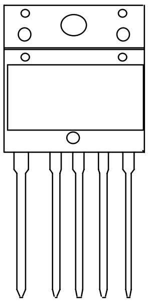
SPS

The SPS product family is specially designed for an off line SMPS with minimal external component. The SPS consist of high voltage Power SenseFET and current mode control IC. Included control IC features a trimmed oscillator, under voltage lock out, leading edge blanking, optimized gate driver, and temperature compensated current sources. Also included are various protective functions, thermal shutdown, Overvoltage protection, Overcurrent protection, and overload protection. Compared with RCC or control IC and MOSFET solution, SPS can reduce total number of components, design size, weight. For this reason SPS can increase efficiency, productivity and system reliability. It has a basic platform well suited for cost effective C-TV power supply.

TO-3PF



1. DRAIN 2.GND 3.Vcc 4.FB 5. Sync

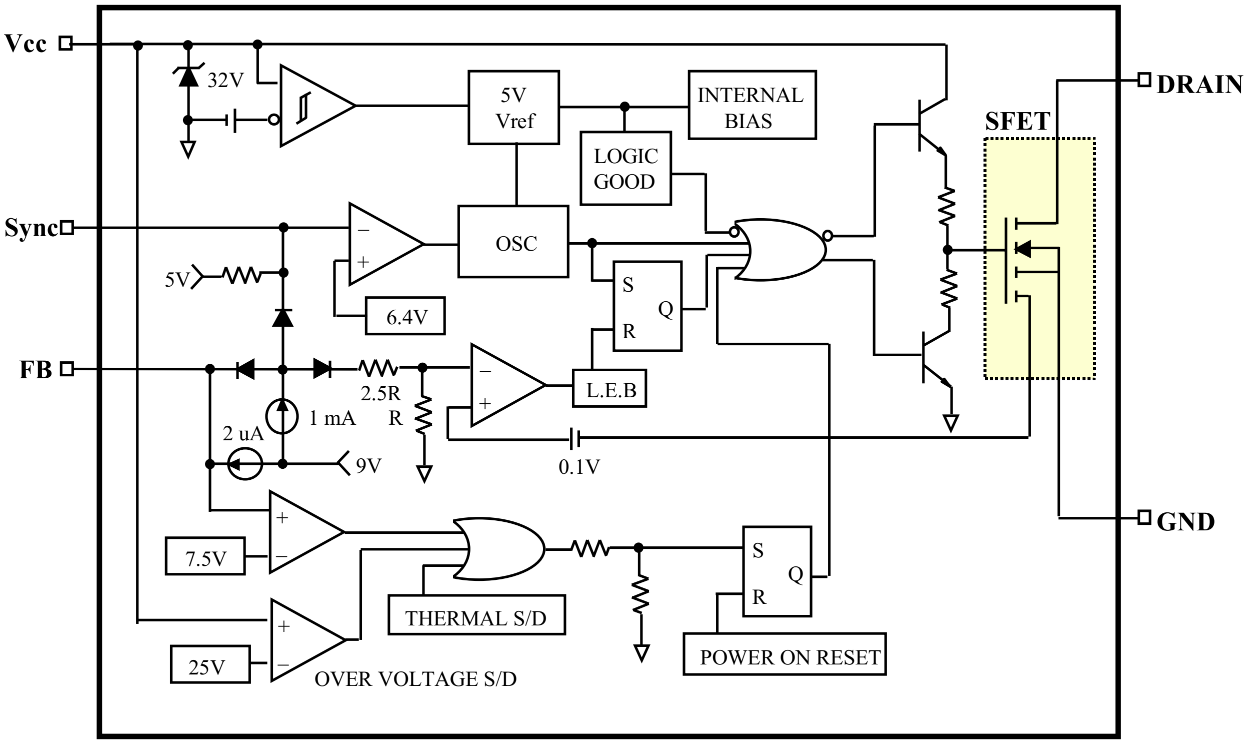
FEATURES

- Wide operating frequency range up to 150KHz
- Pulse by pulse over current limiting
- Over load protection
- Over voltage protection (min:23V)
- Internal thermal shutdown function
- Under voltage lockout
- Internal high voltage sense FET
- External sync terminal
- Auto Restart Mode

