

P-Channel 20-V(D-S) MOSFET

| V(BR)DSS | RDS(on)MAX | ID |
|----------|---------------|------|
| -20 V | 80mΩ @ -4.5V | - 3A |
| | 100mΩ @ -2.5V | |
| | 130mΩ @ -1.8V | |

FEATURE:

※ TrenchFET Power MOSFET

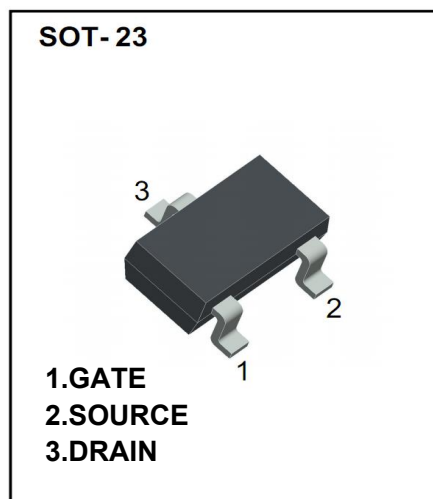
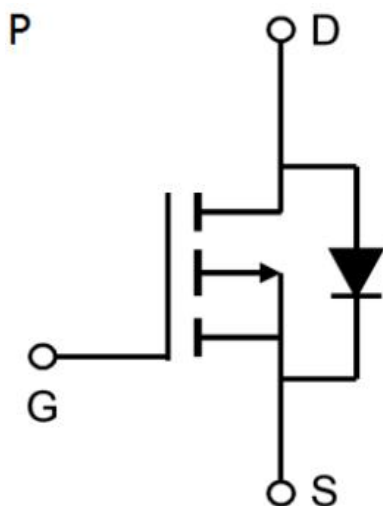
General Description :

The KAO3413 uses advanced trench technology to provide excellent RDS(ON), low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch or in PWM applications.

MARKING:

A39T

Equivalent Circuit :



Maximum ratings (Ta=25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|--------|----------|------|
| Drain-Source Voltage | VDS | -20 | V |
| Gate-Source Voltage | VGS | ±8 | |
| Continuous Drain Current | ID | -3 | A |
| Pulsed Diode Current | IDM | -15 | |
| Continuous Source-Drain Current(Diode Conduction) | IS | -1.4 | |
| Power Dissipation | PD | 1.4 | W |
| Thermal Resistance from Junction to Ambient (t≤10s) | RθJA | 125 | °C/W |
| Operating Junction | TJ | 150 | °C |
| Storage Temperature | TSTG | -55~+150 | °C |

MOSFET ELECTRICAL CHARACTERISTICS

Static Electrical Characteristics (Ta = 25 °C Unless Otherwise Noted)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---------------------------------------|----------|--|------|------|------|------|
| Static | | | | | | |
| Drain-source breakdown voltage | V(BR)DSS | VGS = 0V, ID = -250μA | -20 | | | V |
| Gate-source threshold voltage | VGS(th) | VDS = VGS, ID = -250μA | -0.4 | | -1.1 | V |
| Gate-body leakage current | IGSS | VDS = 0V, VGS = ±8V | | | ±100 | nA |
| Zero gate voltage drain current | IDSS | VDS = -20V, VGS = 0V | | | -1 | μA |
| Static Drain-Source On-Resistance | RDS(on) | VGS = -4.5V, ID = -3A | | 56 | 80 | mΩ |
| | | VGS = -2.5V, ID = -2.5A | | 70 | 100 | mΩ |
| | | VGS = -1.8V, ID = -1A | | 85 | 130 | mΩ |
| Forward transconductance | gfs | VDS = -5V, ID = -3A | | 12 | | S |
| Diode forward voltage | VSD | IS = -1A, VGS = 0V | | -0.8 | -1 | V |
| Maximum Body-Diode Continuous Current | IS | | | | -1.4 | A |
| Dynamic | | | | | | |
| Input capacitance | Ciss | VDS = -10V, VGS = 0V, f = 1MHz | | 560 | | pF |
| Output capacitance | Coss | | | 80 | | pF |
| Reverse transfer capacitance | Crss | | | 70 | | pF |
| Total gate charge | Qg | VDS = -10V, VGS = -4.5V, ID = -3A | | 8.5 | | nC |
| Gate-source charge | Qgs | | | 1.2 | | nC |
| Gate-drain charge | Qgd | | | 2.1 | | nC |
| Gate resistance | Rg | f = 1MHz | | 15 | | Ω |
| Switching | | | | | | |
| Turn-on delay time | td(on) | VDS = -10V RL = 2.7Ω, ID = -3A, VGS = -4.5V, Rg = 6Ω | | 7.2 | | ns |
| Rise time | tr | | | 36 | | ns |
| Turn-off delay time | td(off) | | | 53 | | ns |
| Fall time | tf | | | 56 | | ns |
| Body Diode Reverse Recovery Time | Trr | IF = -3A, dI/dt = 100A/μs | | 37 | | ns |
| Body Diode Reverse Recovery Charge | Qrr | IF = -3A, dI/dt = 100A/μs | | 27 | | nC |

