

General Description

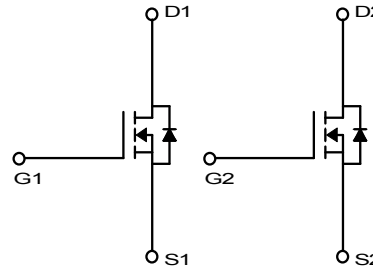
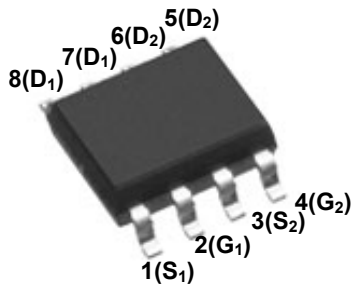
The MDS5951 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

Features

- $V_{DS} = 60V$
- $I_D = 4.5A @ V_{GS} = 10V$
- $R_{DS(ON)} < 50m\Omega @ V_{GS} = 10V$
 $< 60m\Omega @ V_{GS} = 4.5V$

Applications

- Inverters
- General purpose applications



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Characteristics | | Symbol | Rating | Unit |
|---|--------------------|----------------|----------|------------|
| Drain-Source Voltage | | V_{DSS} | 60 | V |
| Gate-Source Voltage | | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 4) | $T_A = 25^\circ C$ | I_D | 4.5 | A |
| | $T_A = 70^\circ C$ | | 3.6 | A |
| Pulsed Drain Current (Note 3) | | I_{DM} | 20 | A |
| Power Dissipation for Single Operation (Note 2) | $T_A = 25^\circ C$ | P_D | 2.0 | W |
| | $T_A = 70^\circ C$ | | 1.28 | |
| Junction and Storage Temperature Range | | T_J, T_{slg} | -55~150 | $^\circ C$ |

Thermal Characteristics

| Characteristics | | Symbol | Rating | Unit |
|--|----------|-----------------|--------|--------------|
| Thermal Resistance, Junction-to-Ambient (Steady-State) | (Note 1) | $R_{\theta JA}$ | 62.5 | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Case | | $R_{\theta JC}$ | 34.0 | |

Ordering Information

| Part Number | Temp. Range | Package | Packing | RoHS Status |
|-------------|-------------|---------|-------------|--------------|
| MDS5951URH | -55~150°C | SOIC-8 | Tape & Reel | Halogen Free |

Electrical Characteristics (T_A =25°C unless otherwise noted)

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Unit | |
|--|---------------------|---|-----------------|-----|------|------|---|
| Static Characteristics | | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | I _D = 250μA, V _{GS} = 0V | 60 | - | - | V | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 1.0 | 2.0 | 3.0 | | |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} = 60V, V _{GS} = 0V | - | - | 1 | μA | |
| Gate Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} = 0V | - | - | 0.1 | | |
| Drain-Source ON Resistance | R _{DS(ON)} | V _{GS} = 10V, I _D = 4.5A | - | 38 | 50 | mΩ | |
| | | V _{GS} = 4.5V, I _D = 3.0A | - | 46 | 60 | | |
| Forward Transconductance | g _{FS} | V _{DS} = 10V, I _D = 3.3A | - | 11 | - | S | |
| Dynamic Characteristics | | | | | | | |
| Total Gate Charge (V _{GS} =10V) | Q _g | V _{DS} = 30V, I _D = 4.5A, V _{GS} = 10V | - | 9.0 | 10.5 | nC | |
| Total Gate Charge (V _{GS} =4.5V) | | | - | 4.4 | - | | |
| Gate-Source Charge | | | Q _{gs} | - | 1.5 | | - |
| Gate-Drain Charge | | | Q _{gd} | - | 2.0 | | - |
| Input Capacitance | C _{iss} | V _{DS} = 30V, V _{GS} = 0V, f = 1.0MHz | - | 420 | - | pF | |
| Reverse Transfer Capacitance | C _{rss} | | - | 25 | - | | |
| Output Capacitance | C _{oss} | | - | 50 | - | | |
| Turn-On Delay Time | t _{d(on)} | V _{GS} = 10V, V _{DS} = 30V, R _L = 6.7Ω, R _{GEN} = 5Ω | - | 4.5 | - | ns | |
| Turn-On Rise Time | t _r | | - | 20 | - | | |
| Turn-Off Delay Time | t _{d(off)} | | - | 15 | - | | |
| Turn-Off Fall Time | t _f | | - | 9.5 | - | | |
| Drain-Source Body Diode Characteristics | | | | | | | |
| Source-Drain Diode Forward Voltage | V _{SD} | I _S = 1.0A, V _{GS} = 0V | - | 0.7 | 1.1 | V | |
| Body Diode Reverse Recovery Time | t _{rr} | I _F = 4.5A, di/dt = 100A/μs | - | 21 | 30 | ns | |
| Body Diode Reverse Recovery Charge | Q _{rr} | | - | 25 | - | nC | |

Note :

1. Surface mounted RF4 board with 2oz. Copper. PDSM is based on R_{θJA} and the maximum allowed junction temperature of 150°C.
2. PD is based on T_{J(MAX)} = 150°C, using R_{θJA}.
3. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%, pulse width limited by junction temperature T_{J(MAX)} = 150°C.
4. Static characteristics are obtained using < 300 μs pulses, duty cycle 0.5% max.