ORDERING INFORMATION

Device	Package	Rating	Topr (℃)
KA3S0880RF	TO3PF-5L	800V, 8A	-20 ~ +80

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Drain - Source(GND) Voltage (1)	VDSS	800	V
Drain - Gate Voltage (RGS =1MΩ)	VDGR	800	V
Gate - Source(GND) Voltage	VGS	±30	V
Drain Current Pulsed (2)	IDM	32.0	ADC
Single Pulsed Avalanche Energy (3)	EAS	810	mJ
Avalanche Current	IAS	-	A
Continuous Drain Current (Tc = 25℃)	ID	8.0	ADC
Continuous Drain Current (Tc = 100℃)	ID	5.6	ADC
Supply Voltage	VCC	30	V
Analog Input Voltage Range	VFB	-0.3 ~ VSD	V
Total Power Dissipation	PD (wt H/S)	190	W
	Derating	1.54	W/℃
Operating Temperature	TOPR	- 25 ~ + 85	℃
Storage Temperature	TSTG	- 55 ~ + 150	℃

Notes: (1) TJ = 25℃ to 150 ℃

(2) Repetitive rating : Pulse width limited by maximum junction temperature

(3) L = 24mH, VDD =50V, RG = 25Ω, starting Tj = 25℃

ELECTRICAL CHARACTERISTICS (SFET part)

(Ta = 25℃ unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BVDSS	Drain-Source Breakdown Voltage	800	-	-	V	VGS=0V, ID=50uA
IDSS	Zero Gate Voltage Drain Current	-	-	50	uA	VDS=Max, Rating,VGS=0V
		-	-	200	uA	VDS=0.8Max,Rating,VGS=0V TC=125 ℃
RDS(on)	Static Drain-Source On Resistance(4)	-	1.2	1.5	Ω	VGS = 10V, ID = 5.0A

ELECTRICAL CHARACTERISTICS (SFET part continued)

(Ta = 25℃ unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
g_{fs}	Forward Transconductance(4)	1.5	2.5	-	mho	V_{DS}=15V, I_D=5.0A
C_{iss}	Input Capacitance	-	2460	-	pF	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz
C_{oss}	Output Capacitance	-	210	-		
C_{rss}	Reverse Transfer Capacitance	-	64	-		
td(on)	Turn On Delay Time	-	-	90	nS	V_{DD} = 0.5BV_{DSS} , I_D = 8.0A (MOSFET switching time are essenstialy independent of operating temperature)
tr	Rise Time	-	95	200		
td(off)	Turn Off Delay Time	-	150	450		
tf	Fall Time	-	60	150		
Qg	Total Gate Charge (Gate-Source + Gate-Drain)	-	-	150	nC	V_{GS} = 10V, I_D = 8.0A V_{DS} = 0.5BV_{DSS} (MOSFET switching time are essenstialy independent of operating temperature)
Qgs	Gate-Source Charge	-	20	-		
Qgd	Gate-Drain(Miller) Charge	-	70	-		

Notes: (1) T_J = 25℃ to 150 ℃

(2) Repetitive rating : Pulse width limited by maximum junction temperature

(3) L = 24mH, V_{DD} =50V, R_G = 25Ω, starting Tj = 25℃

(4) Pulse Test : Pulse width ≤ 300uS, Duty Cycle ≤ 2 %

ELECTRICAL CHARACTERISTICS (Control part)

(Ta = 25℃ unless otherwise specified)

