

KA2S0680

SAMSUNG POWER SWITCH

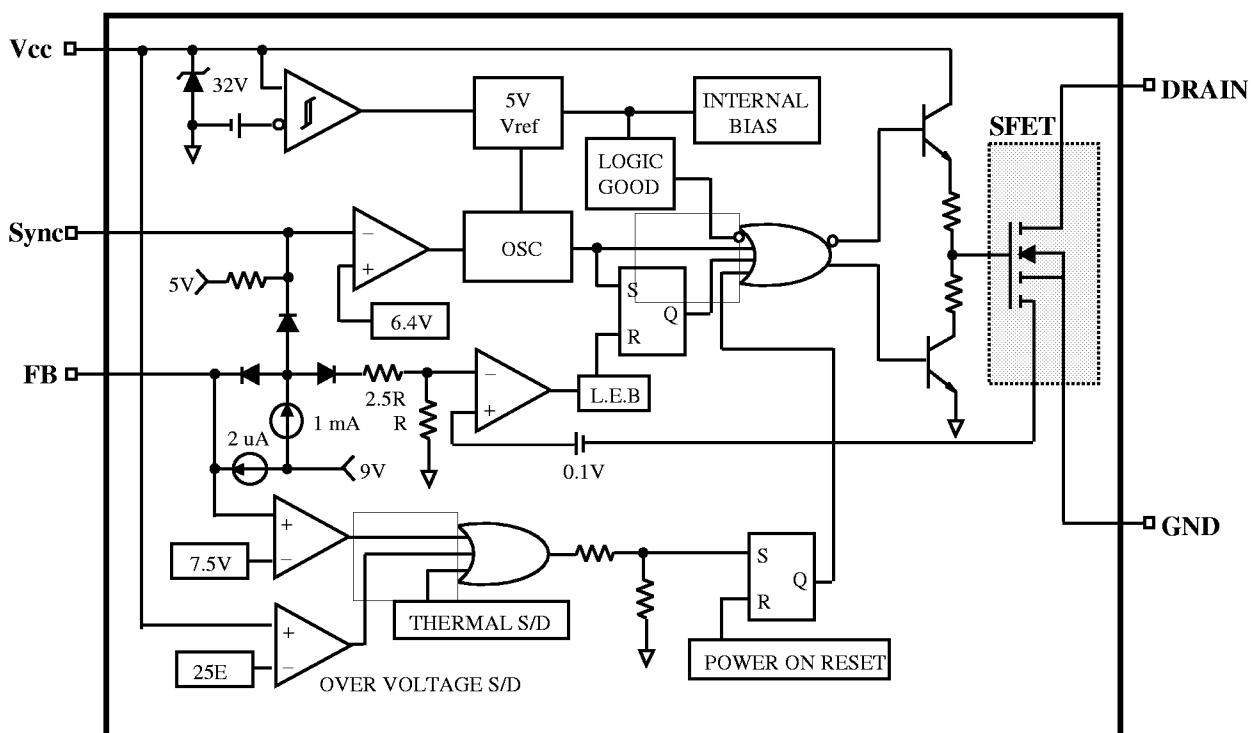
FEATURES

- 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
- Latch Mode

PRODUCT SUMMARY

Part Number	BV _{dss}	R _{ds(on)}	I _D
KA2S0680	800V	2Ω	6A

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Drain - Source(GND) Voltage (1)	V_{DSS}	800	V
Drain - Gate Voltage ($R_{GS} = 1M\Omega$)	V_{DGR}	800	V
Gate - Source(GND) Voltage	V_{GS}	± 30	V
Drain Current Pulsed (2)	I_{DM}	24.0	A_{DC}
Single Pulsed Avalanche Energy (3)	E_{AS}	455	mJ
Avalanche Current	I_{AS}	-	A
Continuous Drain Current ($T_c = 25^\circ C$)	I_D	6.0	A_{DC}
Continuous Drain Current ($T_c = 100^\circ C$)	I_D	4.0	A_{DC}
Supply Voltage	V_{CC}	30	V
Analog Input Voltage Range	V_{FB}	$-0.3 \sim V_{SD}$	V
Total Power Dissipation	P_D (wt H/S)	150	W
	Derating	1.21	W/ $^\circ C$
Operating Temperature	T_{OPR}	$-25 \sim +85$	$^\circ C$
Storage Temperature	T_{STG}	$-55 \sim +150$	$^\circ C$