Note :

1. Repetitive Rating : Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t < 10 sec.
3. Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Electrical Thermal Characteristics:

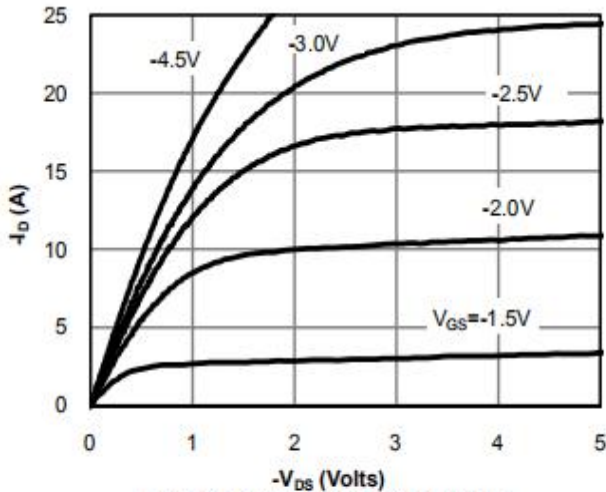


Figure 1: On-Region Characteristics

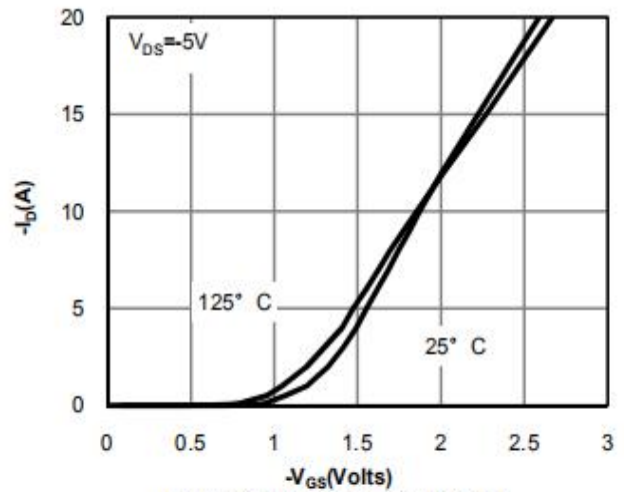


Figure 2: Transfer Characteristics

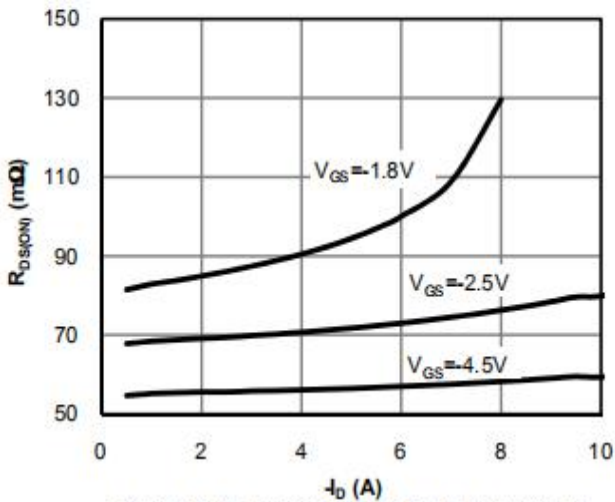