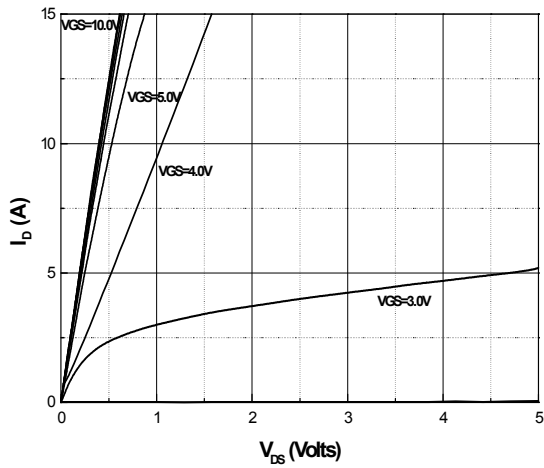


Fig.1 On-Region Characteristics

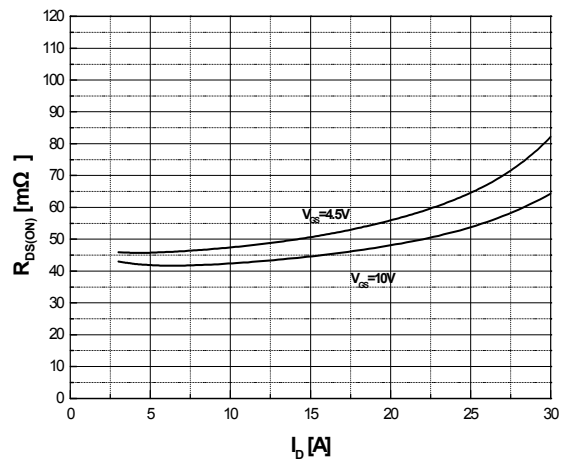


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

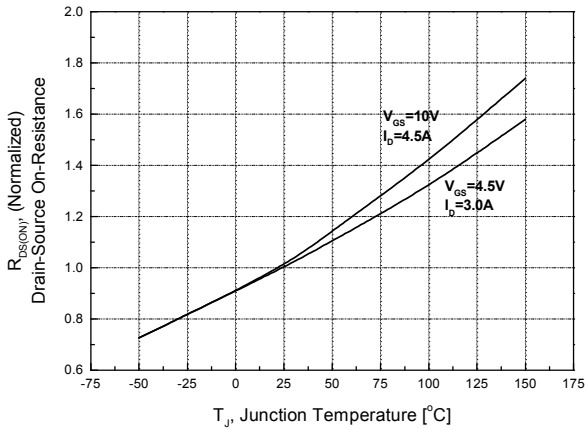


Fig.3 On-Resistance Variation with Temperature

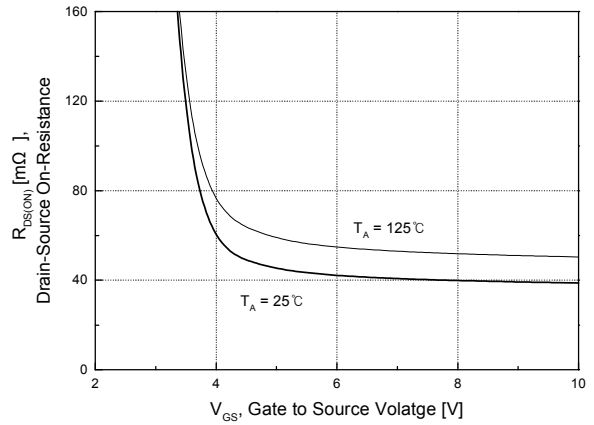


Fig.4 On-Resistance Variation with Gate to Source Voltage

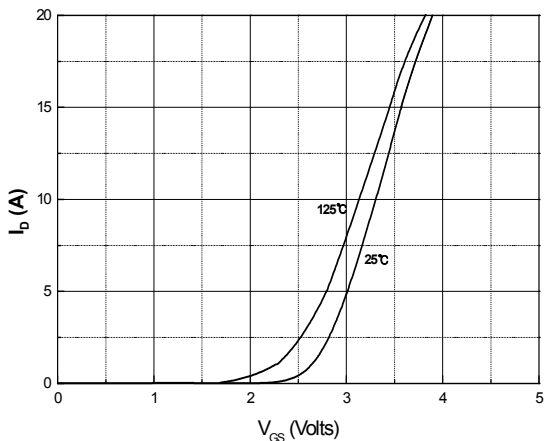


Fig.5 Transfer Characteristics

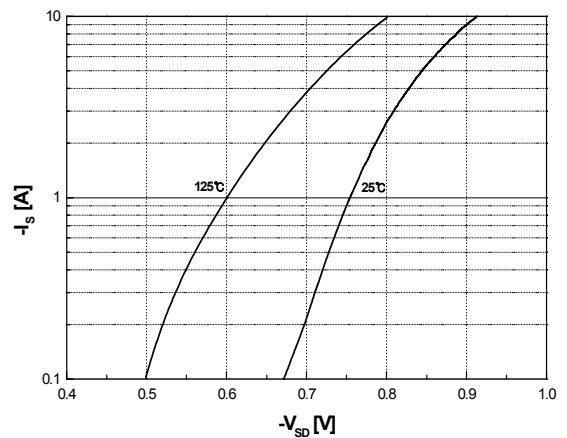


