> =25°C)	I <sub>D</sub>	8.0	ADC
Continuous drain current (T <sub>C</sub> =100°C)	I <sub>D</sub>	5.6	ADC
Maximum Supply voltage	V <sub>CC,MAX</sub>	30	V
Input voltage range	V <sub>FB</sub>	-0.3 to V <sub>SD</sub>	V
Total power dissipation	P <sub>D</sub>	190	W
	Derating	1.54	W/°C
Operating ambient temperature	T <sub>A</sub>	-25 to +85	°C
Storage temperature	T <sub>STG</sub>	-55 to +150	°C

### Notes:

1. T<sub>j</sub>=25°C to 150°C
2. Repetitive rating: Pulse width limited by maximum junction temperature
3. L=24mH, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, starting T<sub>j</sub>=25°C
4. L=13μH, starting T<sub>j</sub>=25°C

## Electrical Characteristics (SFET part)

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Drain source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =50μA	800	-	-	V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> =Max., Rating, V <sub>GS</sub> =0V	-	-	50	μA
		V <sub>DS</sub> =0.8Max., Rating, V <sub>GS</sub> =0V, T <sub>C</sub> =125°C	-	-	200	μA
Static drain source on resistance <sup>(note)</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =5.0A	-	1.2	1.5	Ω
Forward transconductance <sup>(note)</sup>	g <sub>fs</sub>	V <sub>DS</sub> =15V, I <sub>D</sub> =5.0A	1.5	2.5	-	S
Input capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, f=1MHz	-	2460	-	pF
Output capacitance	C <sub>oss</sub>		-	210	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	64	-	
Turn on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =0.5BV <sub>DSS</sub> , I <sub>D</sub> =8.0A (MOSFET switching time are essentially independent of operating temperature)	-	-	90	nS
Rise time	t <sub>r</sub>		-	95	200	
Turn off delay time	t <sub>d(off)</sub>		-	150	450	
Fall time	t <sub>f</sub>		-	60	150	
Total gate charge (gate-source+gate-drain)	Q <sub>g</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =8.0A, V <sub>DS</sub> =0.5BV <sub>DSS</sub> (MOSFET switching time are essentially independent of operating temperature)	-	-	150	nC
Gate source charge	Q <sub>gs</sub>		-	20	-	
Gate drain (Miller) charge	Q <sub>gd</sub>		-	70	-	

**Note:**

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

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

## Electrical Characteristics (CONTROL part)

(Ta=25°C unless otherwise specified)

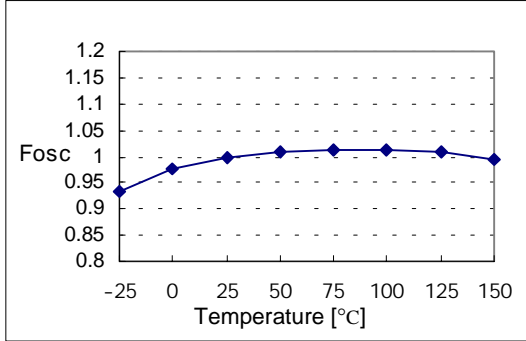
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
<b>UVLO SECTION</b>						
Start threshold voltage	VSTART	-	14	15	16	V
Stop threshold voltage	VSTOP	After turn on	9	10	11	V
<b>OSCILLATOR SECTION</b>						
Initial accuracy	FOSC	KA1L0880B	45	50	55	kHz
		KA1M0880B	61	67	73	
Frequency change with temperature <sup>(2)</sup>	$\Delta F/\Delta T$	-25°C ≤ Ta ≤ +85°C	-	±5	±10	%
Maximum duty cycle	Dmax		74	77	80	%
<b>FEEDBACK SECTION</b>						
Feedback source current	IFB	Ta=25°C, 0V ≤ Vfb ≤ 3V	0.7	0.9	1.1	mA
Shutdown Feedback voltage	VSD	-	6.9	7.5	8.1	V
Shutdown delay current	Idelay	Ta=25°C, 5V ≤ Vfb ≤ VSD	4.0	5.0	6.0	μA
<b>SOFT START SECTION</b>						
Soft Start Voltage	VSS	VFB = 2V	4.7	5.0	5.3	V
Soft Start Current	ISS	Sync & S/S=GND	0.8	1.0	1.2	mA
<b>REFERENCE SECTION</b>						
Output voltage <sup>(1)</sup>	Vref	Ta=25°C	4.80	5.00	5.20	V
Temperature Stability <sup>(1)(2)</sup>	Vref/ΔT	-25°C ≤ Ta ≤ +85°C	-	0.3	0.6	mV/°C
<b>CURRENT LIMIT (SELF-PROTECTION) SECTION</b>						
Peak Current Limit	I <sub>OVER</sub>	Max. inductor current	4.40	5.00	5.60	A
<b>PROTECTION SECTION</b>						
Thermal shutdown temperature (Tj) <sup>(1)</sup>	TSD	-	140	160	-	°C
Over voltage protection voltage	VOVP	-	23	25	28	V
<b>TOTAL DEVICE SECTION</b>						
Start Up current	I <sub>START</sub>	VCC=14V	0.1	0.3	0.45	mA
Operating supply current (control part only)	I <sub>OP</sub>	Ta=25°C	6	12	18	mA
VCC zener voltage	VZ	ICC=20mA	30	32.5	35	V