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

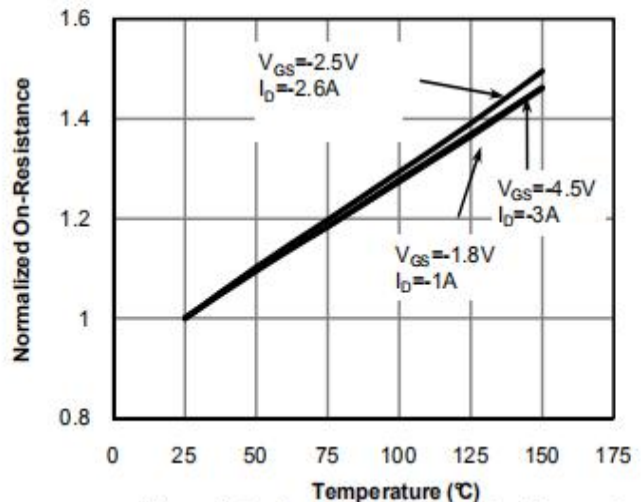


Figure 4: On-Resistance vs. Junction Temperature

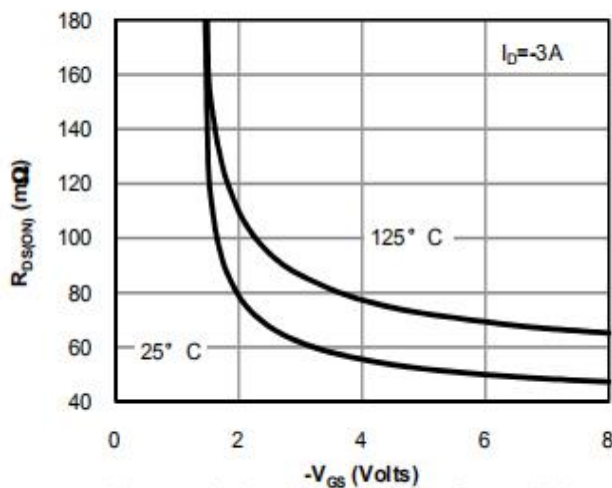


Figure 5: On-Resistance vs. Gate-Source Voltage

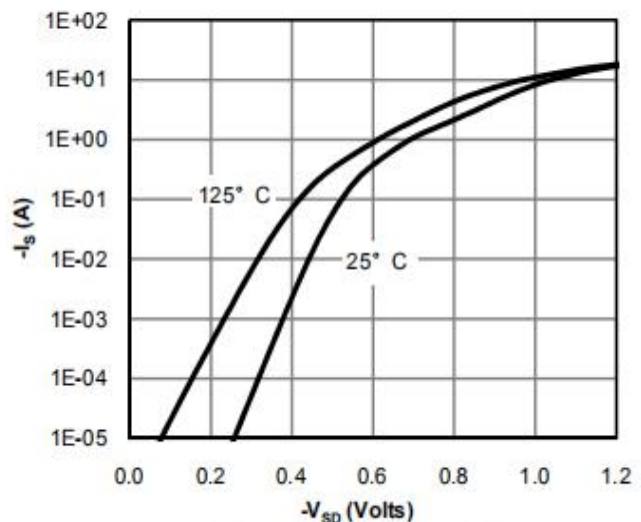


Figure 6: Body-Diode Characteristics

Typical Electrical Thermal Characteristics:

