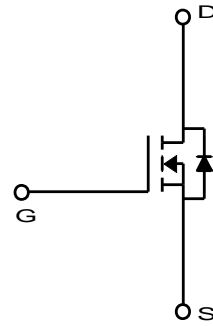
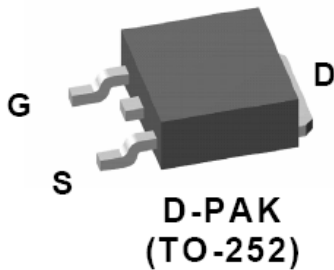


General Description

The MDD1503 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDD1503 is suitable device for DC to DC converter and general purpose applications.

Features

- $V_{DS} = 30V$
- $I_D = 87.5A @ V_{GS} = 10V$
- $R_{DS(ON) (MAX)} < 4.7m\Omega @ V_{GS} = 10V$
- $< 6.8m\Omega @ V_{GS} = 4.5V$
- 100% UIL Tested
- 100% Rg Tested



Absolute Maximum Ratings (Ta = 25°C)

| Characteristics | | Symbol | Rating | Unit |
|--|------------------|----------------|---------------------|------|
| Drain-Source Voltage | | V_{DSS} | 30 | V |
| Gate-Source Voltage | | V_{GSS} | ±20 | V |
| Continuous Drain Current ⁽¹⁾ | $T_C=25^\circ C$ | I_D | 87.5 | A |
| | $T_C=70^\circ C$ | | 70.0 | |
| | $T_A=25^\circ C$ | | 28.2 ⁽³⁾ | |
| | $T_A=70^\circ C$ | | 22.7 ⁽³⁾ | |
| Pulsed Drain Current | | I_{DM} | 350 | A |
| Power Dissipation | $T_C=25^\circ C$ | P_D | 59.5 | W |
| | $T_C=70^\circ C$ | | 38.0 | |
| | $T_A=25^\circ C$ | | 6.2 ⁽³⁾ | |
| | $T_A=70^\circ C$ | | 4.0 ⁽³⁾ | |
| Single Pulse Avalanche Energy ⁽²⁾ | | E_{AS} | 146 | mJ |
| Junction and Storage Temperature Range | | T_J, T_{stg} | -55~150 | °C |

Thermal Characteristics

| Characteristics | Symbol | Rating | Unit |
|--|-----------------|--------|------|
| Thermal Resistance, Junction-to-Ambient ⁽¹⁾ | $R_{\theta JA}$ | 20.0 | °C/W |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 2.1 | |

Ordering Information

| Part Number | Temp. Range | Package | Packing | Quantity | RoHS Status |
|-------------|-------------|---------|-------------|------------|--------------|
| MDD1503RH | -55~150°C | D-PAK | Tape & Reel | 3000 units | Halogen Free |

Electrical Characteristics (T_J =25°C)

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Unit |
|--|----------------------|--|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | I _D = 250μA, V _{GS} = 0V | 30 | - | - | V |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D = 250μA | 1.3 | 1.9 | 2.7 | |
| Drain Cut-Off Current | I _{DSS} | V _{DS} = 30V, V _{GS} = 0V | - | - | 1 | μA |
| | | T _J =55°C | - | - | 5 | |
| 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 = 22A | - | 4.1 | 4.7 | mΩ |
| | | T _J =125°C | - | 5.9 | 6.8 | |
| | | V _{GS} = 4.5V, I _D = 18A | - | 5.7 | 6.8 | |
| Forward Transconductance | g _{fs} | V _{DS} = 5V, I _D = 10A | - | 27 | - | S |
| Dynamic Characteristics | | | | | | |
| Total Gate Charge | Q _{g(10V)} | V _{DS} = 15.0V, I _D = 22A, V _{GS} = 10V | 21 | 28 | 35 | nC |
| Total Gate Charge | Q _{g(4.5V)} | | 10 | 13.3 | 16.6 | |
| Gate-Source Charge | Q _{gs} | | - | 5.9 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 4.2 | - | |
| Input Capacitance | C _{iss} | V _{DS} = 15.0V, V _{GS} = 0V, f = 1.0MHz | 1349 | 1799 | 2249 | pF |
| Reverse Transfer Capacitance | C _{rss} | | 132 | 177 | 221 | |
| Output Capacitance | C _{oss} | | 266 | 354 | 443 | |
| Turn-On Delay Time | t _{d(on)} | V _{GS} = 10V, V _{DS} = 15.0V, I _D = 22A, R _G = 3.0Ω | - | 12 | - | ns |
| Rise Time | t _r | | - | 12.7 | - | |
| Turn-Off Delay Time | t _{d(off)} | | - | 30.6 | - | |
| Fall Time | t _f | | - | 9.2 | - | |
| Gate Resistance | R _g | f=1 MHz | - | 1.2 | 2.0 | Ω |
| Drain-Source Body Diode Characteristics | | | | | | |
| Source-Drain Diode Forward Voltage | V _{SD} | I _S = 22A, V _{GS} = 0V | - | 0.84 | 1.1 | V |
| Body Diode Reverse Recovery Time | t _{rr} | I _F = 22A, di/dt = 100A/μs | - | 27.1 | 40.7 | ns |
| Body Diode Reverse Recovery Charge | Q _{rr} | | - | 20.6 | 30.9 | nC |