### Note:

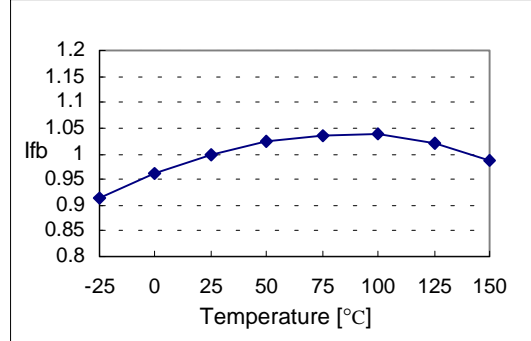
1. These parameters, although guaranteed, are not 100% tested in production
2. These parameters, although guaranteed, are tested in EDS (wafer test) process

## Typical Performance Characteristics

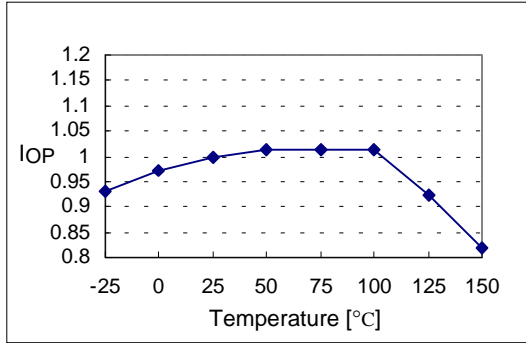
(These characteristic graphs are normalized at  $T_a=25^\circ\text{C}$ )



