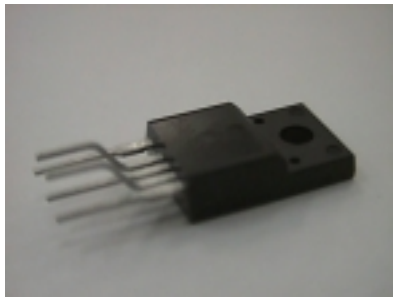
S P S

The SPS product family is specially designed for an off-line SMPS with minimal external components. The SPS consist of high voltage power SenseFET and current mode PWM IC.
Included PWM controller features integrated fixed oscillator, under voltage lock out, leading edge blanking, optimized gate turn-on/turn-off driver, thermal shut down protection, over voltage protection, and temperature compensated precision current sources for loop compensation and fault protection circuitry. Compared to discrete MOSFET and controller or RCC switching converter solution, a SPS can reduce total component count, design size, and weight and at the same time increase efficiency, productivity, and system reliability.
It has a basic platform well suited for cost-effective design in Quasi-Resonant Converter as C-TV power supply.

TO-220F-5L



1. Drain 2. GND 3. V_{CC} 4. FB 5. Sync

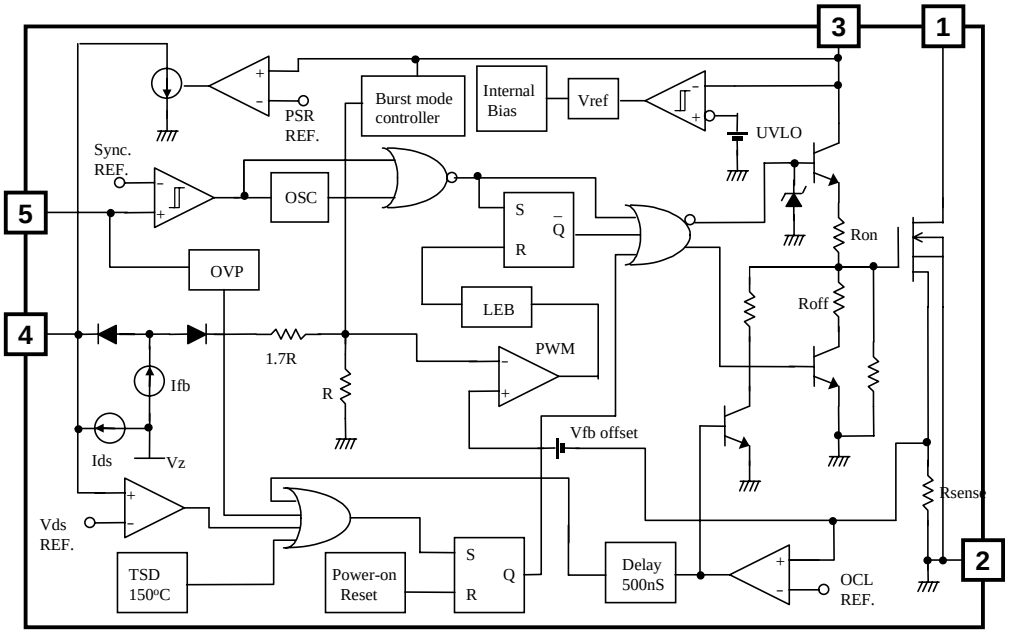
FEATURES

- Quasi Resonant Converter Controller
- Internal Burst mode Controller for Stand-by mode
- Pulse by pulse current limiting
- Over current Latch protection
- Over voltage protection (Vsync: Min. 11V)
- Internal thermal shutdown function
- Under voltage lockout
- Internal high voltage sense FET
- Auto-restart mode

ORDERING INFORMATION

Device	Package	Topr (°C)
KA5Q1265RT	TO-220F-5L	–25°C to +85°C

BLOCK DIAGRAM



FAIRCHILD SEMICONDUCTOR TM

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Drain-source (GND) voltage (1)	V_{DSS}	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	A_{DC}
Single pulsed avalanche energy (3)	E_{AS}	785	mJ
Avalanche current (4)	I_{AS}	–	A
Continuous drain current (T_C=25°C)	I_D	12	A_{DC}
Continuous drain current (T_C=100°C)	I_D	8.4	A_{DC}
Supply voltage	V_{CC}	40	V
Analog input voltage range (F/B pin)	V_{FB}	–0.3 to V_{SD}	V
Analog input voltage range (Sync pin)	V_{SYNC}	–0.3 to 13	V
Total power dissipation	P_D (wt H/S)	135	W
	Derating	1.1	W/°C
Operating temperature	T_{OPR}	–25 to +85	°C
Storage temperature	T_{STG}	–55 to +150	°C