Notes: (1) $T_J = 25^\circ C$ to $150^\circ C$

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

(3) $L = 24mH$, $V_{DD} = 50V$, $R_G = 25\Omega$, starting $T_J = 25^\circ C$

ELECTRICAL CHARACTERISTICS (SFET part)

($T_a = 25^\circ C$ unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
BV_{DSS}	Drain-Source Breakdown Voltage	800	-	-	V	$V_{GS}=0V$, $I_D=50\mu A$
I_{DSS}	Zero Gate Voltage Drain Current	-	-	50	μA	$V_{DS}=Max$, Rating, $V_{GS}=0V$
		-	-	200	μA	$V_{DS}=0.8Max$, Rating, $V_{GS}=0V$ $TC=125^\circ C$
$R_{DS(on)}$	Static Drain-Source On Resistance(4)	-	1.6	2.0	Ω	$V_{GS} = 10V$, $I_D = 4.0A$



ELECTRICAL CHARACTERISTICS (SFET part continued)

(Ta = 25 °C unless otherwise specified)

Symbol	Characteristic	Min	Typ	Max	Units	Test Conditions
g_{fs}	Forward Transconductance(4)	1.5	2.5	-	mho	$V_{DS}=15V, I_D=4.0A$
C_{iss}	Input Capacitance	-	1600	-	pF	$V_{GS} = 0V, V_{DS} = 25V,$ $f = 1MHz$
C_{oss}	Output Capacitance	-	140	-		
C_{rss}	Reverse Transfer Capacitance	-	42	-		
$t_{d(on)}$	Turn On Delay Time	-	60	-	nS	$V_{DD} = 0.5BV_{DSS}, I_D = 6.0A$ (MOSFET switching time are essentially independent of operating temperature)
t_r	Rise Time	-	150	-		
$t_{d(off)}$	Turn Off Delay Time	-	300	-		
t_f	Fall Time	-	130	-		
Q_g	Total Gate Charge (Gate-Source + Gate-Drain)	-	70	-	nC	$V_{GS} = 10V, I_D = 6.0A$ $V_{DS} = 0.5BV_{DSS}$ (MOSFET switching time are essentially independent of operating temperature)
Q_{gs}	Gate-Source Charge	-	16	-		
Q_{gd}	Gate-Drain(Miller) Charge	-	27	-		

Notes: (1) $T_J = 25^\circ C$ to $150^\circ C$

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

(3) $L = 24mH, V_{DD} = 50V, R_G = 25\Omega$, starting $T_J = 25^\circ C$ (4) Pulse Test : Pulse width $\leq 300\mu S$, Duty Cycle $\leq 2\%$

ELECTRICAL CHARACTERISTICS (Control part)

(Ta = 25 °C 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 °C
Vref / ΔT	Temperature Stability (Note 1&2)	-	0.3	0.6	mV/°C	-25 °C ≤ Ta ≤ +85 °C
OSCILLATOR SECTION						
FOSC	Initial Accuracy	18	20	22	KHz	Ta = 25 °C
ΔF / ΔT	Frequency Change with Temperature (Note 2)		±5	±10	%	-25 °C ≤ Ta ≤ +85 °C
VS _{YTH}	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 °C, Vfb = GND
I _{delay}	Shutdown Delay Current	1.4	1.8	2.2	uA	Ta = 25 °C, 5 V ≤ Vfb ≤ V _{SD}
OVER CURRENT PROTECTION SECTION						
I _{L(MAX)}	Over Current Protection	3.52	4.00	4.48	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

