Elektronische Bauelemente

# SMG3407

**-4.1A, -30V,$R_{DS(ON)}$ 52mΩ**

**P-Channel Enhancement Mode Power Mos.FET**

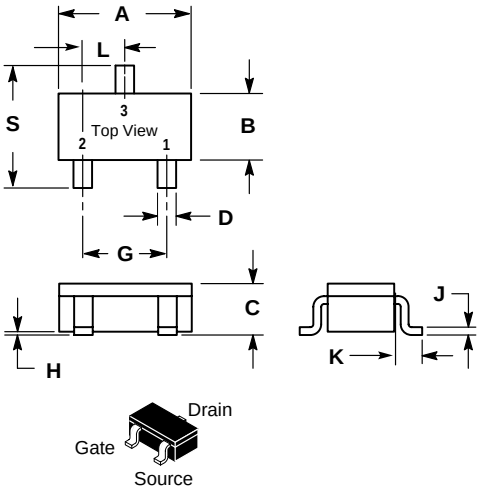
RoHS Compliant Product

## Description

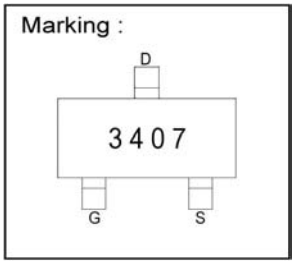
The SMG3407 uses advanced trench technology to provide excellent on-resistance with low gate change. The device is suitable for use as a load switch or in PWM applications.

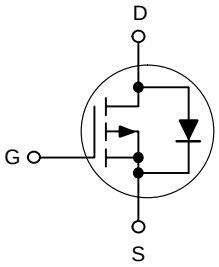
## Features

* Lower Gate Charge
* Small Package Outline
* RoHS Compliant




| SC-59 | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 2.70 | 3.10 |
| **B** | 1.40 | 1.60 |
| **C** | 1.00 | 1.30 |
| **D** | 0.35 | 0.50 |
| **G** | 1.70 | 2.10 |
| **H** | 0.00 | 0.10 |
| **J** | 0.10 | 0.26 |
| **K** | 0.20 | 0.60 |
| **L** | 0.85 | 1.15 |
| **S** | 2.40 | 2.80 |
| All Dimension in mm | | |




## Absolute Maximum Ratings

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Continuous Drain Current[3] | $I_D$ @$T_A$=25℃ | -4.1 | A |
| Continuous Drain Current[3] | $I_D$ @$T_A$=70℃ | -3.5 | A |
| Pulsed Drain Current[1] | $I_{DM}$ | -20 | A |
| Power Dissipation | $P_D$ @$T_A$=25℃ | 1.38 | W |
| Linear Derating Factor | | 0.01 | W/℃ |
| Operating Junction and Storage Temperature Range | Tj, Tstg | -55 ~ +150 | ℃ |

## Thermal Data

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Thermal Resistance Junction-ambient[3] Max. | Rthj-a | 90 | ℃/W |

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**-4.1A, -30V, $R_{DS(ON)}$ 52mΩ**

**P-Channel Enhancement Mode Power Mos.FET**

## Electrical Characteristics (Tj = 25℃ unless otherwise specified)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -30 | - | - | V | $V_{GS}$=0, $I_D$=-250uA |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1.0 | - | -3.0 | V | $V_{DS}$=$V_{GS}$, $I_D$=-250uA |
| Forward Transconductance | $g_{fs}$ | - | 8.2 | - | S | $V_{DS}$=-5V, $I_D$=-4A |
| Gate-Source Leakage Current | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$= ±20V |
| Drain-Source Leakage Current(Tj=25℃) | $I_{DSS}$ | - | - | -1 | uA | $V_{DS}$=-30V, $V_{GS}$=0 |
| Drain-Source Leakage Current(Tj=55℃) | | - | - | -5 | uA | $V_{DS}$=-24V, $V_{GS}$=0 |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | - | - | 52 | mΩ | $V_{GS}$=-10V, $I_D$=-4.1A |
| | | - | - | 87 | | $V_{GS}$=-4.5V, $I_D$=-3.0A |
| Total Gate Charge[2] | $Q_g$ | - | 7 | - | nC | $I_D$=-4A<br>$V_{DS}$=-15V<br>$V_{GS}$=-4.5V |
| Gate-Source Charge | $Q_{gs}$ | - | 3.1 | - | | |
| Gate-Drain (“Miller”) Change | $Q_{gd}$ | - | 3 | - | | |
| Turn-on Delay Time[2] | $T_{d(on)}$ | - | 8.6 | - | ns | $V_{DS}$=-15V<br>$V_{GS}$=-10V<br>$R_G$=3Ω<br>$R_L$=3.6Ω |
| Rise Time | $T_r$ | - | 5 | - | | |
| Turn-off Delay Time | $T_{d(off)}$ | - | 28.2 | - | | |
| Fall Time | $T_f$ | - | 13.5 | - | | |
| Input Capacitance | $C_{iss}$ | - | 700 | 840 | pF | $V_{GS}$=0V<br>$V_{DS}$=-15V<br>f=1.0MHz |
| Output Capacitance | $C_{oss}$ | - | 120 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 75 | - | | |
| Gate Resistance | $R_g$ | - | 10 | - | Ω | f=1.0MHz |

