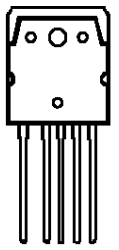
## FEATURES

- 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

**TO-3P**

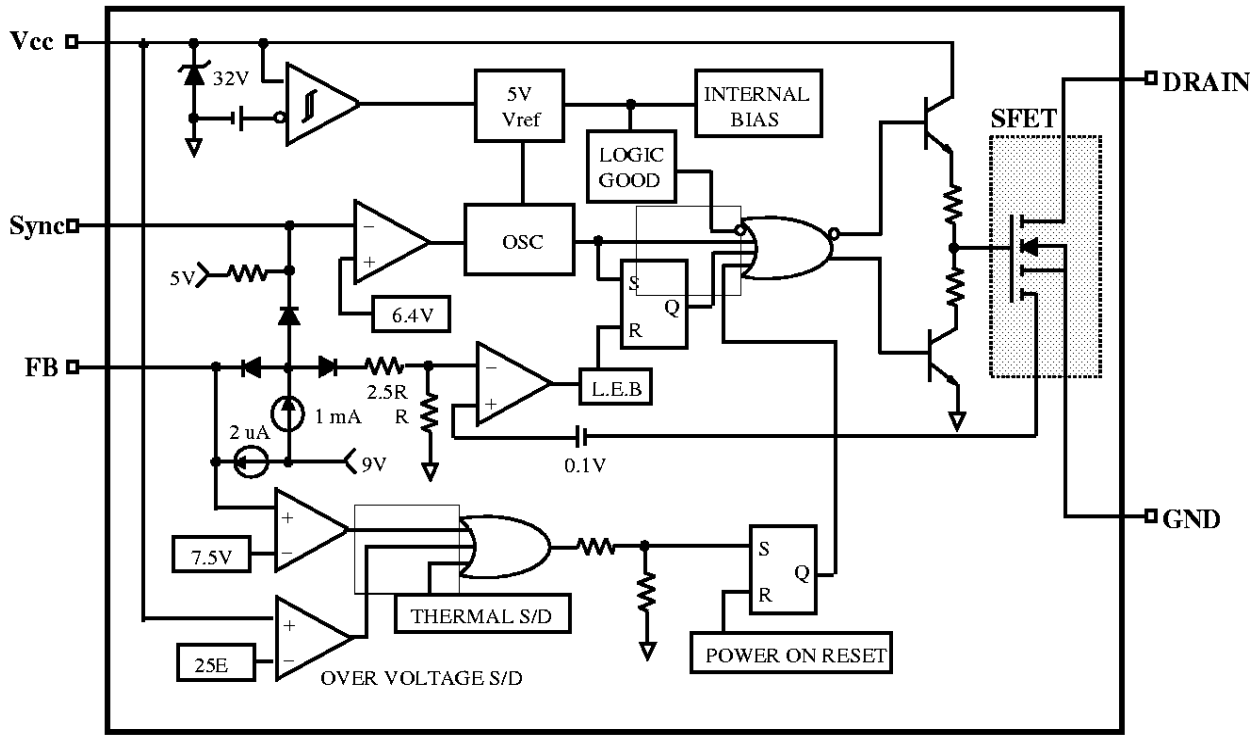


1. DRAIN 2.GND 3.Vcc 4.FB 5. Sync

## PRODUCT SUMMARY

| Part Number | BVdss | Rds(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 ($R_{GS}$ =1MΩ) | $V_{DGR}$ | 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 (Tc = 25℃) | $I_D$ | 6.0 | $A_{DC}$ |
| Continuous Drain Current (Tc = 100℃) | $I_D$ | 4.0 | $A_{DC}$ |
| Supply Voltage | $V_{CC}$ | 30 | V |
| Analog Input Voltage Range | $V_{FB}$ | -0.3 ~ $V_{SD}$ | V |
| Total Power Dissipation | $P_D$ ( wt H/S) | 150 | W |
| | Derating | 1.21 | W/℃ |
| Operating Temperature | $T_{OPR}$ | - 25 ~ + 85 | ℃ |
| Storage Temperature | $T_{STG}$ | - 55 ~ + 150 | ℃ |