Note :

- Surface mounted FR-4 board by JEDEC (jesd51-7)
- E_{AS} is tested at starting T_J = 25°C, L = 0.1mH, I_{AS} = 30.0A, V_{DD} = 27V, V_{GS} = 10V.
- T < 10sec.

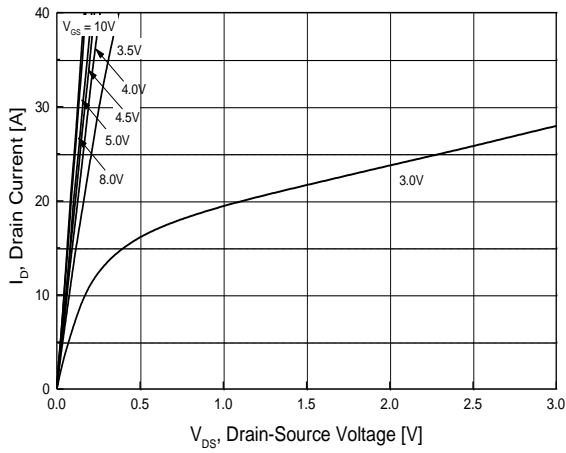


Fig.1 On-Region Characteristics

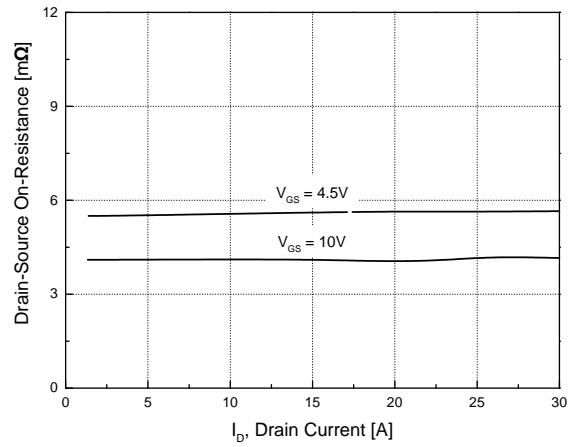


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

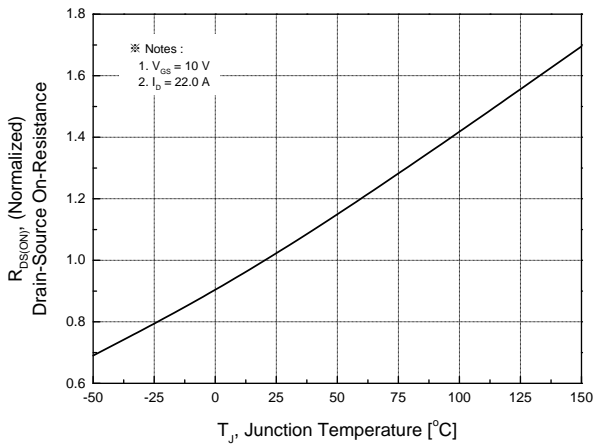


Fig.3 On-Resistance Variation with Temperature

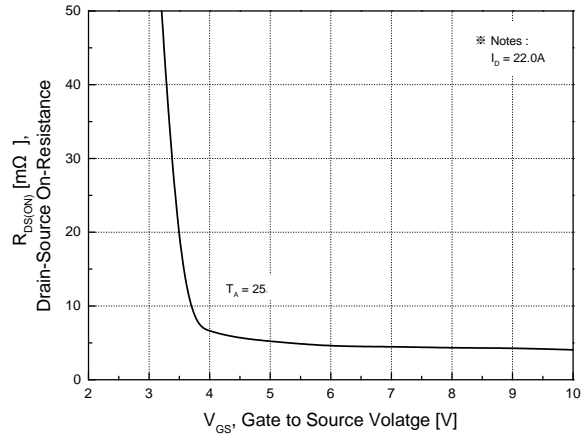


Fig.4 On-Resistance Variation with Gate to Source Voltage

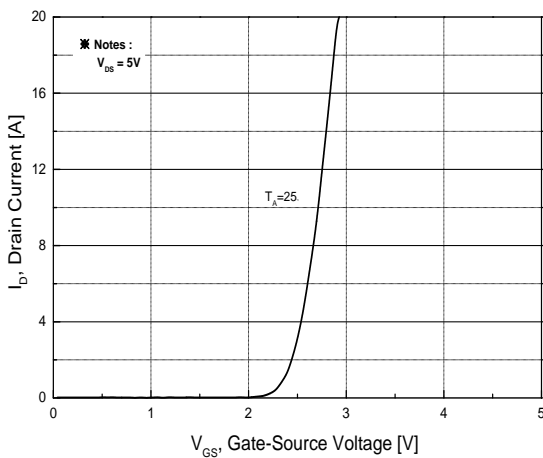


Fig.5 Transfer Characteristics

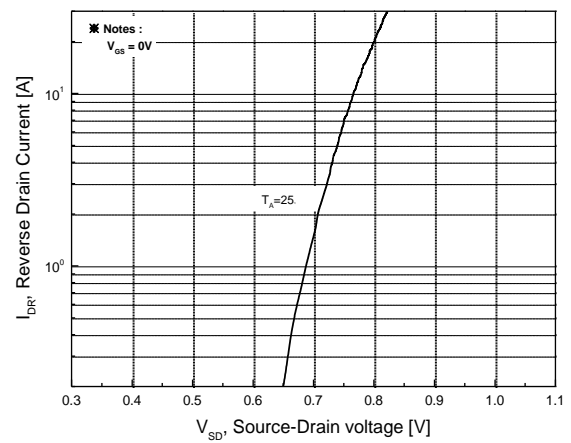