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

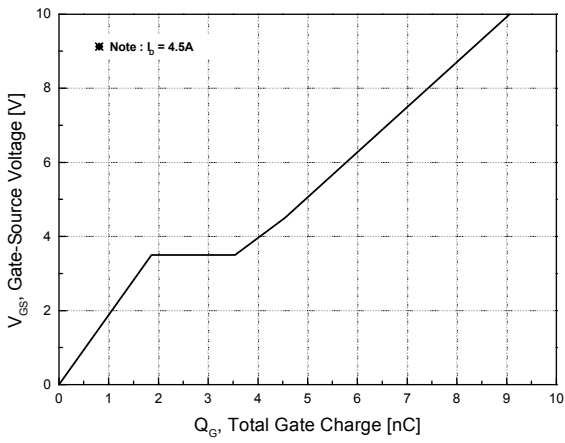


Fig.7 Gate Charge Characteristics

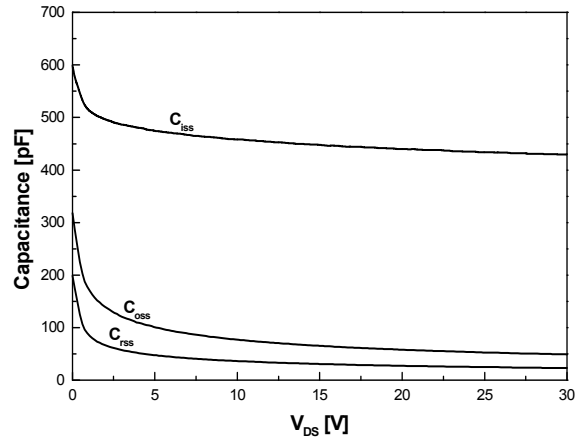


Fig.8 Capacitance Characteristics

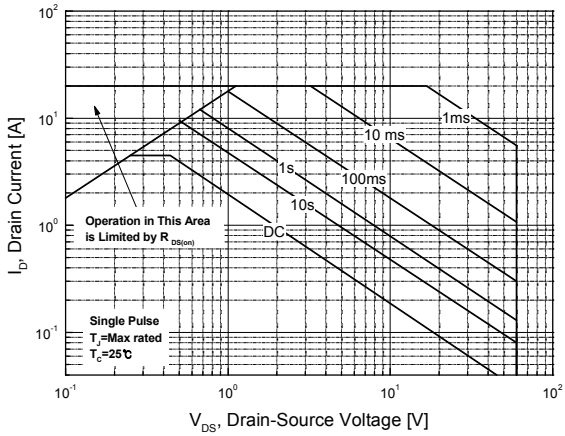


Fig.9 Maximum Safe Operating Area

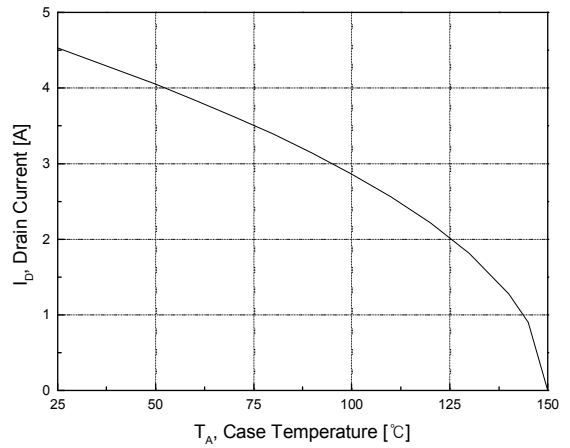


Fig.10 Maximum Drain Current vs. Ambient Temperature

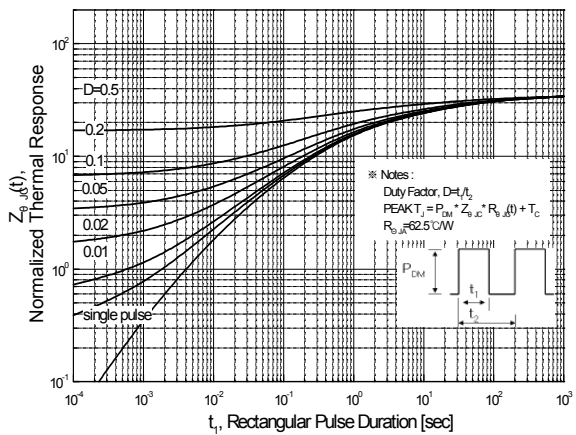
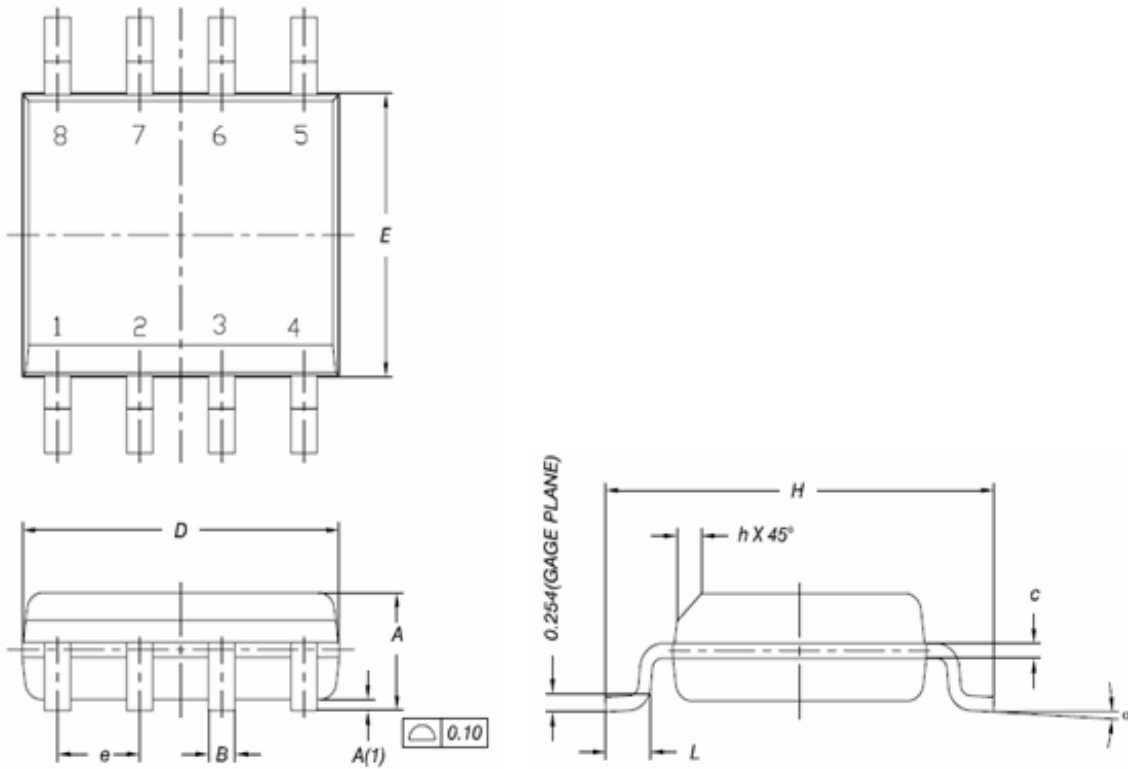


Fig.11 Transient Thermal Response Curve

Physical Dimensions

8 Leads SOIC

Dimensions are in millimeters unless otherwise specified



| Symbol | Min. | Nom. | Max. |
|----------------|----------|---------|-------|
| A | - | - | 1.75 |
| A(1) | 0.10 | - | 0.25 |
| B | 0.31 | - | 0.51 |
| C | 0.10 | - | 0.25 |
| D | - | 4.9 BSC | - |
| E | - | 3.9 BSC | - |
| e | 1.27BSC | | |
| H | - | 6.0 BSC | - |
| L | 0.40 | - | 1.27 |
| a | 0 | - | 8 |
| h | 0.250 | - | 0.500 |
| L2(Gage Plane) | 0.25 BSC | | |

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