## Source-Drain Diode

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|---|
| Forward On Voltage[2] | $V_{SD}$ | - | - | -1.0 | V | $I_S$=-1.0A, $V_{GS}$=0V |
| Reverse Recovery Time[2] | $T_{rr}$ | - | 27 | - | ns | $I_S$=-4A, $V_{GS}$=0V<br>dI/dt=100A/μs |
| Reverse Recovery Charge | $Q_{rr}$ | - | 15 | - | nC | |
| Continuous Source Current (Body Diode) | $I_S$ | - | - | -2.2 | A | $V_D$=$V_G$=0V, $V_S$=-1.0V |

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width≦300us, duty cycle≦2%.

3. Surface mounted on 1 $in^2$ copper pad of FR4 board; 270℃/W when mounted on Min. copper pad.

## Characteristics Curve

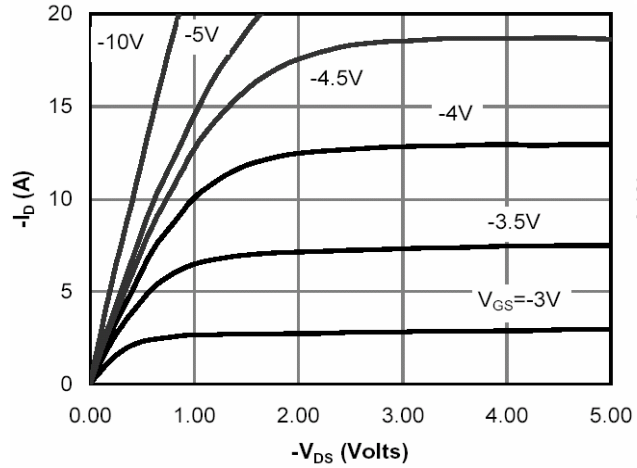


**Fig 1. Typical Output Characteristics**

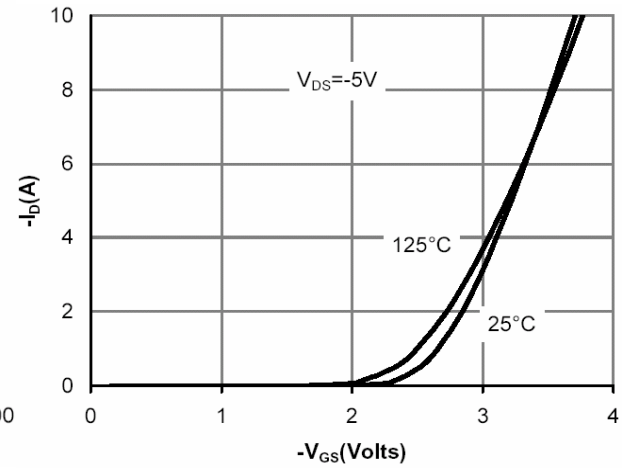


**Fig 2. Typical Output Characteristics**

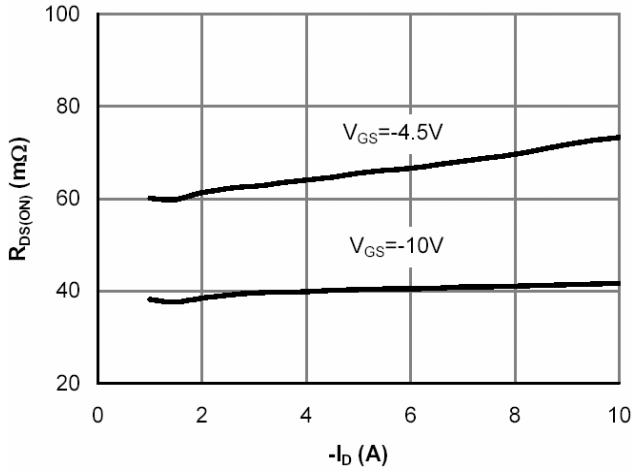


**Fig 3. On-Resistance v.s. Gate Voltage**

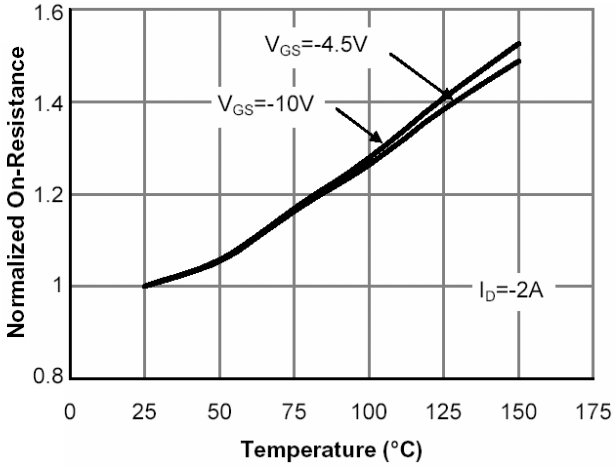


**Fig 4. Normalized On-Resistance v.s. Junction Temperature**

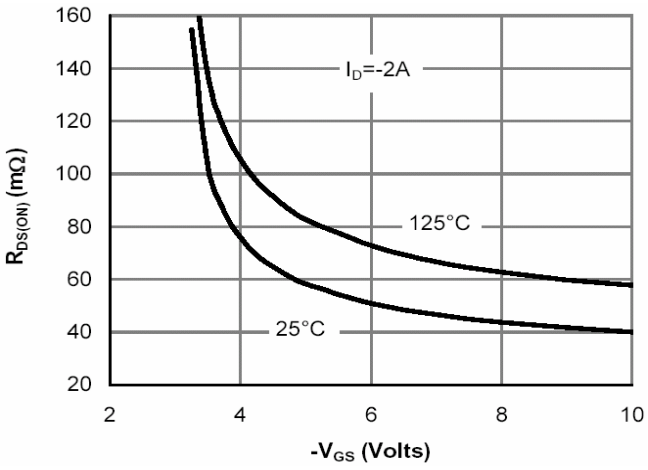


**Fig 5. Forward Characteristics of Reverse Diode**

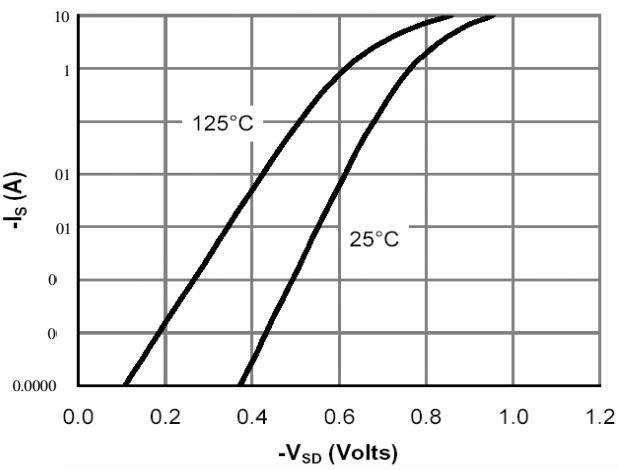