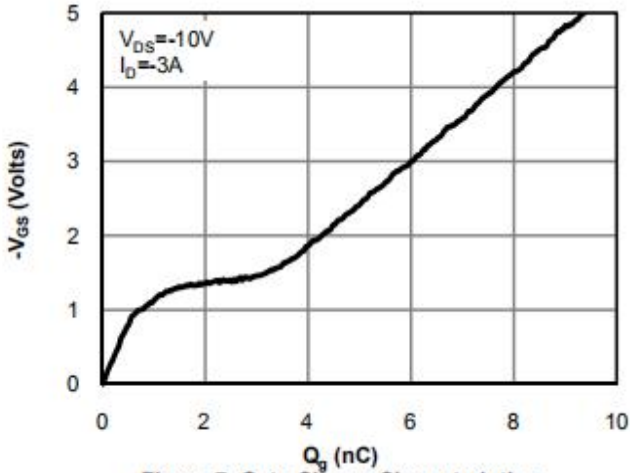


Figure 7: Gate-Charge Characteristics

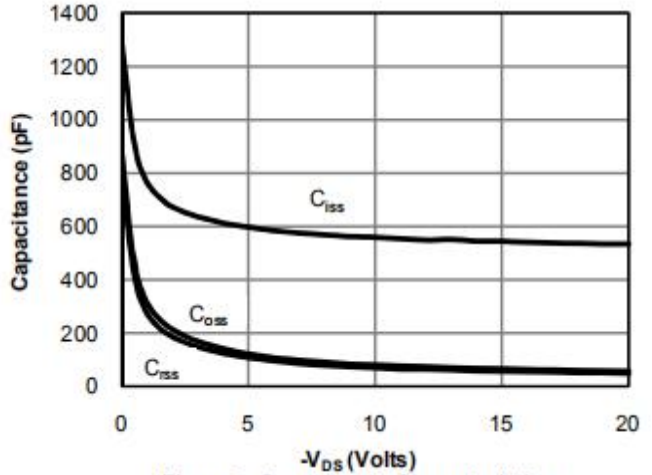


Figure 8: Capacitance Characteristics

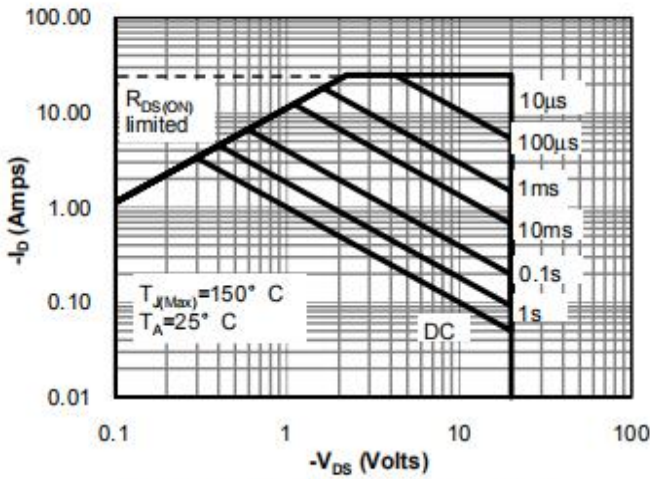


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

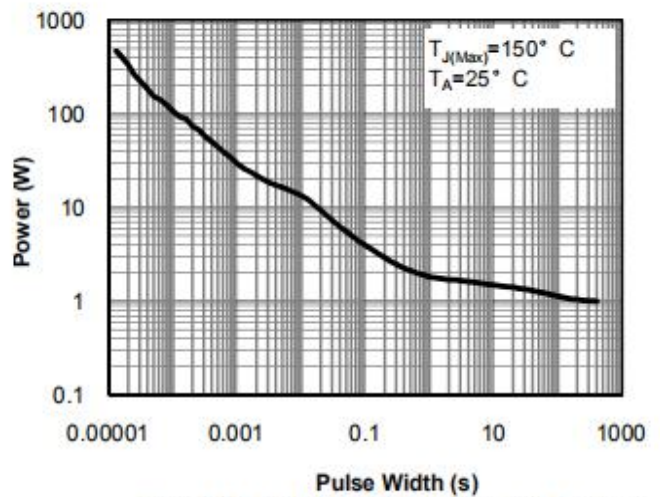