Symbol	Characteristics	Min	Typ	Max	Unit	Test Conditions
REFERENCE SECTION						
Vref	Output Voltage (Note 1)	4.80	5.00	5.20	V	Ta = 25℃
Vref/ ⊿T	Temperature Stability (Note 1&2)	-	0.3	0.6	mV/℃	-25℃ ≤ Ta ≤ +85℃
OSCILLATOR SECTION						
F_{OSC}	Initial Accuracy	18	20	22	KHz	Ta = 25℃
⊿F / ⊿T	Frequency Change with Temperature (Note 2)		±5	±10	%	-25℃ ≤ Ta ≤ +85℃
V_{SYTH}	Sync Threshold Voltage	6.0	6.4	6.8	V	Vfb =5 V
D_{MAX}	Maximum Duty Cycle	92	95	98	%	
FEEDBACK SECTION						
I_{FB}	Feedback Source Current	0.7	0.9	1.1	mA	Ta = 25℃, Vfb = GND
I_{delay}	Shutdown Delay Current	1.4	1.8	2.2	uA	Ta = 25℃, 5 V ≤ Vfb ≤ V_{SD}
OVER CURRENT PROTECTION SECTION						
$I_{L(MAX)}$	Over Current Protection	4.40	5.00	5.60	A	Max. Inductor Current
UVLO SECTION						
$V_{th(H)}$	Start Threshold Voltage	14	15	16	V	
$V_{th(L)}$	Minimum Operating Voltage	9	10	11	V	After turn on

ELECTRICAL CHARACTERISTICS (Continued)

(Ta = 25℃ unless otherwise specified)

Symbol	Characteristics	Min	Typ	Max	Unit	Test Conditions
TOTAL STANDBY CURRENT SECTION						
I_{ST}	Start up Current	0.1	0.3	0.55	mA	V_{CC} = 14V
I_{OPR}	Operating Supply Current (control part only)	6	12	18	mA	Ta = 25℃,
V_Z	Vcc Zener Voltage	30	32.5	35	V	I_{CC} = 20mA
SHUTDOWN SECTION						
V_{SD}	Shutdown Feedback Voltage	6.9	7.5	8.1	V	
T_{SD}	ThermalShutdownTemperature(Tj)	140	160	-	℃	(Note 1)
Vovp	Over Voltage Protection	23	25	28		
SOFT START SECTION						
I_{SS}	Soft Start Current	0.8	1.0	1.2	mA	Sync&S/S = GND
V_{SS}	Soft Start Voltage	4.7	5.0	5.3	V	V_{FB}= 2V

Notes: (1) These parameters, although guaranteed,are not 100% tested in production
(2) These parameters, although guaranteed, are tested in EDS(wafer 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 grahps are normalized at Ta = 25℃)