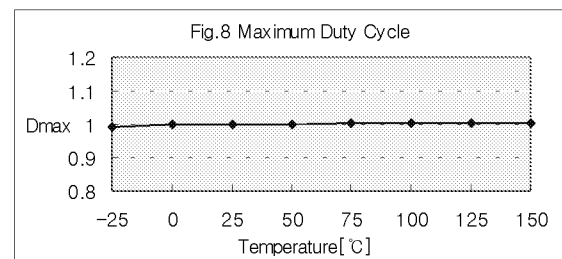
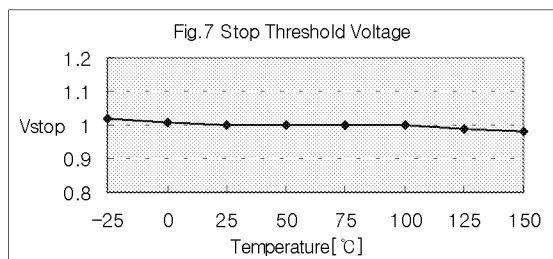
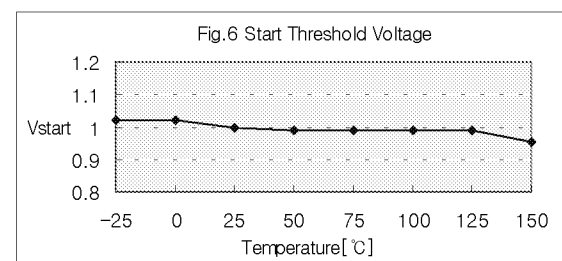
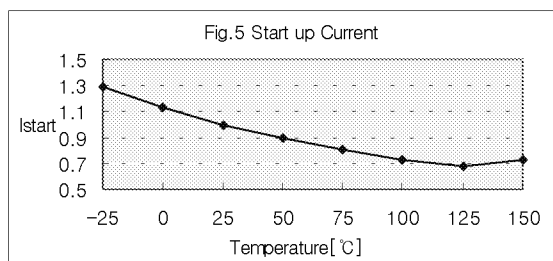
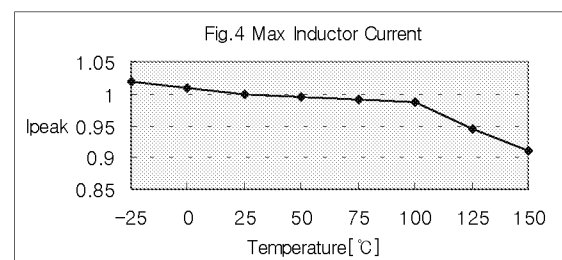
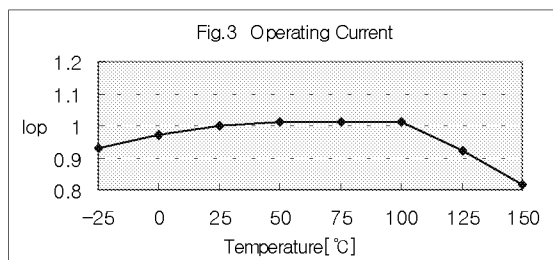
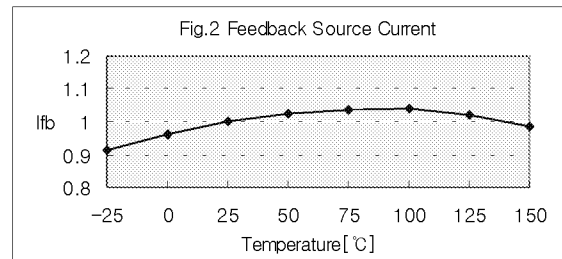
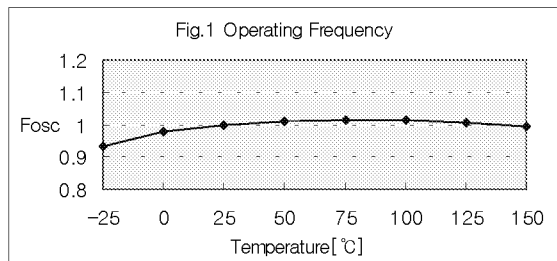
ELECTRICAL CHARACTERISTICS (Continued)

