

Absolute Maximum Ratings

Characteristic	Symbol	Value	Unit
Maximum Drain voltage ⁽¹⁾	V _{D,MAX}	650	V
Drain-Gate voltage (R _{GS} =1MΩ)	V _{DGR}	650	V
Gate-source (GND) voltage	V _{GS}	±30	V
Drain current pulsed ⁽²⁾	I _{DM}	48.0	ADC
Single pulsed avalanche energy ⁽³⁾	E _{AS}	785	mJ
Continuous drain current (T _C =25°C)	I _D	12	ADC
Continuous drain current (T _C =100°C)	I _D	8.4	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	269	W
	Derating	2.17	W/°C
Operating ambient temperature	T _A	−25 to +85	°C
Storage temperature	T _{STG}	−55 to +150	°C

Notes:

1. T_j=25°C to 150°C
2. Repetitive rating: Pulse width limited by maximum junction temperature
3. L=10mH, V_{DD}=50V, R_G=27Ω, 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	BVDSS	VGS=0V, ID=50μA	650	-	-	V
Zero gate voltage drain current	IDSS	VDS=Max., Rating, VGS=0V	-	-	50	μA
		VDS=0.8Max., Rating, VGS=0V, TC=125°C	-	-	200	mA
Static drain-source on resistance ^(note)	RDS(ON)	VGS=10V, ID=6.0A	-	0.72	-	W
Forward transconductance ^(note)	gfs	VDS=50V, ID=6.0A	5.7	-	-	S
Input capacitance	Ciss	VGS=0V, VDS=25V, f=1MHz	-	2700	-	pF
Output capacitance	Coss		-	300	-	
Reverse transfer capacitance	Crss		-	61	-	
Turn on delay time	td(on)	VDD=0.5BVDSS, ID=12.0A (MOSFET switching time are essentially independent of operating temperature)	-	18	-	nS
Rise time	tr		-	37	-	
Turn off delay time	td(off)		-	88	-	
Fall time	tf		-	36	-	
Total gate charge (gate-source+gate-drain)	Qg	VGS=10V, ID=12.0A, VDS=0.5BVDSS (MOSFET switching time are essentially independent of operating temperature)	-	-	140	nC
Gate-source charge	Qgs		-	20	-	
Gate-drain (Miller) charge	Qgd		-	69	-	

Note:

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

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

Electrical Characteristics (CONTROL part)

(Ta = 25°C unless otherwise specified)

Characteristic	Symbol	Test condition	Min.	Typ.	Max.	Unit
UVLO SECTION						
Start threshold voltage	VSTART	-	14	15	16	V
Stop operating voltage	VSTOP	After turn on	9	10	11	V
OSCILLATOR SECTION						
Initial accuracy	FOSC	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	Dmax	-	92	95	98	%
FEEDBACK SECTION						
Feedback source current	IFB	Ta=25°C, Vfb=GND	0.8	1	1.2	mA
Shutdown Feedback voltage	VSD	-	6.9	7.5	8.1	V
Shutdown delay current	Idelay	Ta=25°C, 5V≤Vfb≤VSD	1.4	1.8	2.2	μA
SYNC. & SOFT START SECTION						
Soft start voltage	VSS	VFB=2V	4.7	5.0	5.3	V
Soft start current	ISS	Sync & S/S=GND	0.8	-	-	mA
Sync threshold voltage ⁽³⁾	VSATH	Vfb=5V	6.0	6.4	6.8	V
REFERENCE SECTION						
Output voltage ⁽¹⁾	Vref	Ta=25°C	4.80	5.00	5.20	V
Temperature Stability ⁽¹⁾⁽²⁾	Vref/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	7.04	8.00	8.96	A
PROTECTION SECTION						
Thermal shutdown temperature (Tj) ⁽¹⁾	TSD	-	140	160	-	°C
TOTAL DEVICE SECTION						
Start Up current	I _{START}	VCC=14V	0.1	0.3	0.55	mA
Operating supply current (control part only)	I _{OP}	Ta=25°C	6	12	18	mA
VCC zener voltage	VZ	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

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

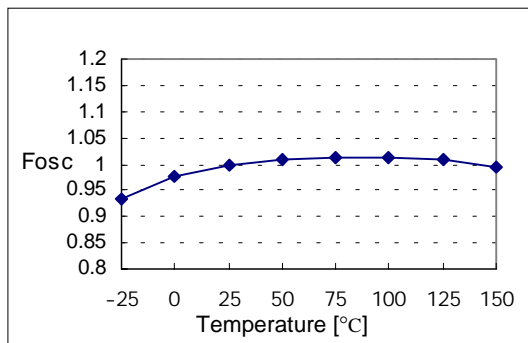


Figure 1. Operating Frequency

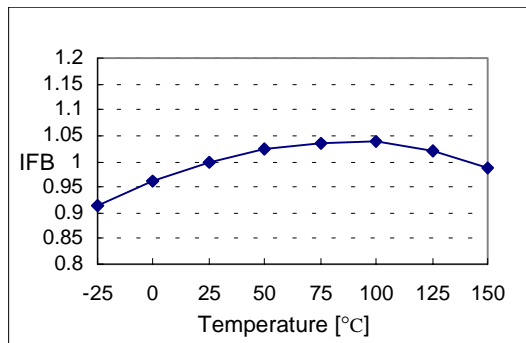


Figure 2. Feedback Source Current

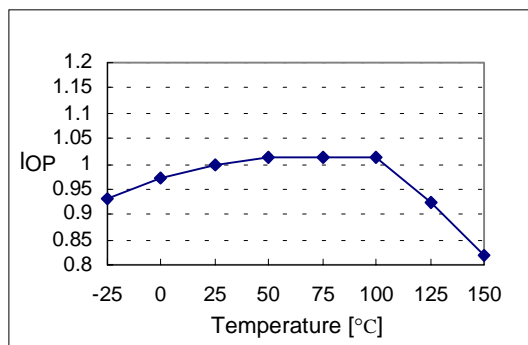


Figure 3. Operating Supply Current

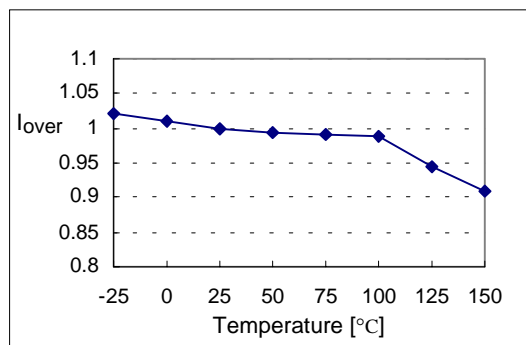


Figure 4. Peak Current Limit

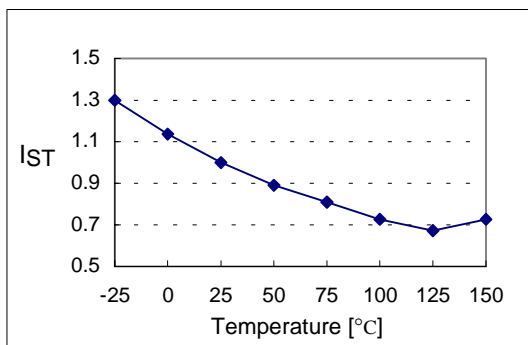


Figure 5. Start Current

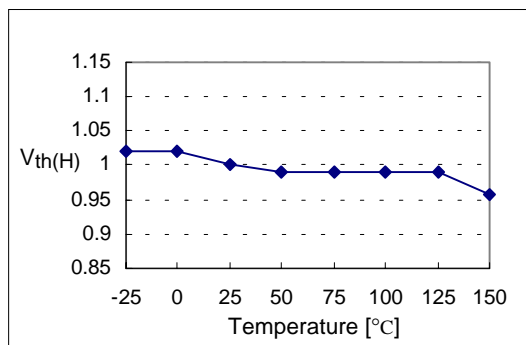


Figure 6. Start Threshold Voltage

Typical Performance Characteristics (Continued)

