

GSMDS3907

30V P-Channel MOSFETs

Product Description

These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.

These devices are well suited for high efficiency fast switching applications.

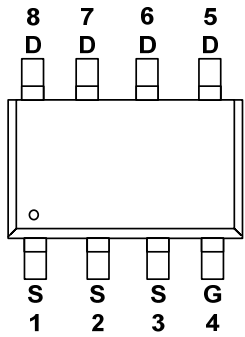
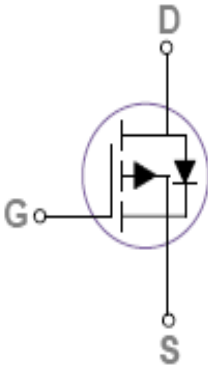
Features

- -30V, -8A, $R_{DS(ON)}=20m\Omega@V_{GS}=-10V$
- Fast switching
- Suit for -4.5V Gate Drive Applications
- Green Device Available
- SOP-8 package design

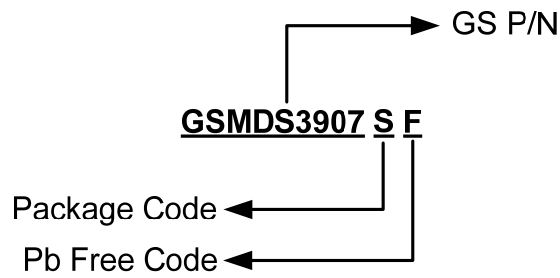
Applications

- MB / VGA / Vcore
- POL Applications
- Load Switch
- LED Application

Packages & Pin Assignments

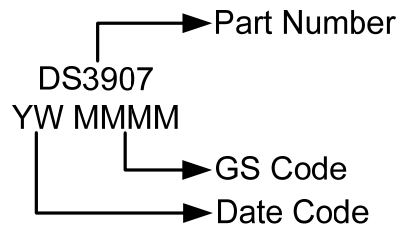
| GSMDS3907SF (SOP-8) | | | |
|--|-------------|-----|-------------|
|  | | | |
|  | | | |
| Pin | Description | Pin | Description |
| 1 | Source | 5 | Drain |
| 2 | Source | 6 | Drain |
| 3 | Source | 7 | Drain |
| 4 | Gate | 8 | Drain |

Ordering Information



| Part Number | Package | Quantity Reel |
|-------------|---------|---------------|
| GSMDS3907SF | SOP-8 | 4000 PCS |

Marking Information



Absolute Maximum Ratings

$T_A=25^{\circ}\text{C}$ Unless otherwise noted

| Symbol | Parameter | Typical | Unit |
|-----------------|--|---------------------------|-----------------------------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate –Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current | $T_A=25^{\circ}\text{C}$ | -8 |
| | | $T_A=100^{\circ}\text{C}$ | -5.1 |
| I_{DM} | Pulsed Drain Current | -32 | A |
| P_D | Power Dissipation ($T_A=25^{\circ}\text{C}$) | 2.1 | W |
| | Power Dissipation (Derate above 25°C) | 0.017 | W/ $^{\circ}\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to +150 | $^{\circ}\text{C}$ |
| T_{STG} | Storage Temperature Range | -55 to +150 | $^{\circ}\text{C}$ |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | 60 | $^{\circ}\text{C}/\text{W}$ |

Electrical Characteristics

T_A=25°C Unless otherwise noted

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------------------------------|---|--|------|-------|------|-------|
| Static | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =-250uA | -30 | | | V |
| ΔBV _{DSS} /ΔT _J | BV _{DSS} Temperature Coefficient | Reference to 25°C, I _D =-1mA | | -0.03 | | V/°C |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =-250uA | -1.0 | -1.6 | -2.5 | V |
| ΔV _{GS(th)} | V _{GS(th)} Temperature Coefficient | | | 4 | | mV/°C |
| I _{GSS} | Gate Leakage Current | V _{DS} =0V, V _{GS} =±20V | | | ±100 | nA |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-30V, V _{GS} =0V | | | -1 | uA |
| | | V _{DS} =-24V, V _{GS} =0V, T _J =125°C | | | -10 | |
| I _S | Continuous Source Current | V _G =V _D =0V, Force Current | | | -8 | A |
| I _{SM} | Pulsed Source Current | | | | -16 | |
| R _{DS(on)} | Drain-Source On-Resistance | V _{GS} =-10V, I _D =-8A | | 16.5 | 20 | mΩ |
| | | V _{GS} =-4.5V, I _D =-5A | | 25.6 | 32 | |
| g _{FS} | Forward Transconductance | V _{DS} =-10V, I _D =-3A | | 6.8 | | S |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =-1A | | | -1 | V |
| Dynamic | | | | | | |
| Q _g | Total Gate Charge | V _{DS} =-15V, V _{GS} =-4.5V, I _D =-5A | | 11 | 17 | nC |
| Q _{gs} | Gate-Source Charge | | | 3.4 | 6 | |
| Q _{gd} | Gate-Drain Charge | | | 4.2 | 8 | |
| C _{iss} | Input Capacitance | V _{DS} =-15V, V _{GS} =0V, f=1MHz | | 1250 | 1820 | pF |
| C _{oss} | Output Capacitance | | | 160 | 235 | |
| C _{rss} | Reverse Transfer Capacitance | | | 90 | 130 | |
| t _{d(on)} | Turn-On Time | V _{DD} =-15V, I _D =-1A, V _{GS} =-10V, R _G =6Ω | | 5.8 | 11 | ns |
| t _r | | | | 18.8 | 36 | |
| t _{d(off)} | Turn-Off Time | | | 46.9 | 89 | |
| t _f | | | | 12.3 | 23 | |