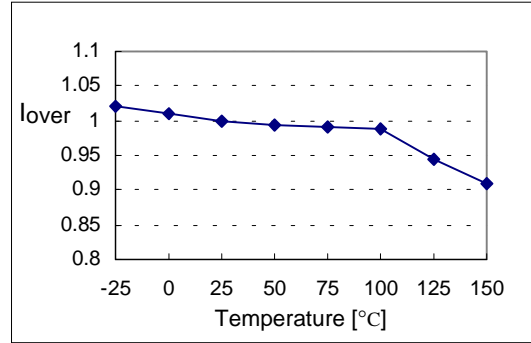
**Figure 1. Operating Frequency**



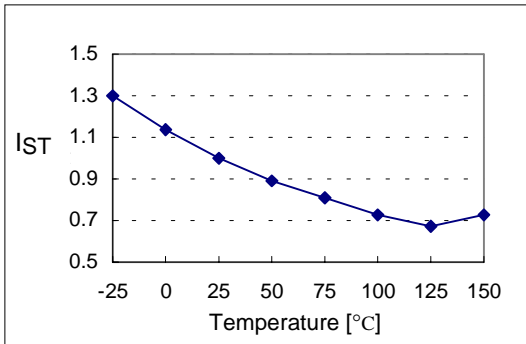
**Figure 2. Feedback Source Current**



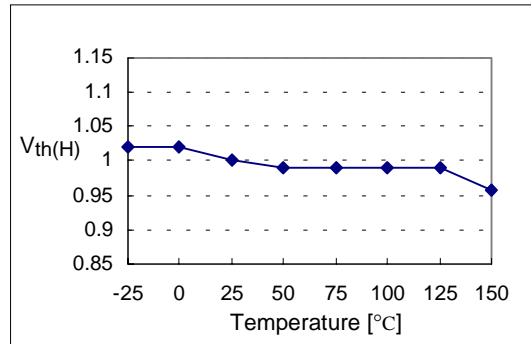
**Figure 3. Operating Supply Current**



**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)

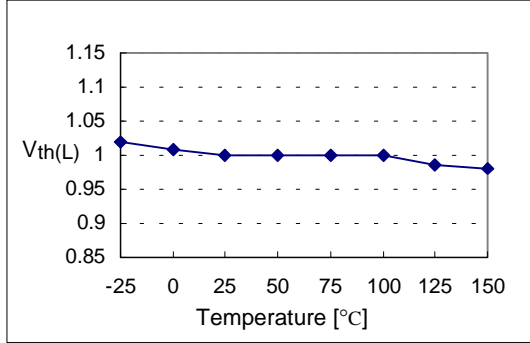


Figure 7. Stop Threshold Voltage

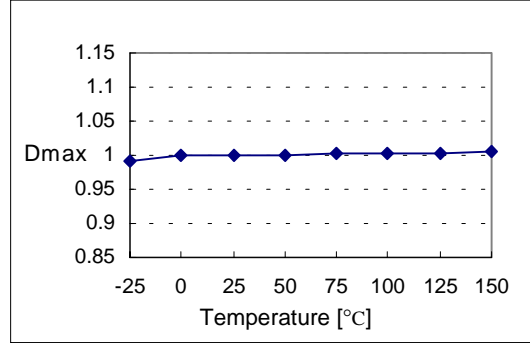


Figure 8. Maximum Duty Cycle

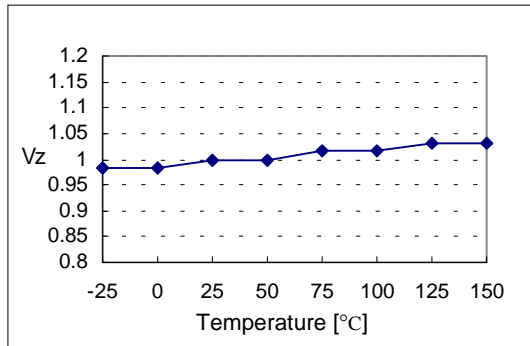


Figure 9. VCC Zener Voltage

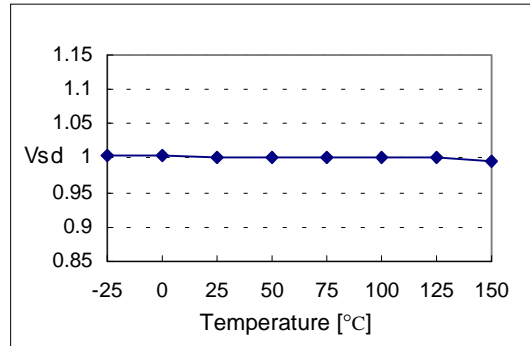


Figure 10. Shutdown Feedback Voltage

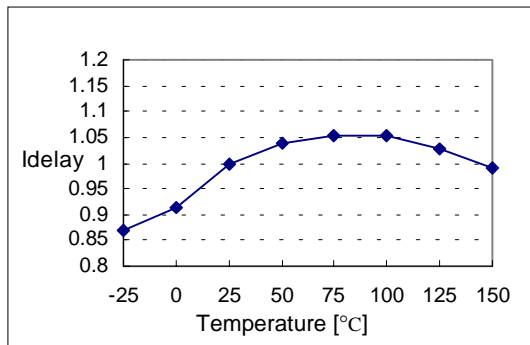


Figure 11. Shutdown Delay Current

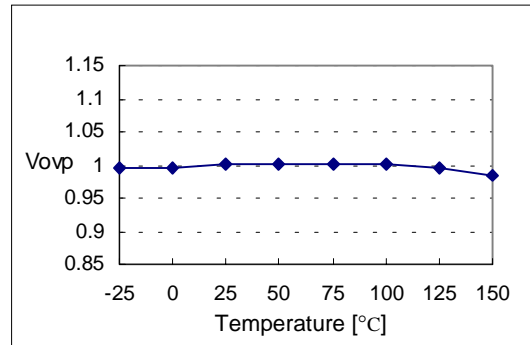