(Ta = 25℃ unless otherwise specified)

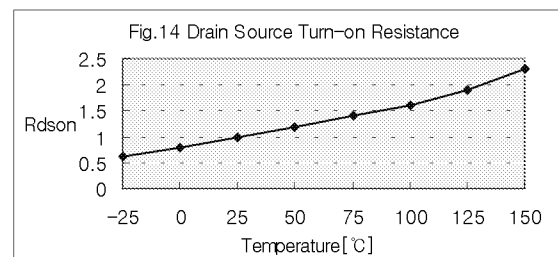
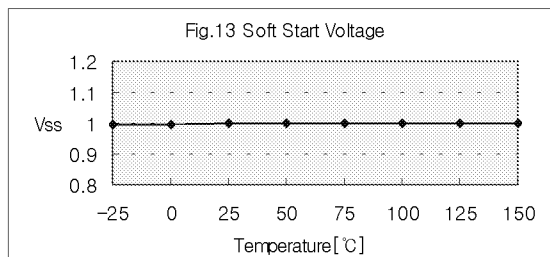
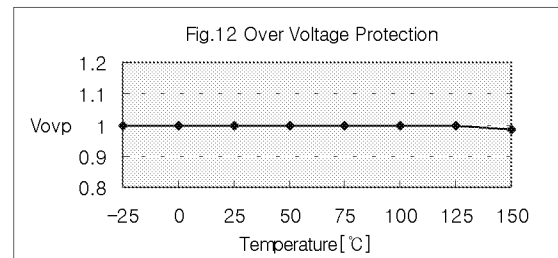
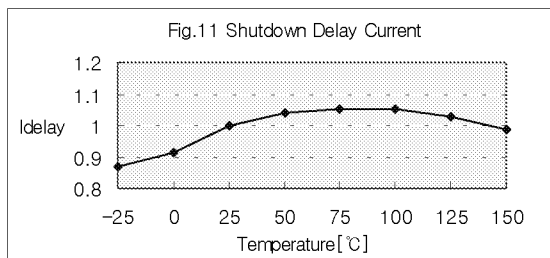
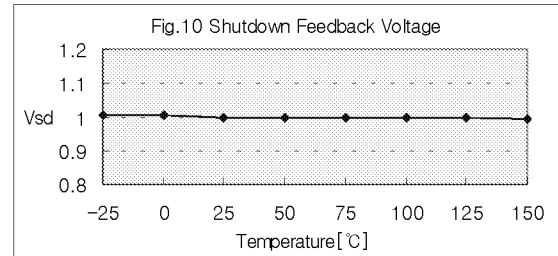
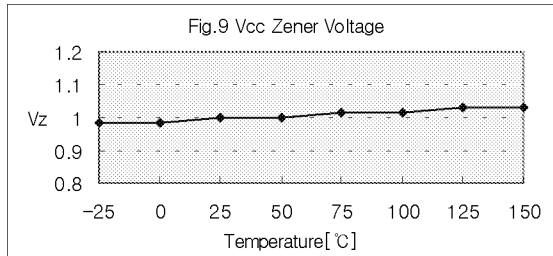
Symbol	Characteristics	Min	Typ	Max	Unit	Test Conditions
TOTAL STANDBY CURRENT SECTION						
I _{ST}	Start up Current	0.1	0.3	0.55	mA	V _{CC} = 14V
I _{OPR}	Operating Supply Current (control part only)	6	12	18	mA	Ta = 25℃ ,
V _Z	V _{CC} Zener Voltage	30	32.5	35	V	I _{CC} = 20mA
SHUTDOWN SECTION						
V _{SD}	Shutdown Feedback Voltage	6.9	7.5	8.1	V	
T _{SD}	ThermalShutdownTemperature(Tj)	140	160	-	℃	(Note 1)
V _{ovp}	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.