Typical Performance Characteristics

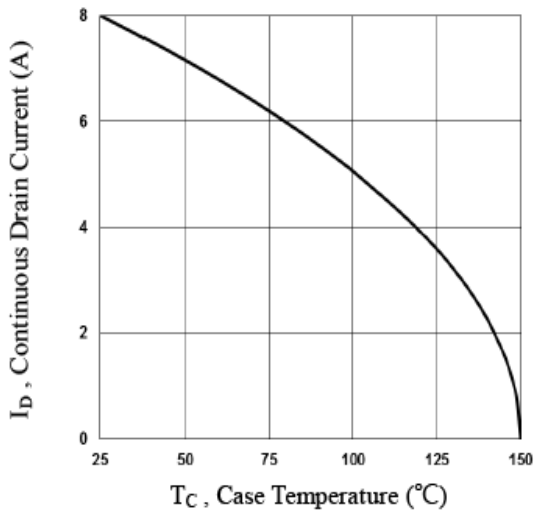


Fig.1 Continuous Drain Current vs. T_c

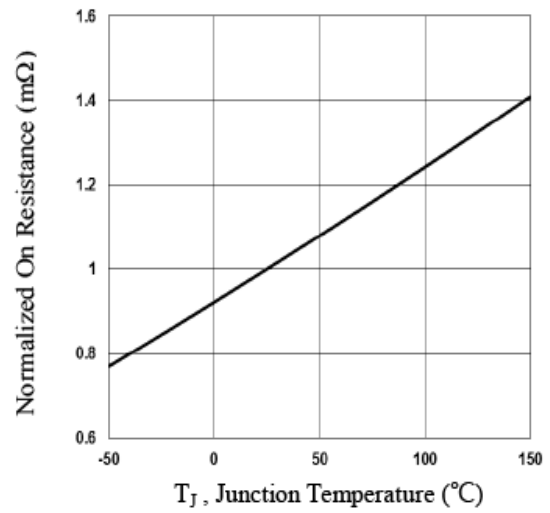


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

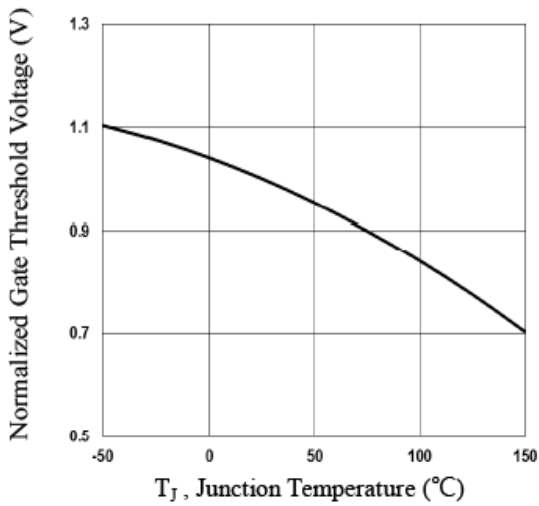


Fig.3 Normalized V_{th} vs. T_j

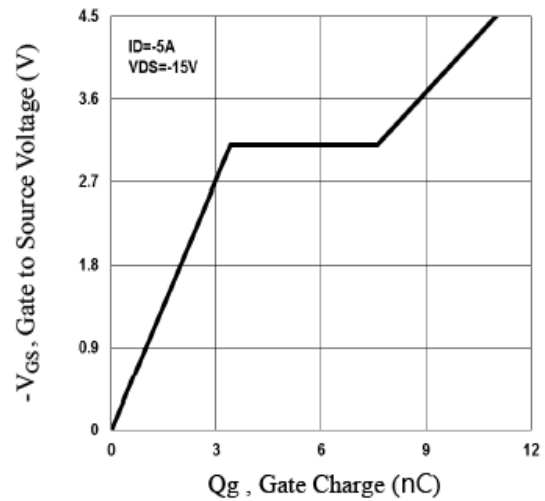


Fig.4 Gate Charge Waveform

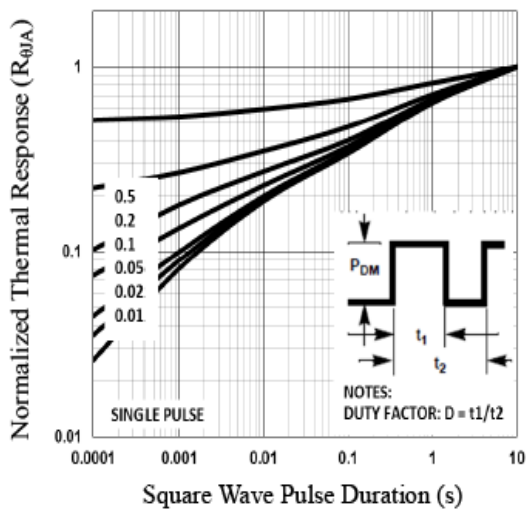


Fig.5 Normalized Transient Impedance

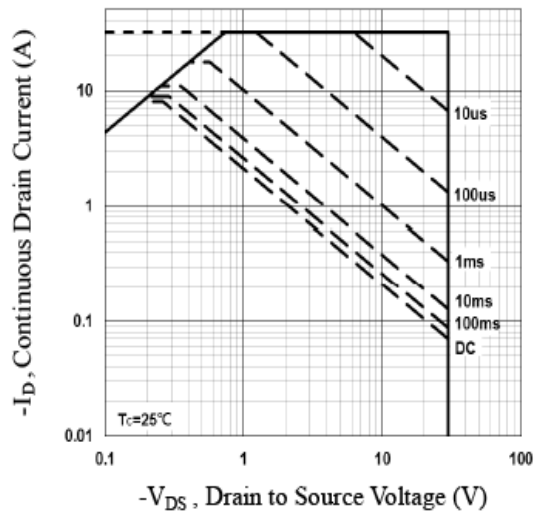
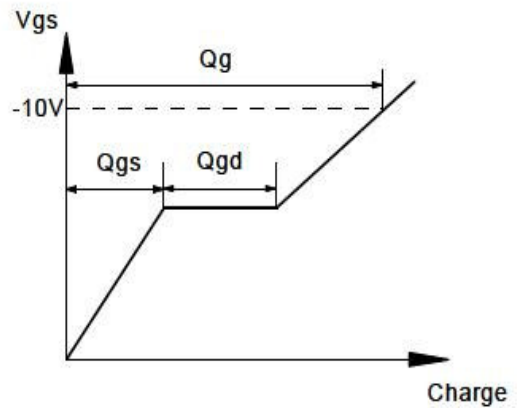
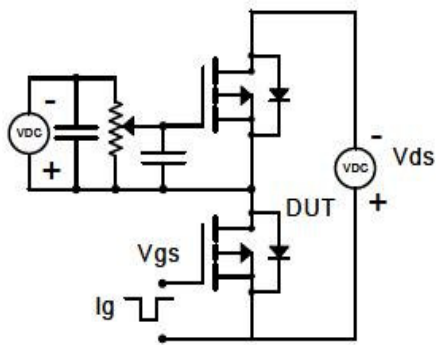


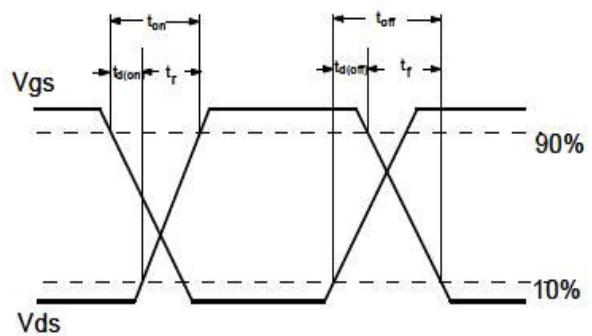
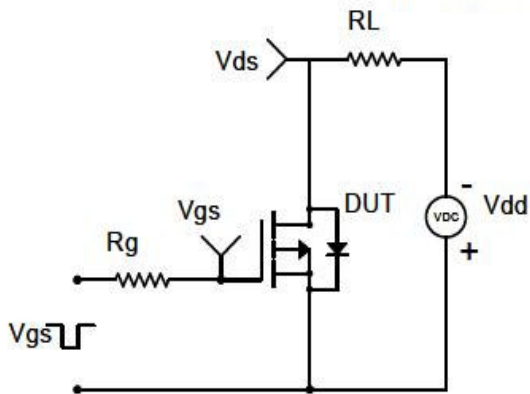
Fig.6 Maximum Safe Operation Area

