



Description

The BSH205G2R uses advanced trench technology to provide excellent $R_{DS(ON)}$, 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.



SOT-23

General Features

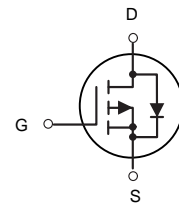
$V_{DS} = -20V, I_D = -2.3A$

$R_{DS(ON)} < 140m\Omega @ V_{GS} = -4.5V$

$R_{DS(ON)} < 170m\Omega @ V_{GS} = -2.5V$

Application

PWM applications
Load switch



P-Channel MOSFET

Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|------------|--------|------------|----------|
| BSH205G2R | SOT-23 | HXY MOSFET | 3000 |

Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Symbol | Parameter | Limit | Unit |
|-----------------|--|------------|------|
| V_{DS} | Drain-Source Voltage | -20 | V |
| V_{GS} | Gate-Source Voltage | ±12 | V |
| I_D | Drain Current-Continuous | -2.3 | A |
| I_{DM} | Drain Current-Pulsed (Note 1) | -9 | A |
| P_D | Maximum Power Dissipation | 0.65 | W |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 178 | °C/W |



Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|--------------|---|------|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS}=0V, I_D=-250\mu A$ | -20 | | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS}=-20V, V_{GS}=0V$ | - | - | -1 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS}=\pm 12V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -0.4 | -0.7 | -1 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=-4.5V, I_D=-2A$ | | 130 | 140 | m Ω |
| | | $V_{GS}=-2.5V, I_D=-1.8A$ | | 152 | 170 | m Ω |
| Forward Transconductance | g_{FS} | $V_{DS}=-5V, I_D=-2A$ | 4 | - | - | S |
| Dynamic Characteristics (Note4) | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS}=-10V, V_{GS}=0V,$ $F=1.0MHz$ | - | 285 | - | PF |
| Output Capacitance | C_{oss} | | - | 58 | - | PF |
| Reverse Transfer Capacitance | C_{rss} | | - | 32 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}=-10V, R_L=5\Omega$ $V_{GS}=-4.5V, R_{GEN}=3\Omega$ | - | 9.8 | - | nS |
| Turn-on Rise Time | t_r | | - | 4.9 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 20.5 | - | nS |
| Turn-Off Fall Time | t_f | | - | 7 | - | nS |
| Total Gate Charge | Q_g | $V_{DS}=-10V, I_D=-2A,$ $V_{GS}=-4.5V$ | - | 2.9 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 0.45 | - | nC |
| Gate-Drain Charge | Q_{gd} | | - | 0.75 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage (Note 3) | V_{SD} | $V_{GS}=0V, I_S=-2A$ | - | - | -1.2 | V |
| Diode Forward Current (Note 2) | I_S | | - | - | -2.0 | A |

Notes:

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



Typical Electrical and Thermal Characteristics

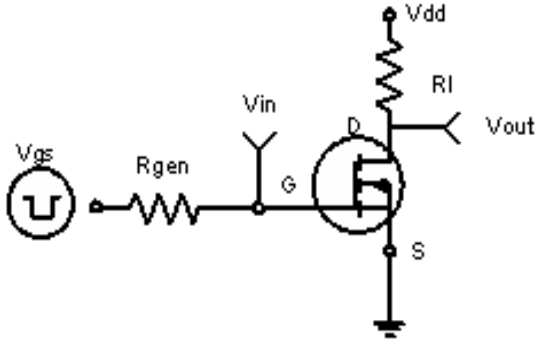


Figure 1: Switching Test Circuit

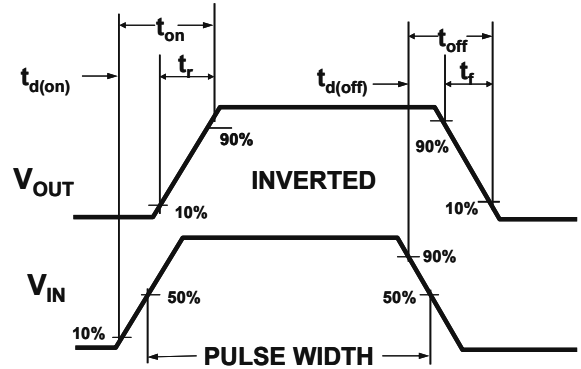
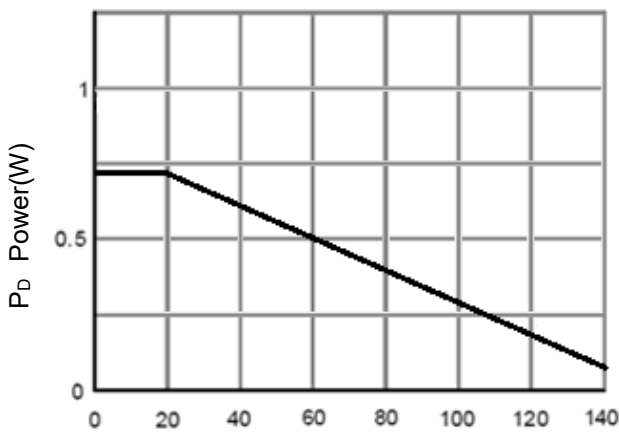
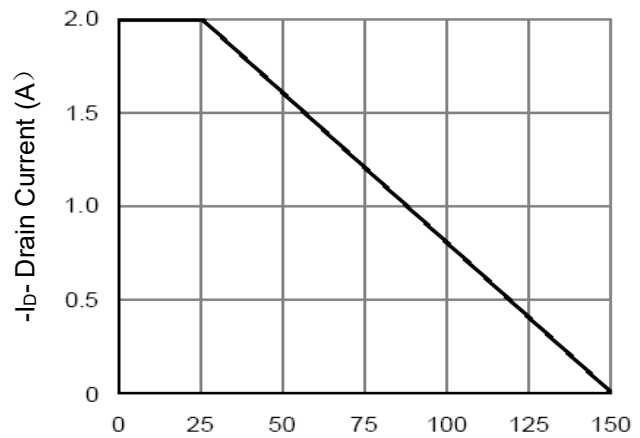


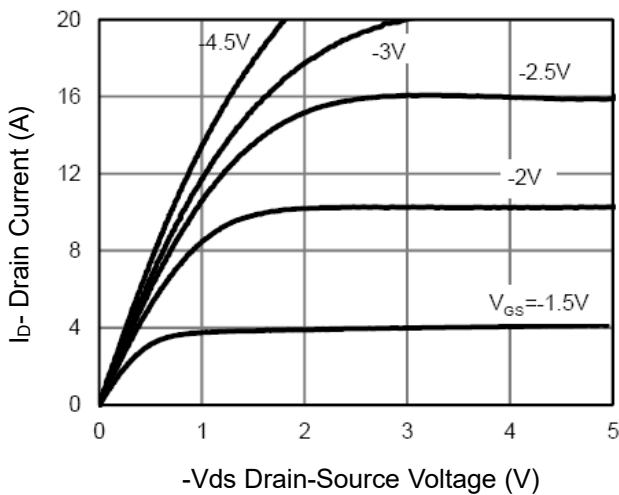
Figure 2: Switching Waveforms



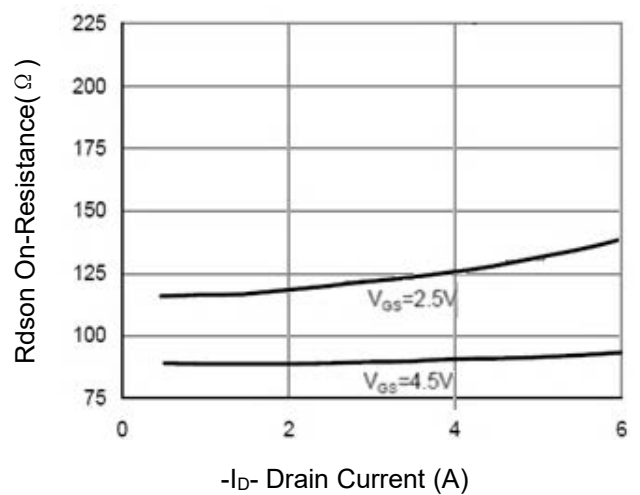
T_J-Junction Temperature(°C)
Figure 3 Power Dissipation



T_J-Junction Temperature(°C)
Figure 4 Drain Current



-V_{ds} Drain-Source Voltage (V)
Figure 5 Output Characteristics



-I_D- Drain Current (A)
Figure 6 Drain-Source On-Resistance

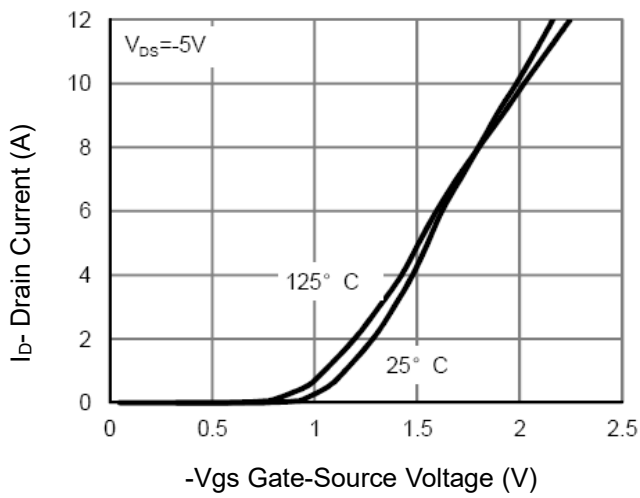


Figure 7 Transfer Characteristics

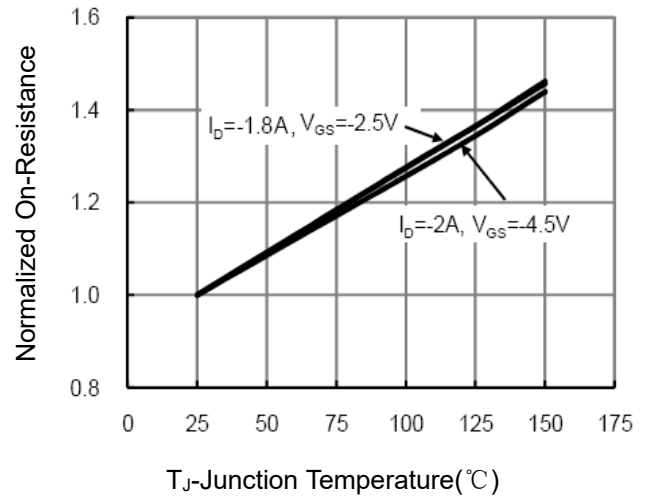


Figure 8 Drain-Source On-Resistance

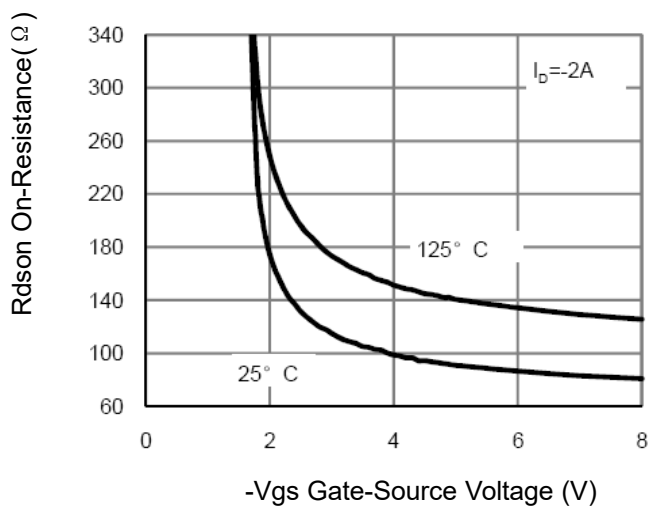