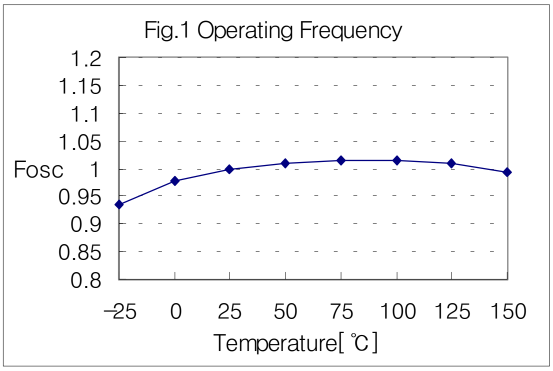


Fig.1 Operating Frequency

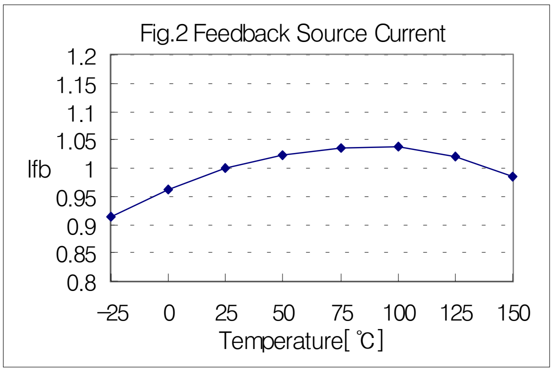


Fig.2 Feedback Source Current

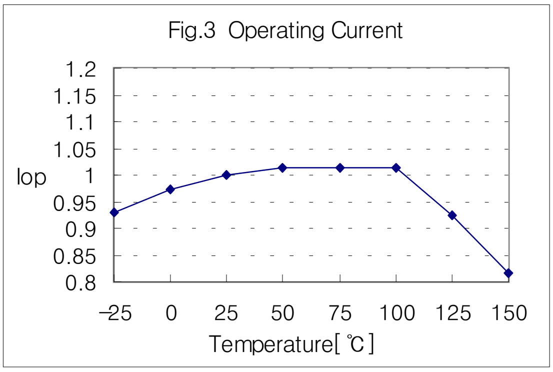


Fig.3 Operating Current

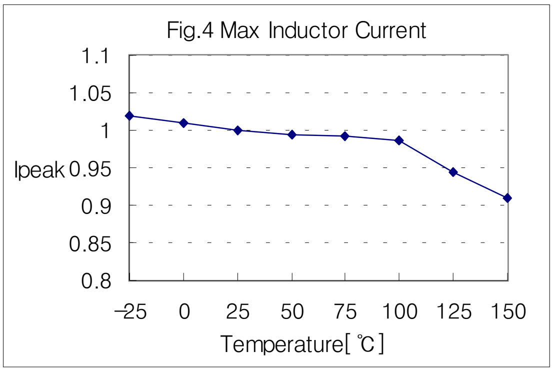


Fig.4 Max Inductor Current

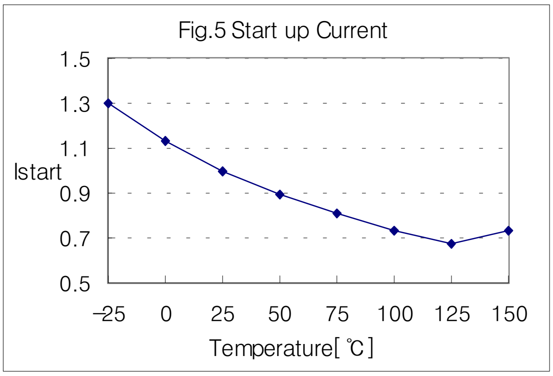


Fig.5 Start up Current

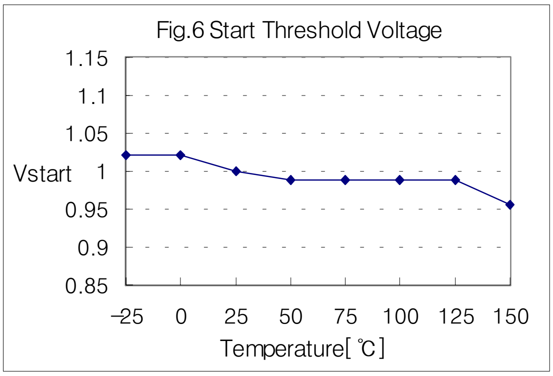
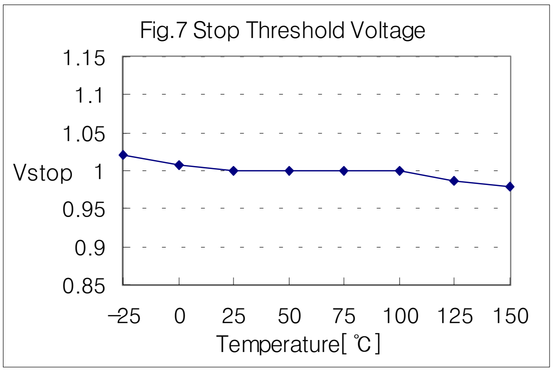
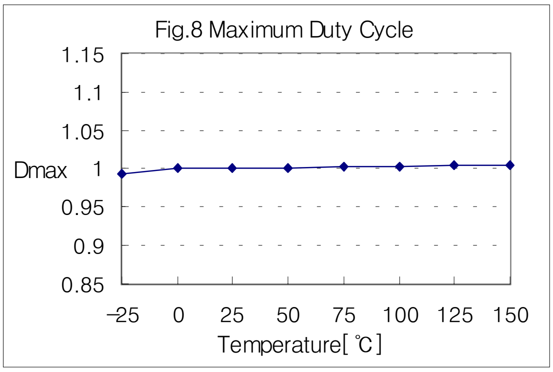