**Fig 6. Gate Threshold Voltage v.s. Junction Temperature**

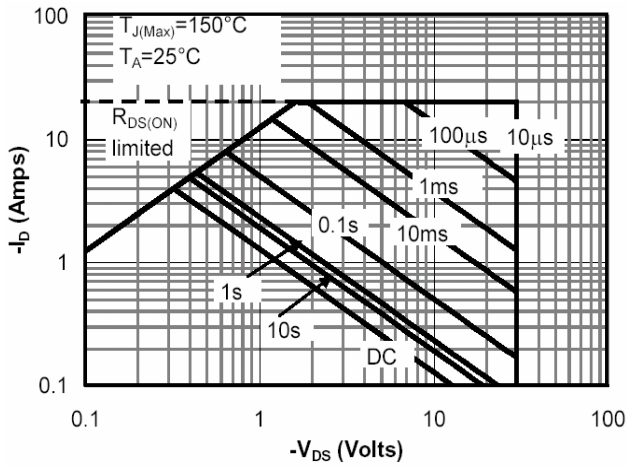


**Fig 7. Maximum Safe Operating Area**

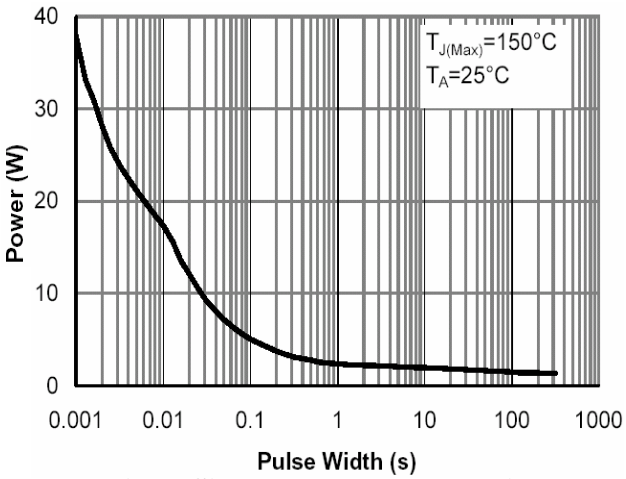


**Fig 8. Single Pulse Power Rating Junction-to-Ambient**

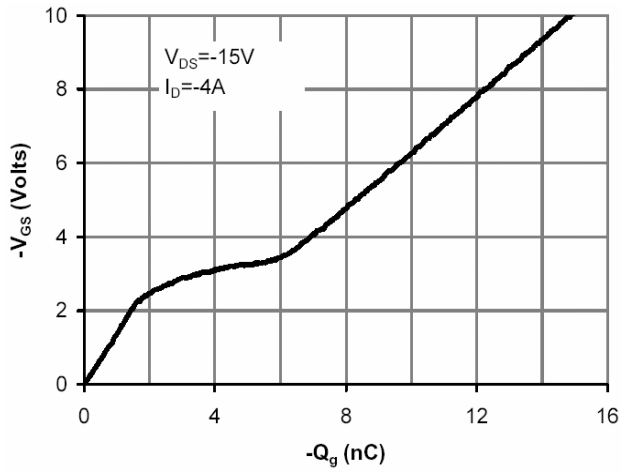


**Fig 9. Gate Charge Characteristics**

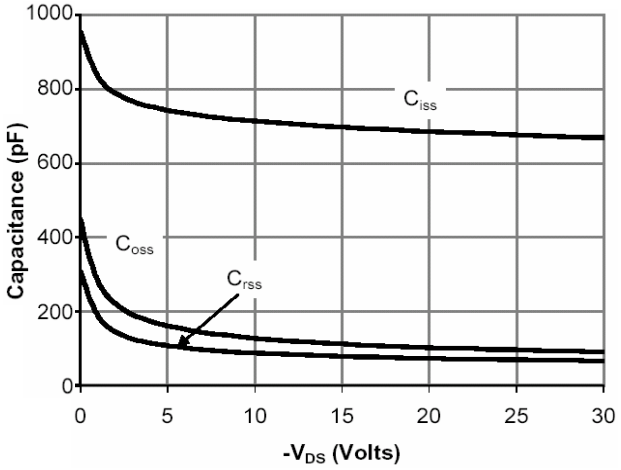


**Fig 10. Typical Capacitance Characteristics**

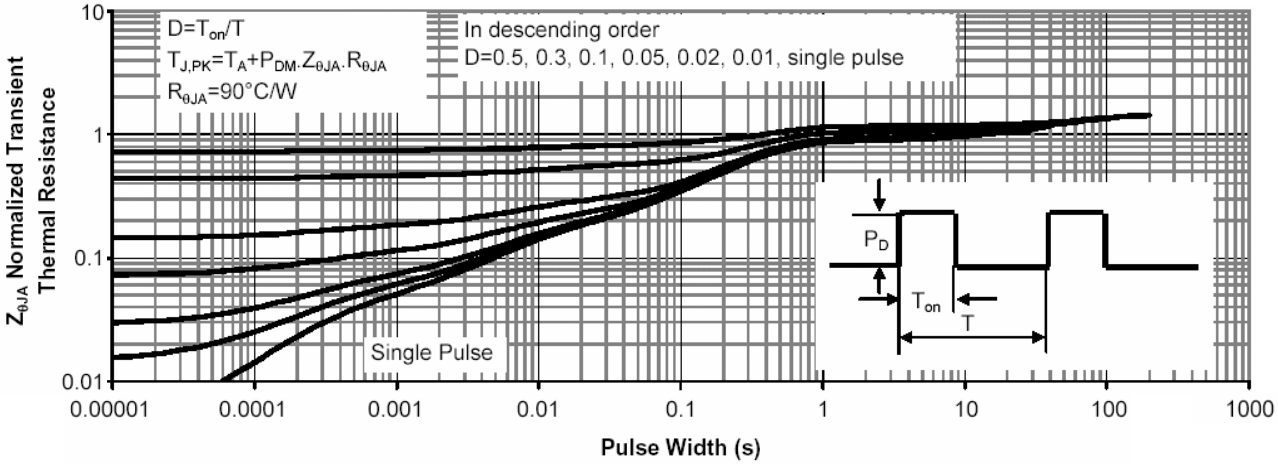


**Fig 11. Normalized Maximum Transient Thermal Impedance**