NOTES:
1. Tj=25°C to 150°C
2. Repetitive rating: Pulse width limited by maximum junction temperature
3. L=24mH, starting Tj=25°C
4. L=13uH, starting Tj=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	650	–	–	V
Zero gate voltage drain current	I_{DSS}	V_{DS}=Max., Rating, V_{GS}=0V	–	–	200	μA
		V_{DS}=0.8*Max., Rating, V_{GS}=0V, T_C=125°C	–	–	500	μA
Static drain-source on resistance (note)	$R_{DS(ON)}$	V_{GS}=10V, I_D=6.0A	–	0.72	–	Ω
Forward transconductance (note)	gfs	V_{DS}=15V, I_D=6.0A	5.7	–	–	S
Input capacitance	Ciss	V_{GS}=0V, V_{DS}=25V, f=1MHz	–	2700	–	pF
Output capacitance	Coss		–	300	–	
Reverse transfer capacitance	Crss		–	61	–	
Turn on delay time	td(on)	V_{DD}=0.5BV_{DSS}, I_D=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	V_{GS}=10V, I_D=12.0A, V_{DS}=0.5BV_{DSS} (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%

ELECTRICAL CHARACTERISTICS (Control part)

(Ta=25°C unless otherwise specified)

Characteristic	Symbol	Test condition	Min.	Typ.	Max.	Unit
OSCILLATOR SECTION						
Initial accuracy	F_{OSC}	Ta=25°C	18	20	22	KHz
Frequency change with temperature (2)	–	-25°C≤Ta≤+85°C	–	±5	±10	%
PWM SECTION						
Maximum duty cycle	D_{MAX}	–	92	95	98	%
FEEDBACK SECTION						
Feedback Source Current	I_{FB}	Ta=25°C, 0V≤Vfb≤3V	0.7	0.9	1.1	mA
Shutdown Delay Current	I_{DELAY}	Ta=25°C, 5V≤Vfb≤V_{SD}	4	5	6	µA
OVER CURRENT PROTECTION SECTION						
Over Current Protection	$I_{L(MAX)}$	Max. inductor current	5.28	6.00	6.72	A
UVLO SECTION						
Start threshold voltage	I_{ST}	–	14	15	16	V
Minimum oeration voltage	I_{OPR}	After turn on	8	9	10	V
TOTAL STANDBY CURRENT SECTION						
Start threshold voltage	Vth(H)	V_{CC}=14	–	0.1	0.2	mA
Operating supply current (Control part only)	Vth(L)	V_{CC}≤28	–	10	18	mA
SHUTDOWN SECTION						
Shutdown Feedback voltage	V_{SD}	Vfb≥6.5V	6.9	7.5	8.1	V
Thermal shutdown temperature (Tj) (1)	T_{SD}	–	140	–	–	°C
Over Voltage Protection Voltage	V_{OVP}	Vsync≥11V	11	12	13	V
Over Current latch Protection (1)	V_{OCL}	–	0.9	1.0	1.1	V
BURST MODE SECTION						
Burst mode Threshold Voltage	V_{BURST}	Vfb=0V	10.6	11.0	11.4	V
Burst mode Hysteresis Voltage	V_{BURSTH}	Vfb=0V	0.7	1	1.2	V
Burst mode Enable Feedback voltage	V_{BURST_EN}	V_{CC}=11V	0.7	1.0	1.3	V
Burst mode Current Limit	I_{BURST}	V_{CC}=11.5V	0.7	0.85	1.0	V

ELECTRICAL CHARACTERISTICS (Continued)

(Ta=25°C unless otherwise specified)

Characteristic	Symbol	Test condition	Min.	Typ.	Max.	Unit
SYNCHORONIZATION SECTION						
Burst Sync Threshold Voltage	V_{BSY}	V_{FB}=0V	3.1	3.5	3.9	V
Burst Sync Hysteresis Voltage	V_{BSYH}	V_{FB}=0V	2.0	2.25	2.5	V
Normal Sync Threshold Voltage	V_{NSY}	V_{FB}=5V	4.0	4.5	5.0	V
Normal Sync Hysteresis Voltage	V_{NSYH}	V_{FB}=5V	1.8	2.0	2.2	V
PRIMARY SIDE REGULATION SECTION						
Primary Reg. Threshold Voltage	V_{PR}	I_{FB}=0	32.0	32.3	32.6	V
Primary Reg. Transconductance	G_{PR}	–	–	2.6	–	mA/V

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

LIFE SUPPORT POLICY

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.