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

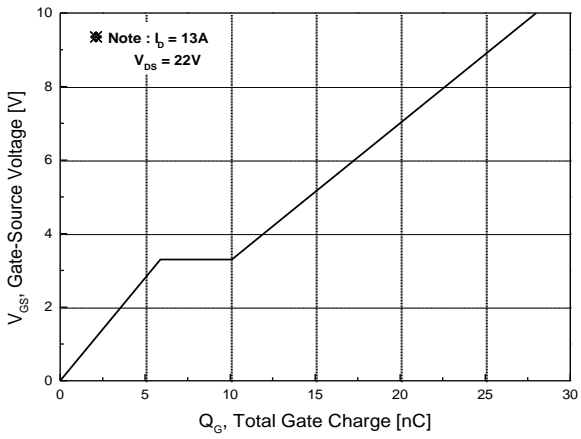


Fig.7 Gate Charge Characteristics

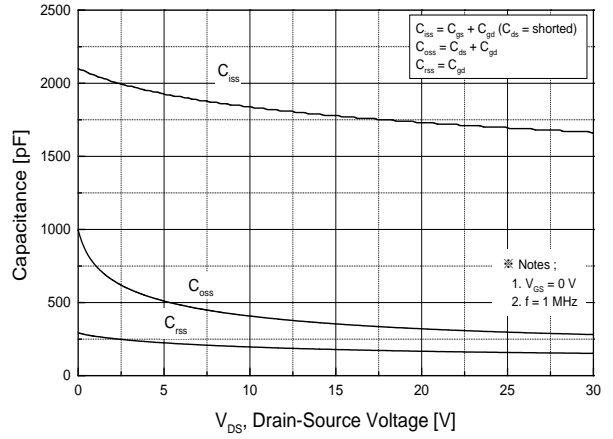


Fig.8 Capacitance Characteristics

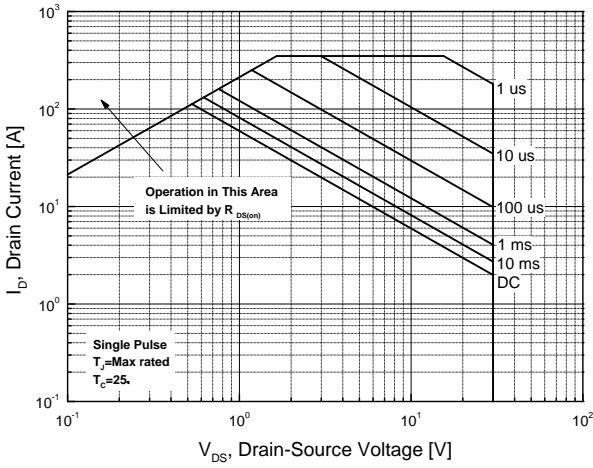


Fig.9 Maximum Safe Operating Area

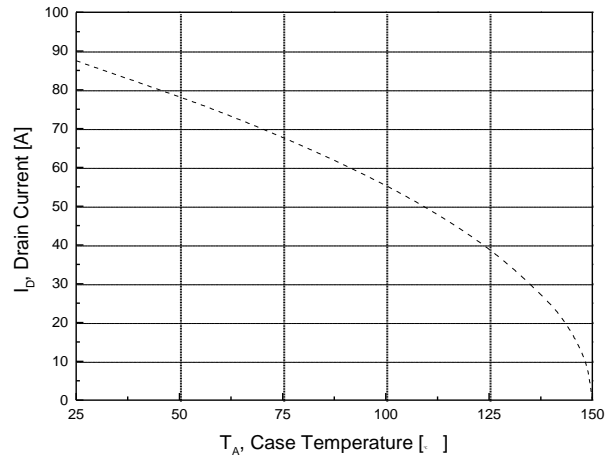


Fig.10 Maximum Drain Current vs. Case Temperature

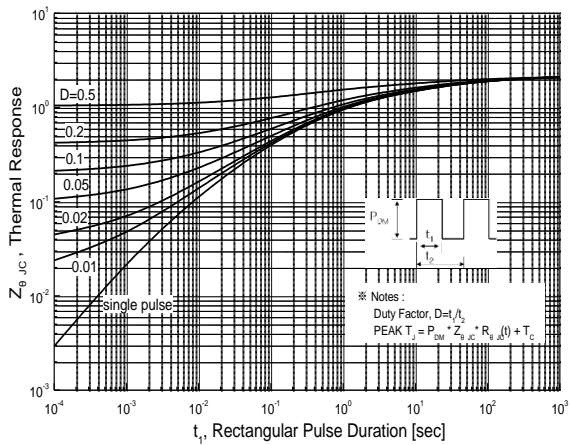
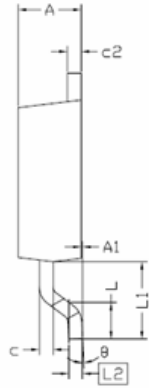
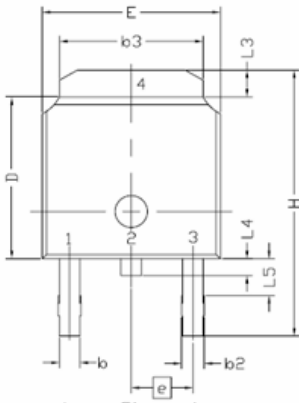


Fig.11 Transient Thermal Response Curve

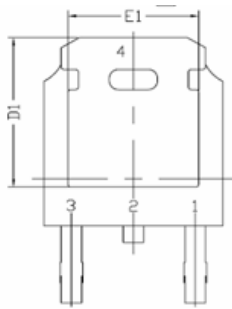
Package Dimension

D-PAK (TO-252)

Dimensions are in millimeters, unless otherwise specified



| Symbol | Min. | Nom. | Max. |
|--------|-----------|------|-------|
| E | 6,35 | - | 6,73 |
| L | 1,40 | 1,52 | 1,78 |
| L1 | 2,74 REF | | |
| L2 | 0,508 BCS | | |
| L3 | 0,89 | - | 1,27 |
| L4 | - | - | 1,02 |
| L5 | 1,14 | - | 1,52 |
| D | 5,97 | 6,10 | 6,22 |
| H | 9,40 | - | 10,41 |
| b | 0,64 | - | 0,89 |
| b2 | 0,76 | - | 1,14 |
| b3 | 4,95 | - | 5,46 |
| e | 2,286 BSC | | |
| A | 2,18 | - | 2,39 |
| A1 | - | - | 0,13 |
| c | 0,46 | - | 0,61 |
| c2 | 0,46 | - | 0,89 |
| D1 | 5,21 | - | - |
| E1 | 4,32 | - | - |
| ⌀ | 0,00 | - | 10,00 |



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