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

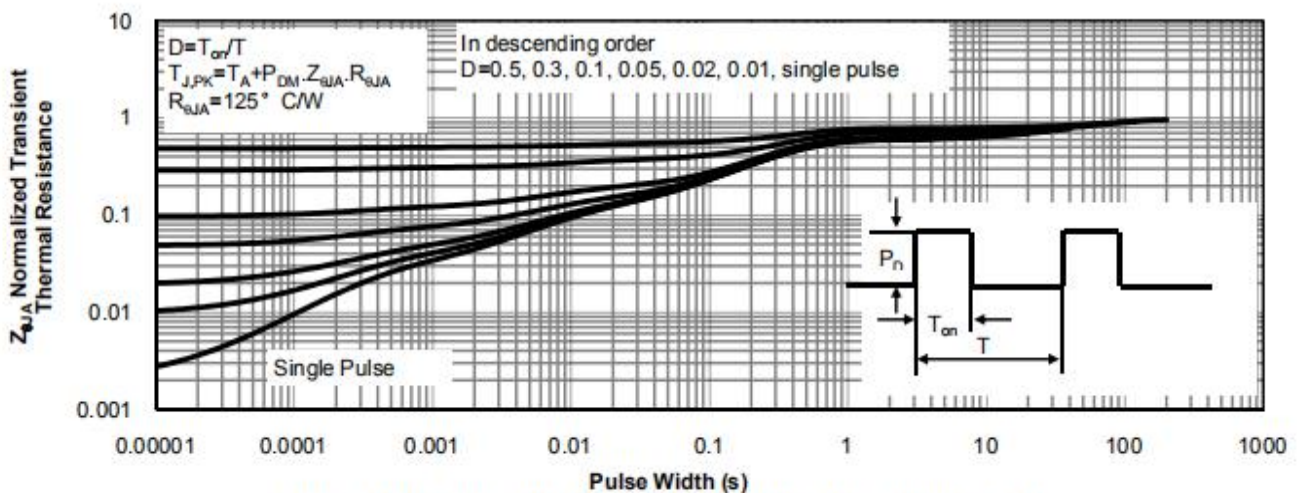
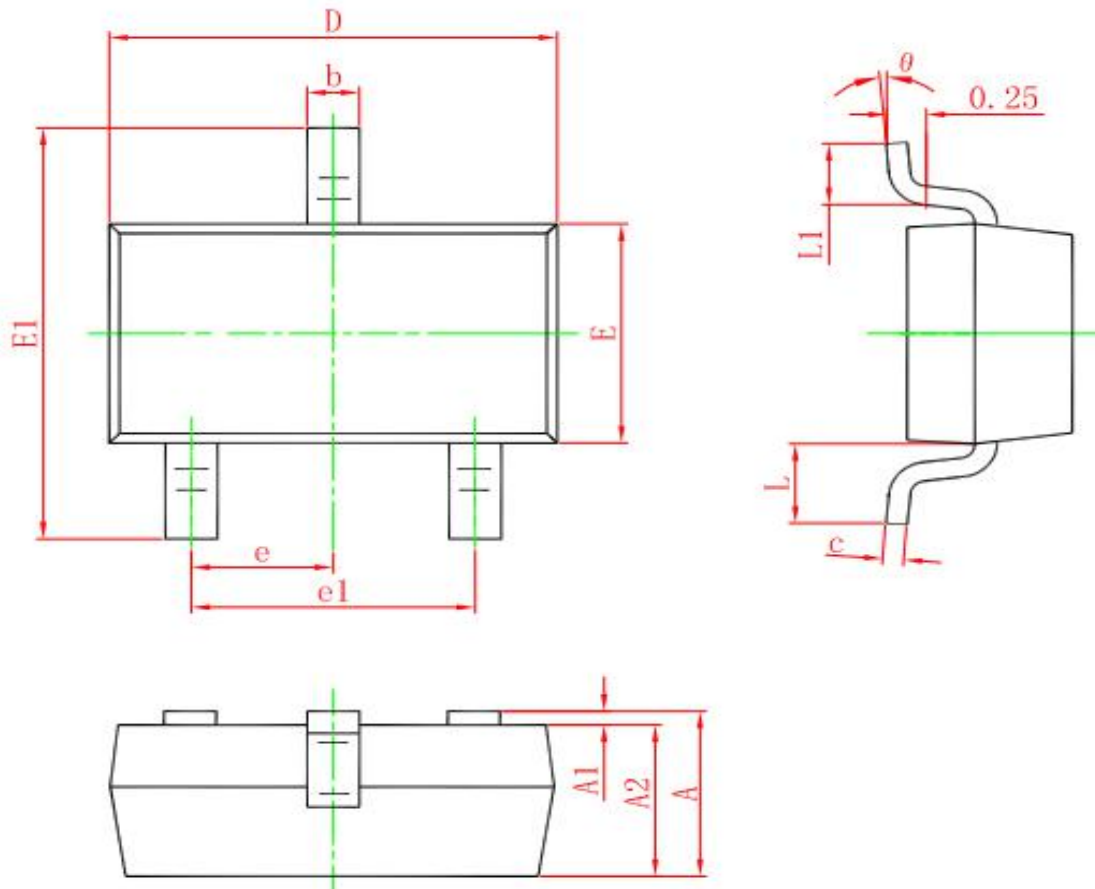


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)

SOT-23 PACKAGE OUTLINE DIMENSIONS:

SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |