

F4905S-VB Datasheet

P-Channel 60-V (D-S) 175 °C MOSFET

PRODUCT SUMMARY

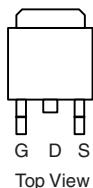
| V_{DS} (V) | $R_{DS(on)}$ (Ω) | I_D (A) ^d |
|--------------|------------------------------|------------------------|
| - 60 | 0.0065 at $V_{GS} = - 10$ V | - 110 |
| | 0.0085 at $V_{GS} = - 4.5$ V | |

FEATURES

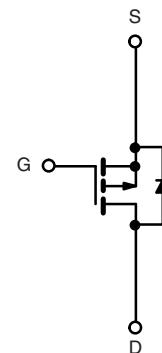
- TrenchFET® Power MOSFET
- Package with Low Thermal Resistance
- 100 % R_g Tested



TO-263



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted

| Parameter | Symbol | Limit | Unit |
|--|----------------|-------------------|------|
| Drain-Source Voltage | V_{DS} | - 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | |
| Continuous Drain Current ^d ($T_J = 175$ °C) | I_D | - 110 | A |
| | | - 75 | |
| Pulsed Drain Current | I_{DM} | - 200 | A |
| Avalanche Current | I_{AS} | - 85 | |
| Single Pulse Avalanche Energy ^d | E_{AS} | 211 | mJ |
| Maximum Power Dissipation | P_D | 272 ^c | W |
| | | 3.75 ^b | |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | - 55 to 175 | °C |

THERMAL RESISTANCE RATINGS

| Parameter | Symbol | Limit | Unit |
|---------------------|------------|-------|------|
| Junction-to-Ambient | R_{thJA} | 40 | °C/W |
| Junction-to-Case | R_{thJC} | 0.55 | |

Notes:

- a. Duty cycle ≤ 1 %.
- b. When Mounted on 1" square PCB (FR-4 material).
- c. See SOA curve for voltage derating.
- d. Limited by Package.

* Pb containing terminations are not RoHS compliant, exemptions may apply.

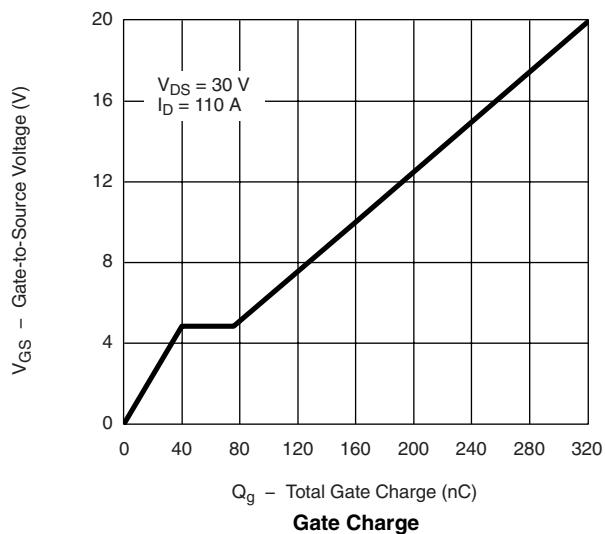
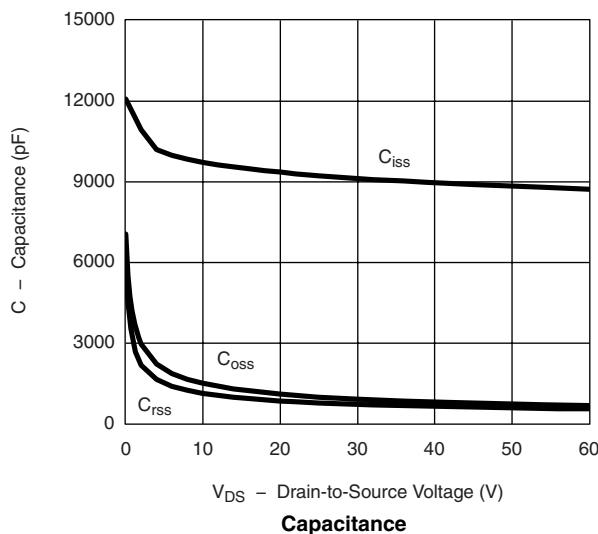
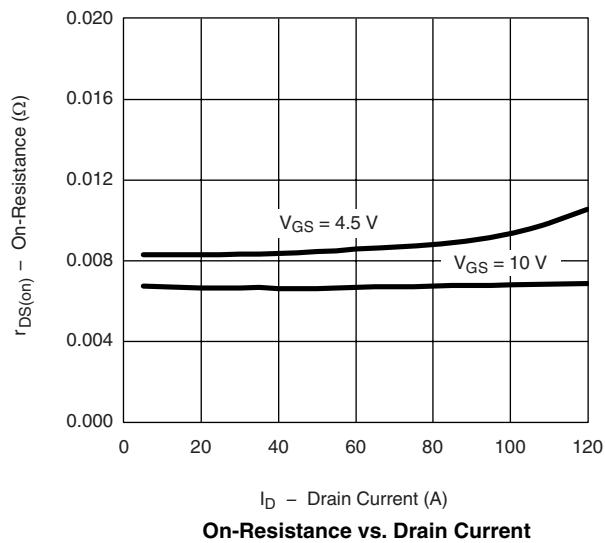
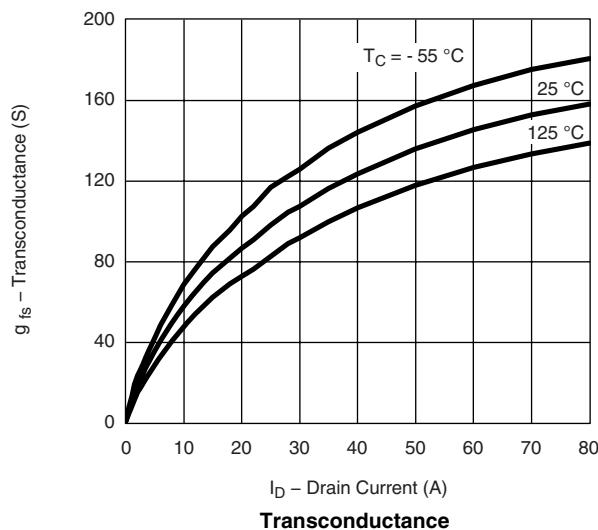
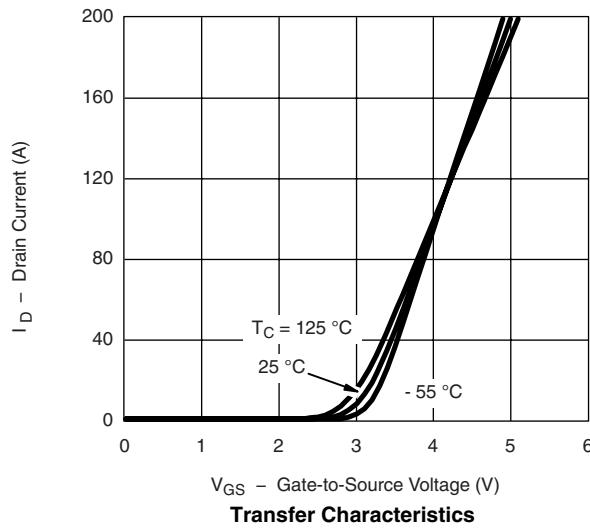
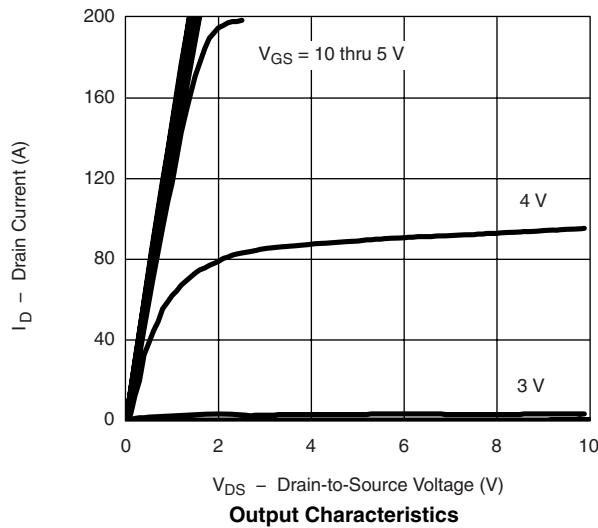
SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

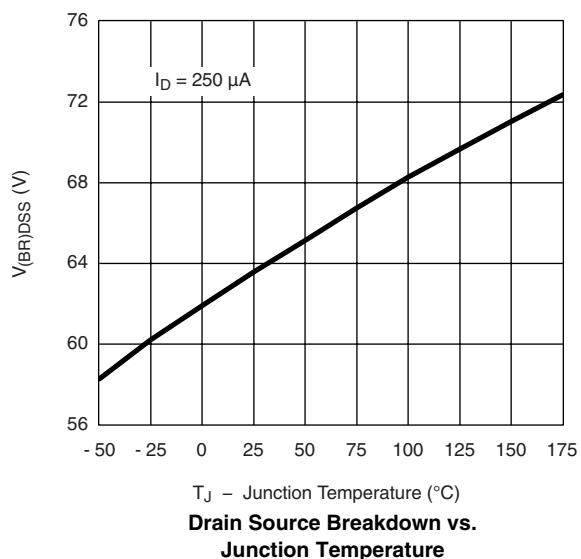
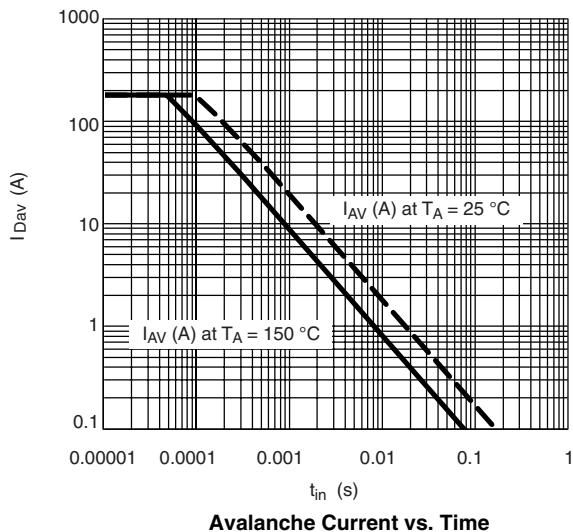
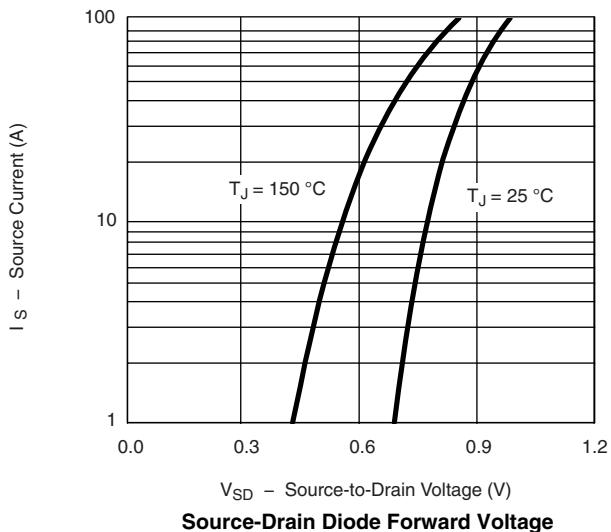
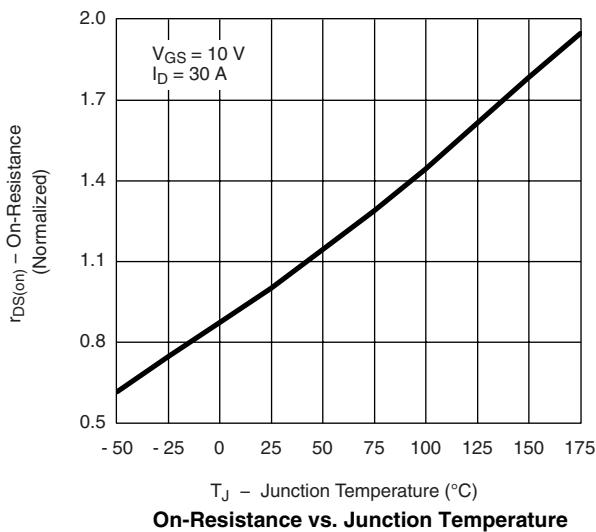
| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|--|-----------------------------|--|-------|--------|-----------|---------------|
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(\text{BR})\text{DSS}}$ | $V_{\text{GS}} = 0 \text{ V}, I_D = -250 \mu\text{A}$ | - 60 | | | V |
| Gate-Threshold Voltage | $V_{\text{GS}(\text{th})}$ | $V_{\text{DS}} = V_{\text{GS}}, I_D = -250 \mu\text{A}$ | - 1 | | - 3 | |
| Gate-Body Leakage | I_{GSS} | $V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 20 \text{ V}$ | | | ± 100 | nA |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}$ | | | - 1 | μA |
| | | $V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 125^\circ\text{C}$ | | | - 50 | |
| | | $V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 175^\circ\text{C}$ | | | - 250 | |
| On-State Drain Current ^a | $I_{\text{D}(\text{on})}$ | $V_{\text{DS}} = -5 \text{ V}, V_{\text{GS}} = -10 \text{ V}$ | - 120 | | | A |
| Drain-Source On-State Resistance ^a | $R_{\text{DS}(\text{on})}$ | $V_{\text{GS}} = -10 \text{ V}, I_D = -30 \text{ A}$ | | 0.0065 | | Ω |
| | | $V_{\text{GS}} = -10 \text{ V}, I_D = -30 \text{ A}, T_J = 125^\circ\text{C}$ | | 0.0129 | | |
| | | $V_{\text{GS}} = -10 \text{ V}, I_D = -30 \text{ A}, T_J = 175^\circ\text{C}$ | | 0.016 | | |
| | | $V_{\text{GS}} = -4.5 \text{ V}, I_D = -20 \text{ A}$ | | 0.0085 | | |
| Forward Transconductance ^a | g_{fs} | $V_{\text{DS}} = -15 \text{ V}, I_D = -50 \text{ A}$ | 20 | | | S |
| Dynamic^b | | | | | | |
| Input Capacitance | C_{iss} | $V_{\text{GS}} = 0 \text{ V}, V_{\text{DS}} = -25 \text{ V}, f = 1 \text{ MHz}$ | | 9200 | | pF |
| Output Capacitance | C_{oss} | | | 975 | | |
| Reverse Transfer Capacitance | C_{rss} | | | 760 | | |
| Total Gate Charge ^c | Q_g | $V_{\text{DS}} = -30 \text{ V}, V_{\text{GS}} = -10 \text{ V}, I_D = -110 \text{ A}$ | | 160 | 240 | nC |
| Gate-Source Charge ^c | Q_{gs} | | | 40 | | |
| Gate-Drain Charge ^c | Q_{gd} | | | 36 | | |
| Gate Resistance | R_g | $f = 1 \text{ MHz}$ | 1.5 | 3 | 4.5 | Ω |
| Turn-On Delay Time ^c | $t_{\text{d}(\text{on})}$ | $V_{\text{DD}} = -30 \text{ V}, R_L = 0.27 \Omega$ $I_D = -110 \text{ A}, V_{\text{GEN}} = -10 \text{ V}, R_G = 2.5 \Omega$ | | 20 | 30 | ns |
| Rise Time ^c | t_r | | | 190 | 285 | |
| Turn-Off Delay Time ^c | $t_{\text{d}(\text{off})}$ | | | 140 | 210 | |
| Fall Time ^c | t_f | | | 300 | 450 | |
| Source-Drain Diode Ratings and Characteristics $T_C = 25^\circ\text{C}^b$ | | | | | | |
| Continuous Current | I_S | | | | - 110 | A |
| Pulsed Current | I_{SM} | | | | - 200 | |
| Forward Voltage ^a | V_{SD} | $I_F = -50 \text{ A}, V_{\text{GS}} = 0 \text{ V}$ | | - 1.0 | - 1.5 | V |
| Reverse Recovery Time | t_{rr} | $I_F = -50 \text{ A}, \text{di}/\text{dt} = 100 \text{ A}/\mu\text{s}$ | | 60 | 90 | ns |
| Peak Reverse Recovery Charge | $I_{\text{RM}(\text{REC})}$ | | | - 3 | - 4.5 | A |
| Reverse Recovery Charge | Q_{rr} | | | 0.09 | 0.2 | μC |

Notes:

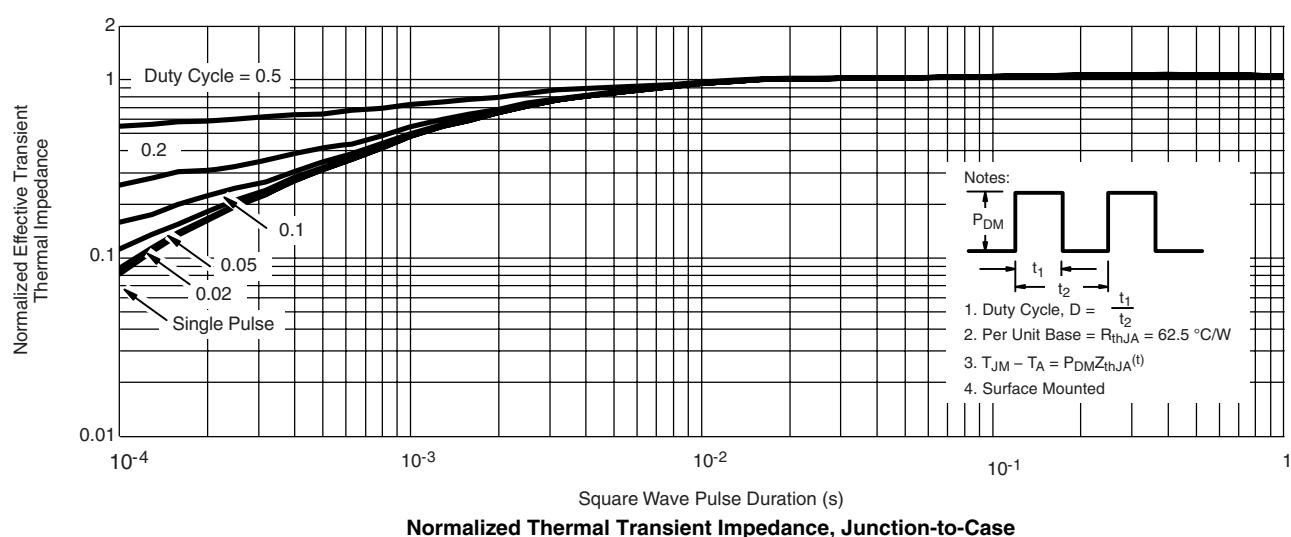
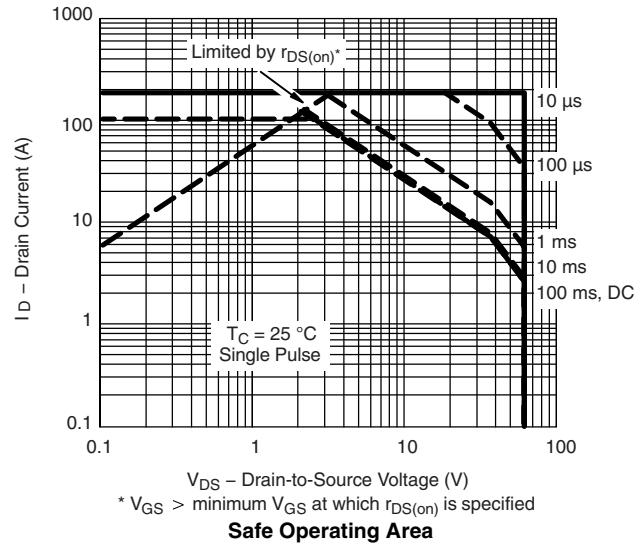
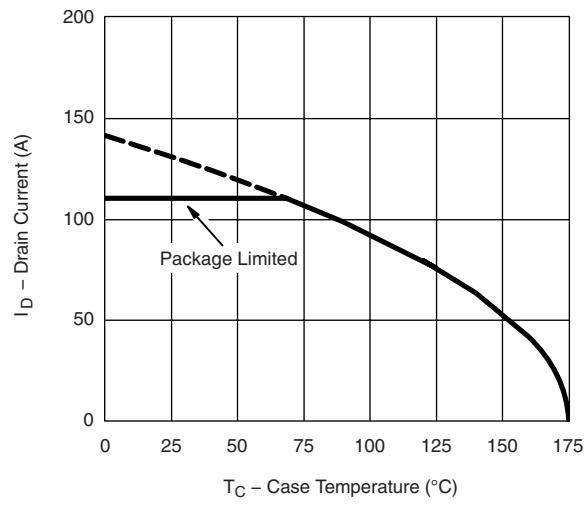
- a. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

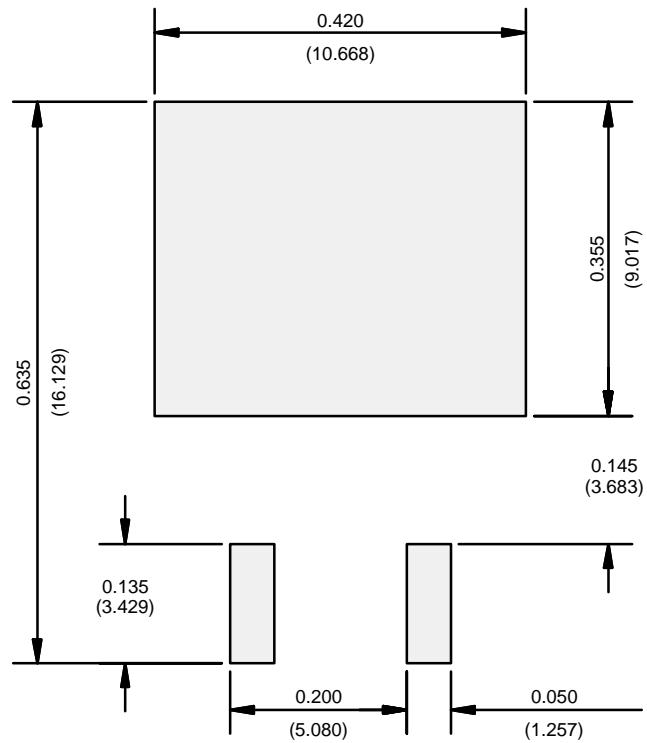
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


THERMAL RATINGS



RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

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