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

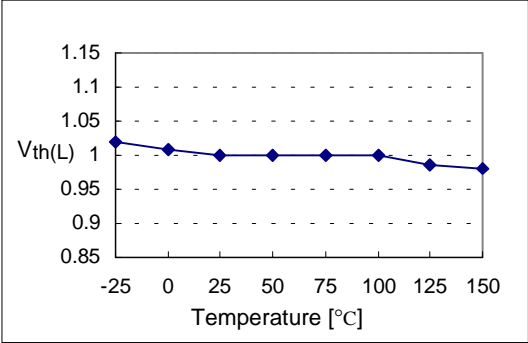


Figure 7. Stop Threshold Voltage

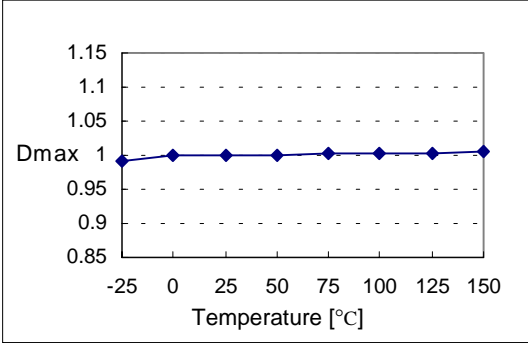


Figure 8. Maximum Duty Cycle

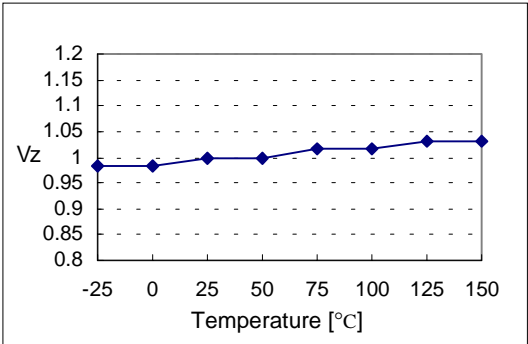


Figure 9. VCC Zener Voltage

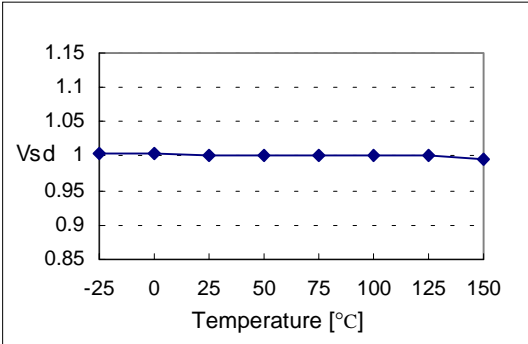


Figure 10. Shutdown Feedback Voltage

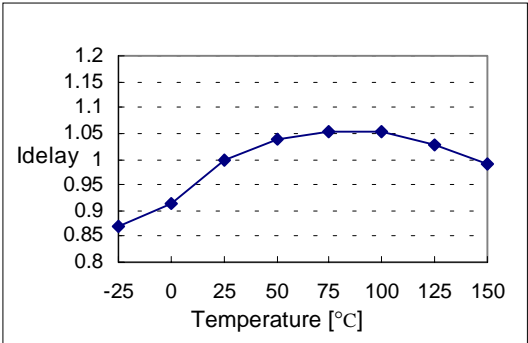


Figure 11. Shutdown Delay Current

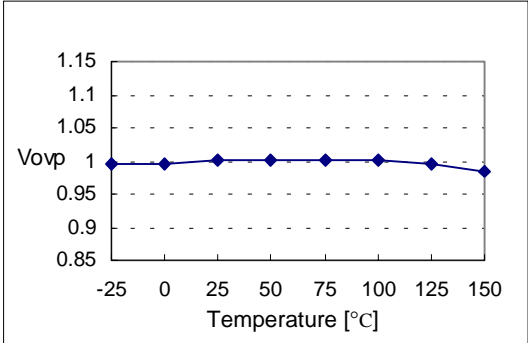


Figure 12. Over Voltage Protection

Typical Performance Characteristics (Continued)