Typical Performance Characteristics (Continue)

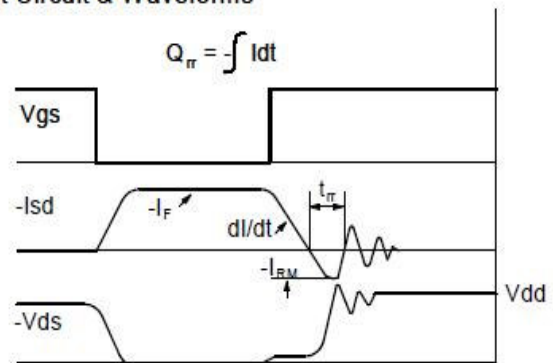
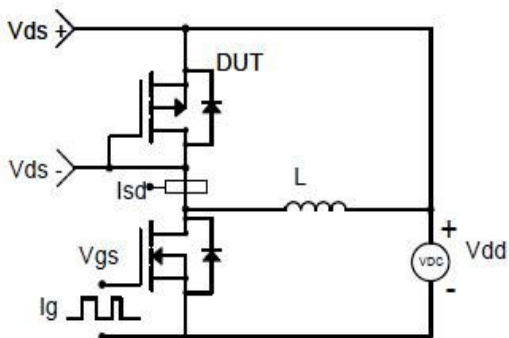
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms

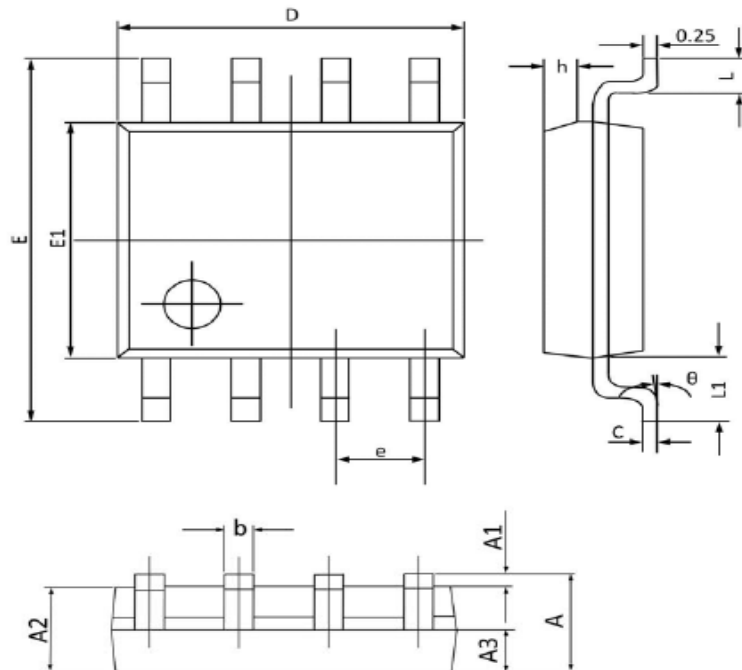


Diode Recovery Test Circuit & Waveforms



Package Dimension

SOP-8






| Dimensions | | | | |
|------------|-------------|-------|-------------|-------|
| Symbol | Millimeters | | Inches | |
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.068 |
| A1 | 0.100 | 0.250 | 0.004 | 0.009 |
| A2 | 1.300 | 1.500 | 0.052 | 0.059 |
| A3 | 0.600 | 0.700 | 0.024 | 0.027 |
| b | 0.390 | 0.480 | 0.016 | 0.018 |
| c | 0.210 | 0.260 | 0.009 | 0.010 |
| D | 4.700 | 5.100 | 0.186 | 0.200 |
| E | 5.800 | 6.200 | 0.229 | 0.244 |
| E1 | 3.700 | 4.100 | 0.146 | 0.161 |
| e | 1.270 (BSC) | | 0.050 (BSC) | |
| h | 0.250 | 0.500 | 0.010 | 0.019 |
| L | 0.500 | 0.800 | 0.019 | 0.031 |
| L1 | 1.050 (BSC) | | 0.041 (BSC) | |
| θ | 0° | 8° | 0° | 8° |



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