Figure 9 Rdson vs Vgs

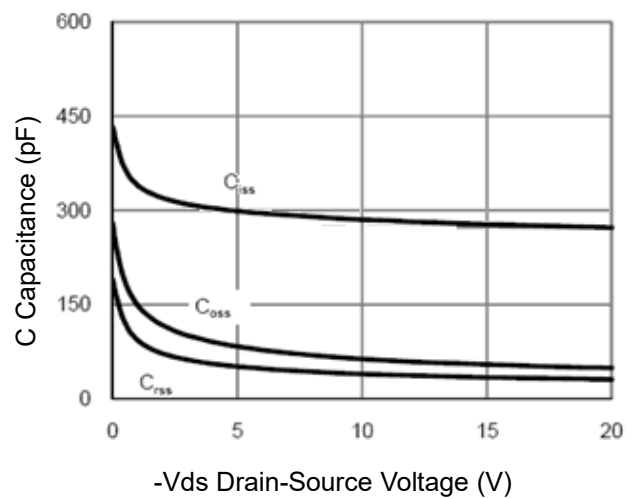


Figure 10 Capacitance vs Vds

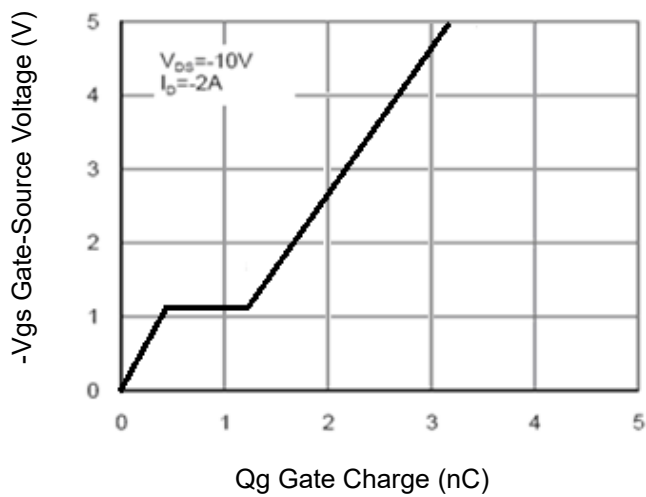


Figure 11 Gate Charge

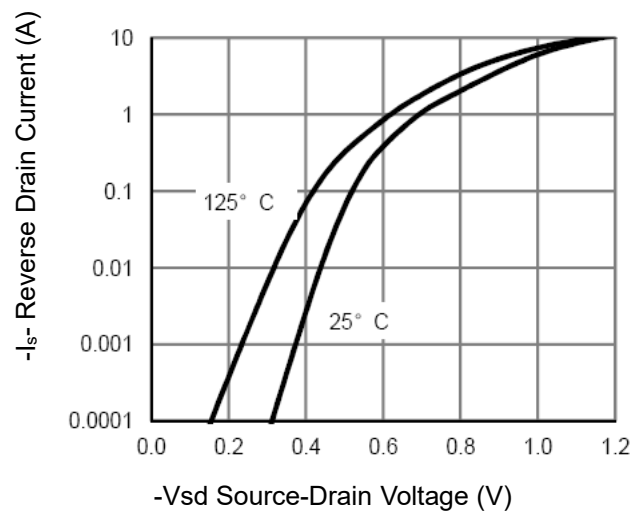


Figure 12 Source- Drain Diode Forward

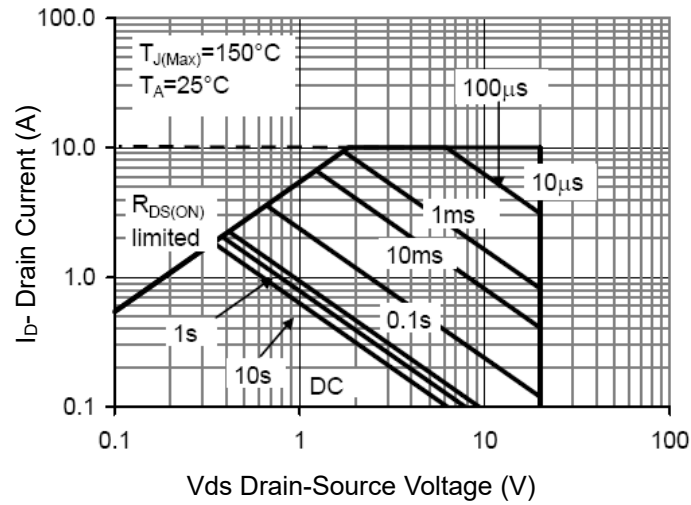


Figure 13 Safe Operation Area

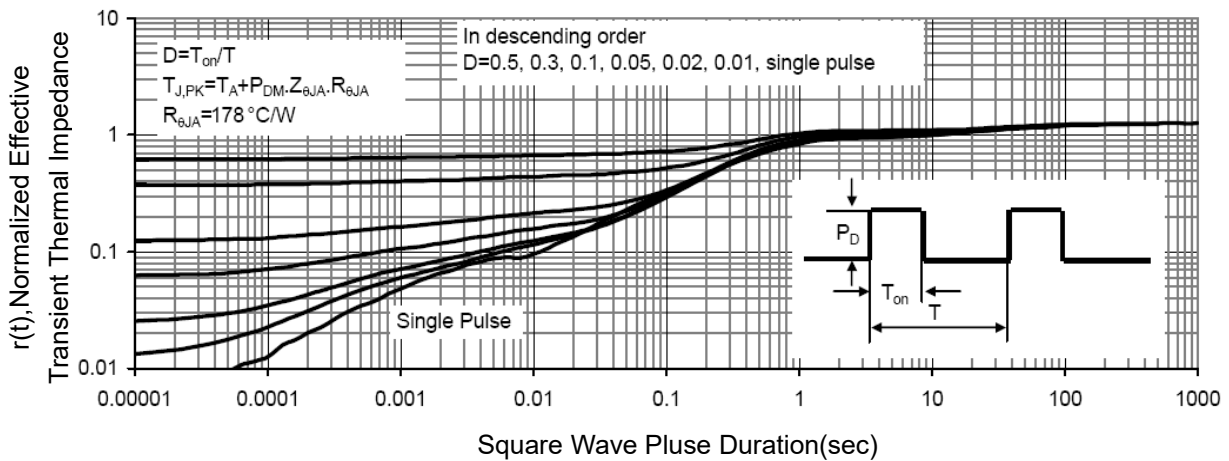