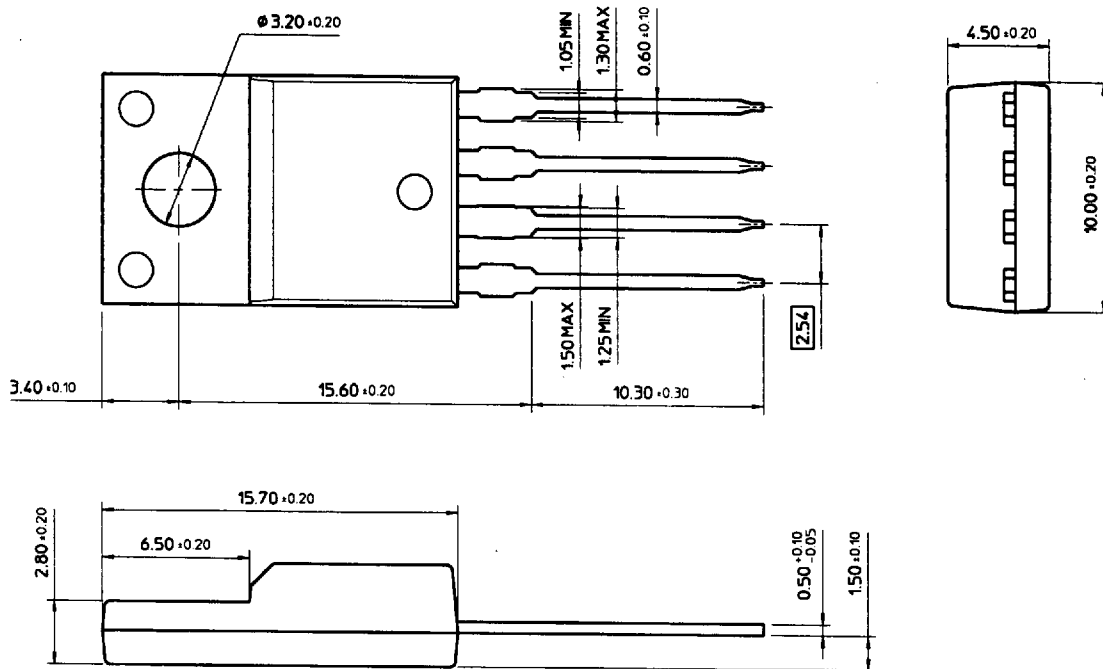
TYPICAL PERFORMANCE CHARACTERISTICS



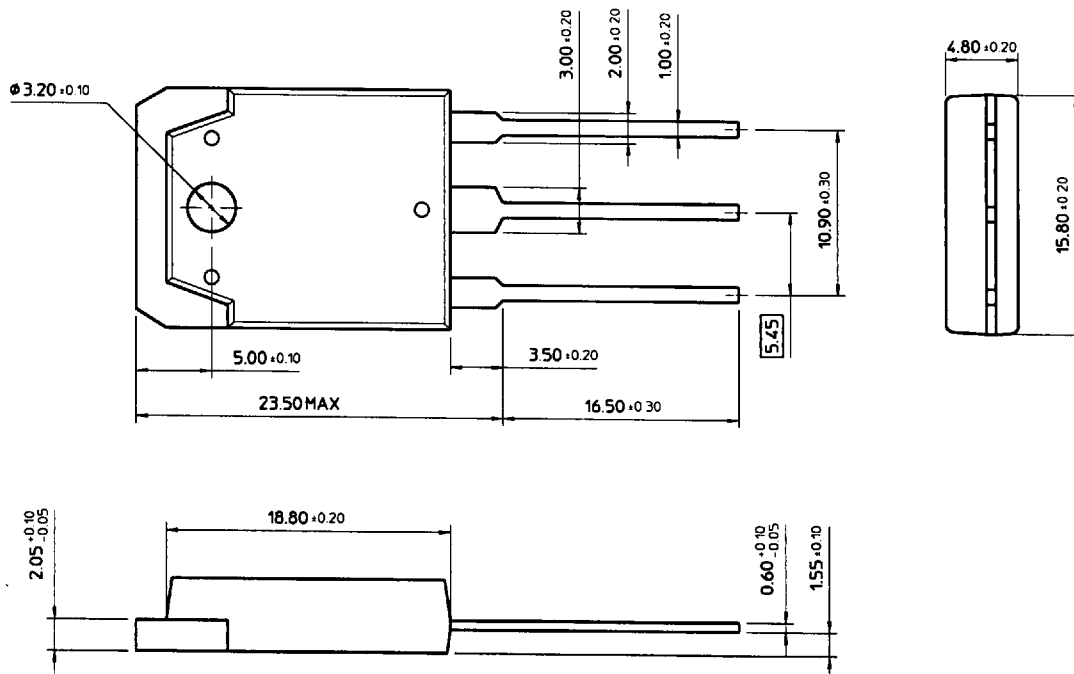
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