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

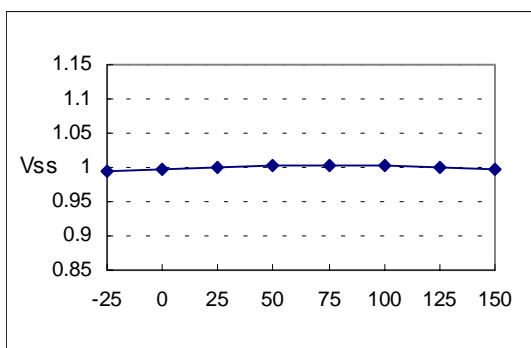


Figure13. Soft Start Voltage

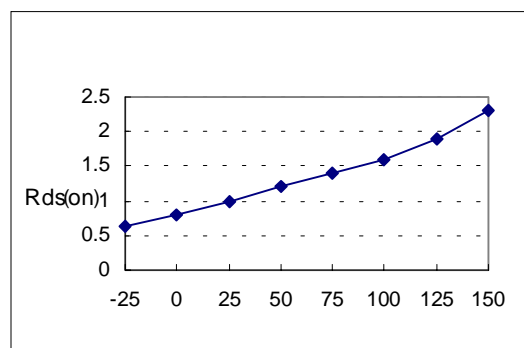
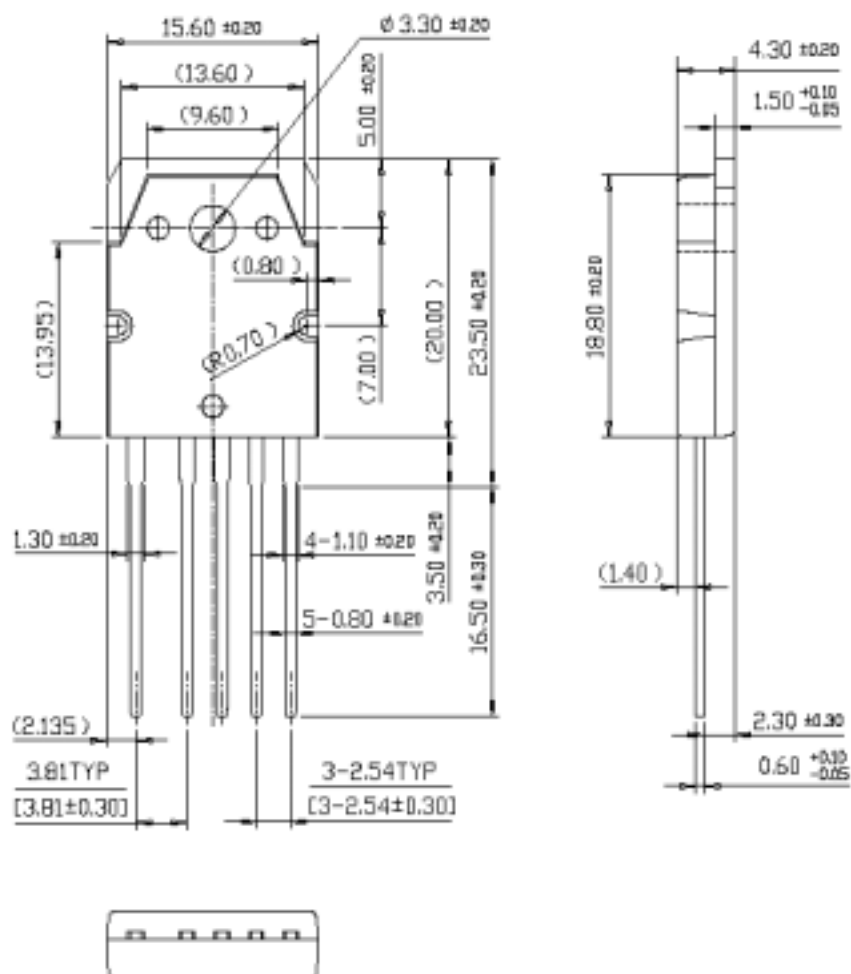


Figure 14. Static Drain-Source on Resistance

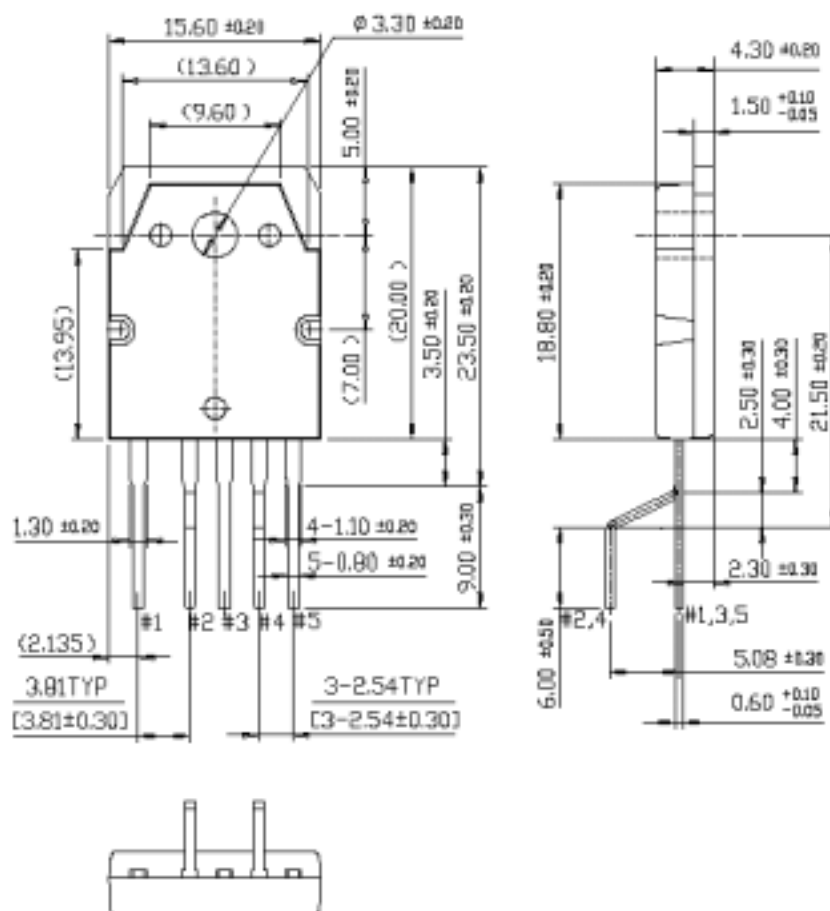
Package Dimensions

TO-3P-5L



Package Dimensions (Continued)

TO-3P-5L (Forming)



Ordering Information

Product Number	Package	Rating	Operating Temperature
KA2S1265-TU	TO-3P-5L	650V,12A	-25°C to +85°C
KA2S1265-YDTU	TO-3P-5L(Forming)		

TU : Non Forming Type

YDTU : Forming Type

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