Figure 12. Over Voltage Protection

## Typical Performance Characteristics (Continued)

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

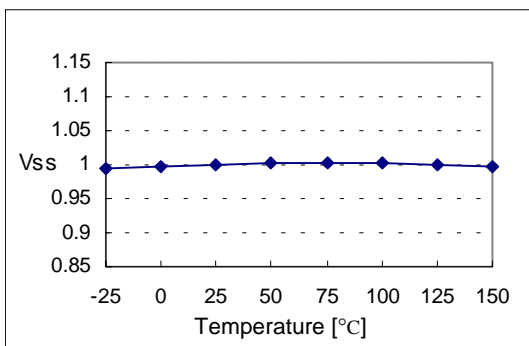


Figure 13. Soft Start Voltage

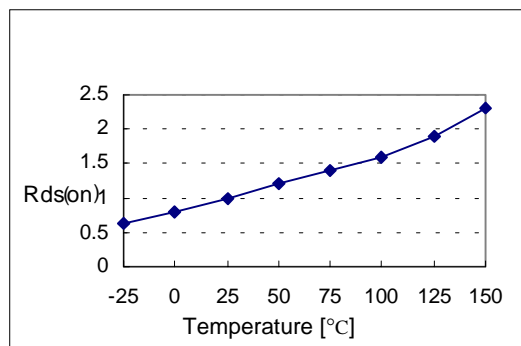
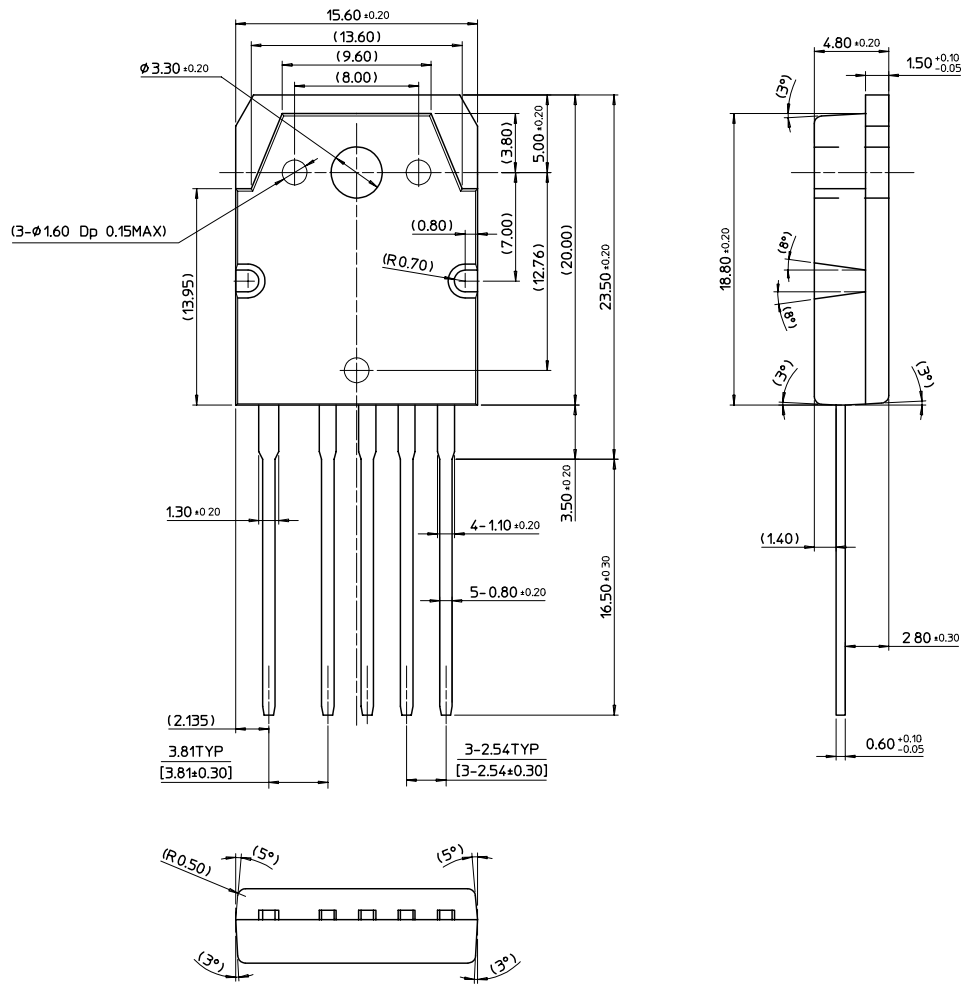


Figure 14. Static Drain Source on Resistance



# Package Dimensions

## TO-3P-5L





## Ordering Information

Product Number	Package	Rating	Fosc
KA1L0880B-TU	TO-3P-5L	800V, 8A	50kHz
KA1L0880B-YDTU	TO-3P-5L(Forming)		
KA1M0880B-TU	TO-3P-5L	800V, 8A	67kHz
KA1M0880B-YDTU	TO-3P-5L(Forming)		

TU : Non Forming Type

YDTU : Forming type

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