**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℃

## ELECTRICAL CHARACTERISTICS ( SFET part )

( Ta = 25℃ unless otherwise specified )

| Symbol | Characteristic | Min | Typ | Max | Units | Test Conditions |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | 800 | - | - | V | $V_{GS}$=0V, $I_D$=50uA |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | - | - | 50 | uA | $V_{DS}$=Max, Rating,$V_{GS}$=0V |
| | | - | - | 200 | uA | $V_{DS}$=0.8Max,Rating,$V_{GS}$=0V TC=125 ℃ |
| $R_{DS}$(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℃ 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 | - | | |
| td(on) | Turn On Delay Time | - | 60 | - | nS | $V_{DD}$ = 0.5B$V_{DSS}$ , $I_D$ = 6.0A (MOSFET switching time are essenstialy independent of operating temperature ) |
| tr | Rise Time | - | 150 | - | | |
| td(off) | Turn Off Delay Time | - | 300 | - | | |
| tf | Fall Time | - | 130 | - | | |
| Qg | Total Gate Charge ( Gate-Source + Gate-Drain ) | - | 70 | - | nC | $V_{GS}$ = 10V, $I_D$ = 6.0A $V_{DS}$ = 0.5B$V_{DSS}$ (MOSFET switching time are essenstialy independent of operating temperature ) |
| Qgs | Gate-Source Charge | - | 16 | - | | |
| Qgd | Gate-Drain(Miller) Charge | - | 27 | - | | |

**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/ ΔT | Temperature Stability (Note 1&2) | - | 0.3 | 0.6 | mV/℃ | -25℃≤Ta ≤+85℃ |
| **OSCILLATOR SECTION** | | | | | | |
| FOSC | Initial Accuracy | 18 | 20 | 22 | KHz | Ta = 25℃ |
| ΔF / ΔT | Frequency Change with Temperature (Note 2) | | ±5 | ±10 | % | -25℃≤Ta ≤+85℃ |
| VSYTH | Sync Threshold Voltage | 6.0 | 6.4 | 6.8 | V | Vfb =5 V |
| | | | | | | |
| DMAX | Maximum Duty Cycle | 92 | 95 | 98 | % | |
| **FEEDBACK SECTION** | | | | | | |
| I FB | Feedback Source Current | 0.7 | 0.9 | 1.1 | mA | Ta = 25℃, Vfb = GND |
| Idelay | Shutdown Delay Current | 1.4 | 1.8 | 2.2 | uA | Ta = 25℃, 5 V≤Vfb≤VSD |
| **OVER CURRENT PROTECTION SECTION** | | | | | | |
| IL(MAX) | Over Current Protection | 3.52 | 4.00 | 4.48 | A | Max. Inductor Current |
| **UVLO SECTION** | | | | | | |
| Vth(H) | Start Threshold Voltage | 14 | 15 | 16 | V | |
| Vth(L) | Minimum Operating Voltage | 9 | 10 | 11 | V | After turn on |

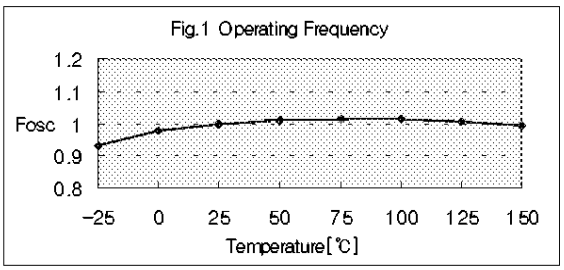
## ELECTRICAL CHARACTERISTICS ( Continued)

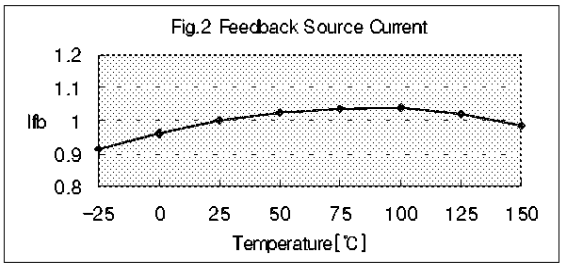
( Ta = 25℃ unless otherwise specified )