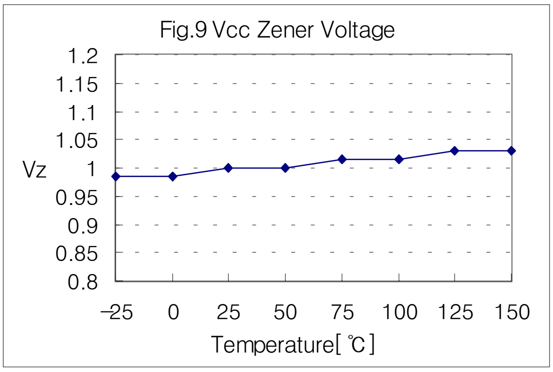
Fig.6 Start Threshold Voltage

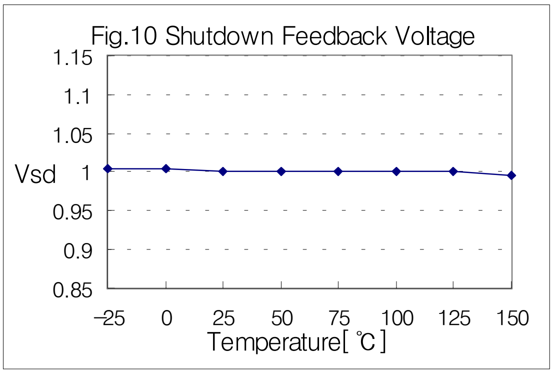
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

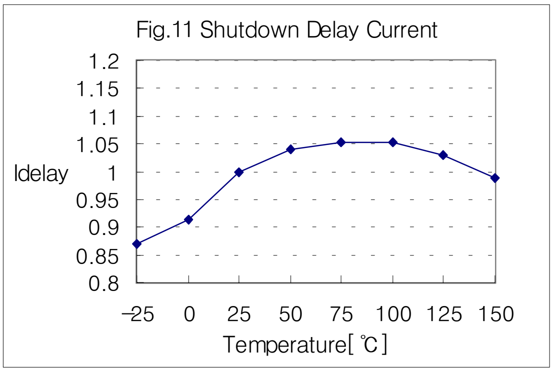
(These characteristic grahps are normalized at Ta = 25℃)

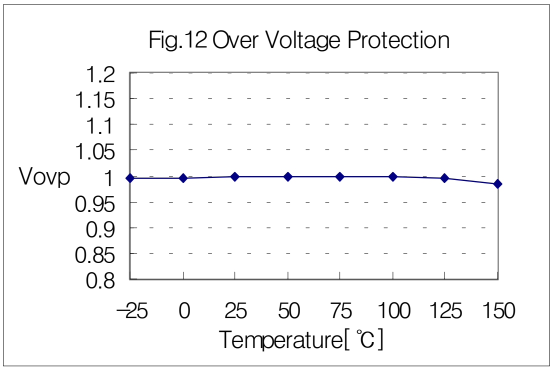






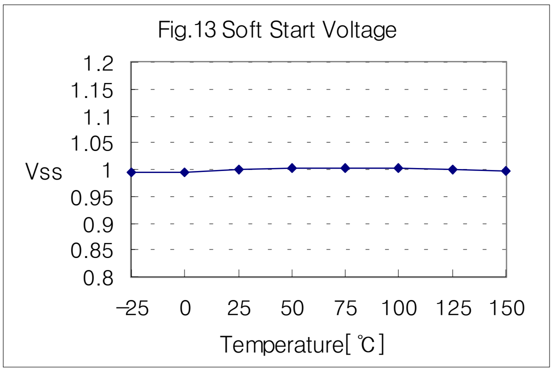


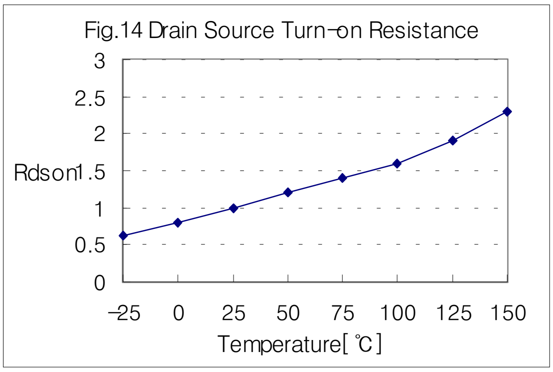




TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(These characteristic grahps are normalized at Ta = 25℃)





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