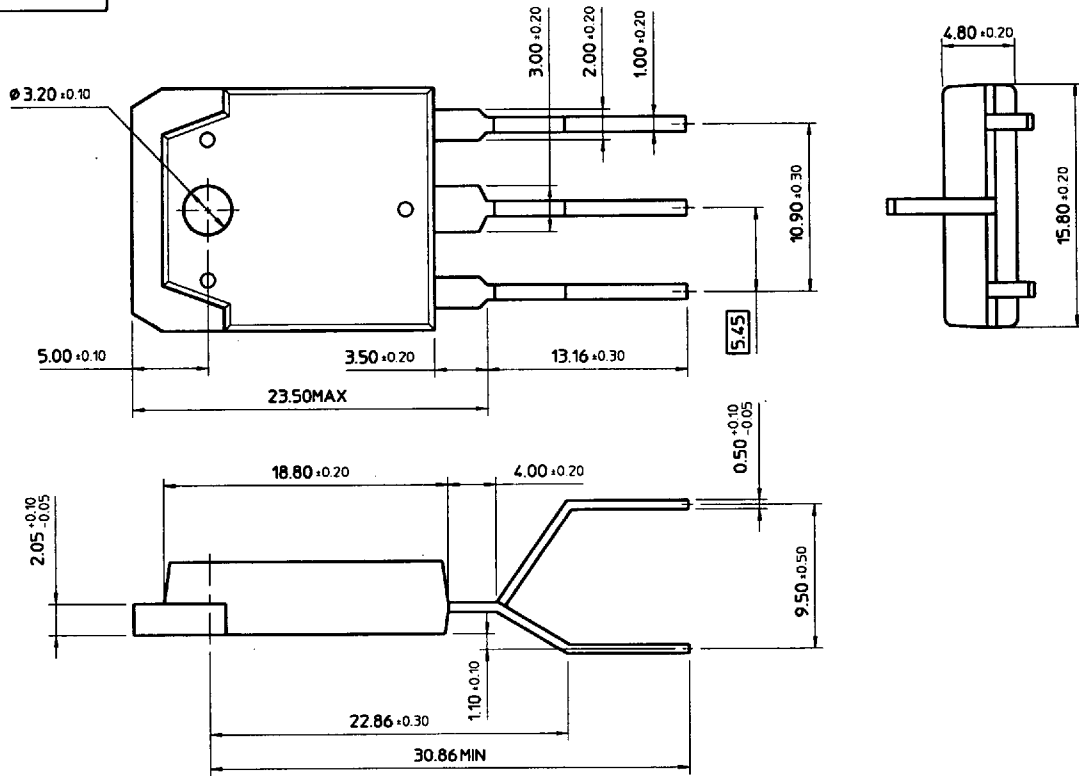
TO-220-F-4L



TO-3P (1)



T0-3P (2)



T0-3PF (1)