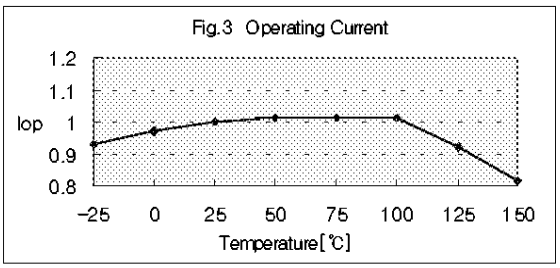
| Symbol | Characteristics | Min | Typ | Max | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| **TOTAL STANDBY CURRENT SECTION** | | | | | | |
| $I_{ST}$ | Start up Current | 0.1 | 0.3 | 0.55 | mA | $V_{CC}$ = 14V |
| $I_{OPR}$ | Operating Supply Current ( control part only ) | 6 | 12 | 18 | 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 |

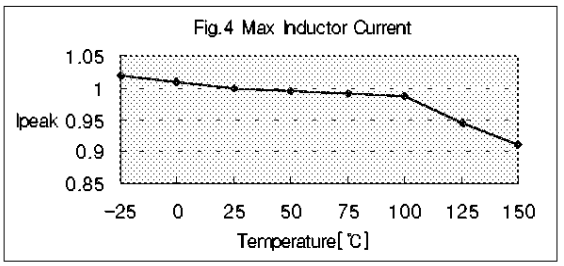
**Notes:** (1) These parameters, although guaranteed,are not 100% tested in production
(2) These parameters, although guaranteed, are tested in EDS(wafer test) process.

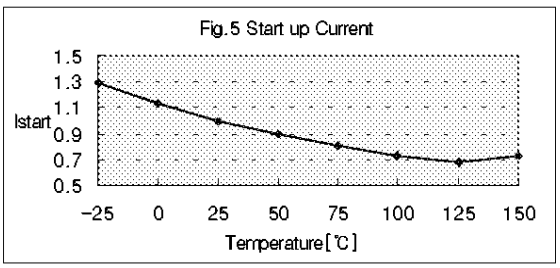
## TYPICAL PERFORMANCE CHARACTERISTICS

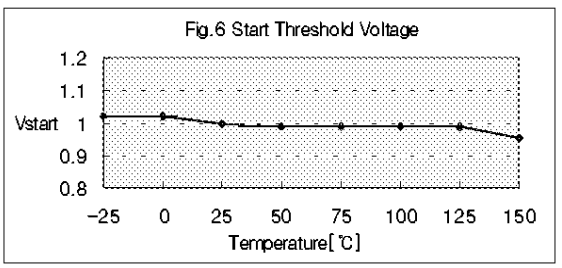


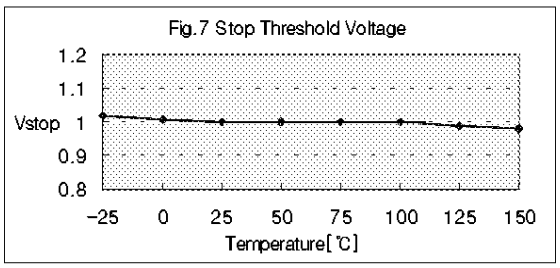



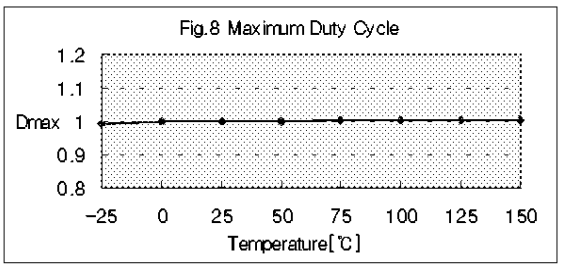



## TYPICAL PERFORMANCE CHARACTERISTICS (Continued)