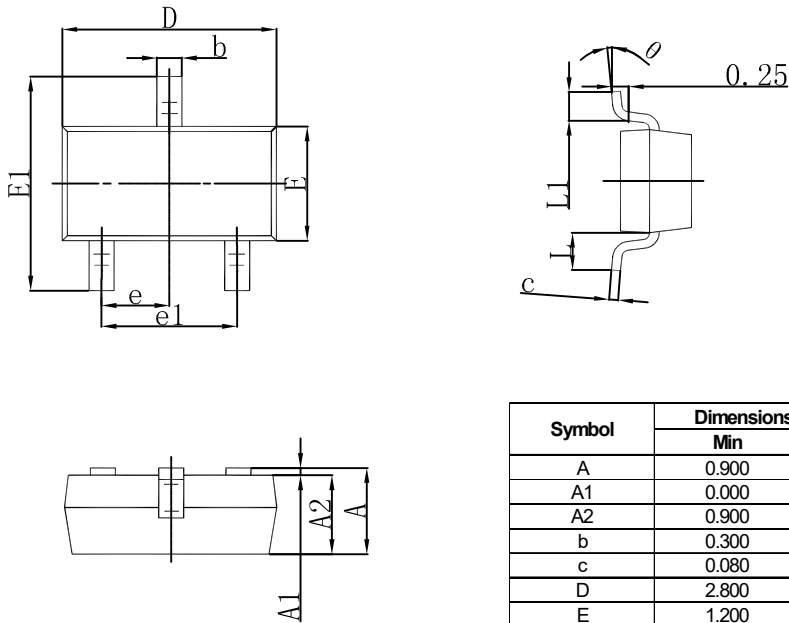


Figure 14 Normalized Maximum Transient Thermal Impedance

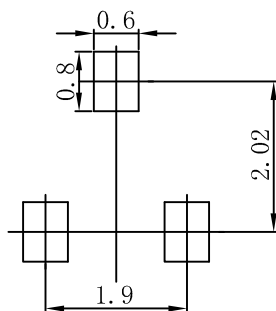


SOT-23 Package Outline Dimensions



| 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° |

SOT-23 Suggested Pad Layout



- Note:
1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.



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