

MJ N-Channel Enhancement Mode Power MOSFET

Description

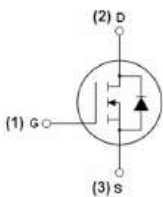
The MJ82H110D uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

General Features

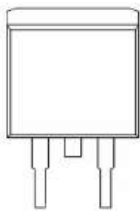
- ◆ $V_{DS} = 82V, I_D = 110A$
 $R_{DS(ON)} < 7m\Omega @ V_{GS} = 10V$ (Typ: 5.9m Ω)
- ◆ Special process technology for high ESD capability
- ◆ High density cell design for ultra low R_{dson}
- ◆ Fully characterized avalanche voltage and current
- ◆ Good stability and uniformity with high E_{AS}
- ◆ Excellent package for good heat dissipation

Application

- ◆ Power switching application
- ◆ Hard switched and High frequency circuits
- ◆ Uninterruptible power supply



Schematic diagram



Marking and pin assignment



TO-263-2L top view

100% UIS TESTED! 100% ΔV_{ds} TESTED!

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|----------------|-----------|----------------|-----------|------------|----------|
| MJ82H110D | MJ82H110D | TO-263-2L | - | - | - |

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

| Parameter | Symbol | Limit | Unit |
|--|-----------------------|------------|------|
| Drain-Source Voltage | V_{DS} | 82 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous (Silicon Limited) | I_D | 110 | A |
| Drain Current-Continuous($T_c=100^{\circ}C$) (Silicon Limited) | $I_{D(100^{\circ}C)}$ | 81 | A |
| Pulsed Drain Current | I_{DM} | 350 | A |
| Maximum Power Dissipation | P_D | 200 | W |
| Derating factor | | 1.33 | W/°C |
| Single pulse avalanche energy ^(Note 5) | E_{AS} | 950 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55 To 175 | °C |

Thermal Characteristic

| | | | |
|--|-----------------|------|------|
| Thermal Resistance, Junction-to-Case ^(Note 2) | $R_{\theta JC}$ | 0.75 | °C/W |
|--|-----------------|------|------|

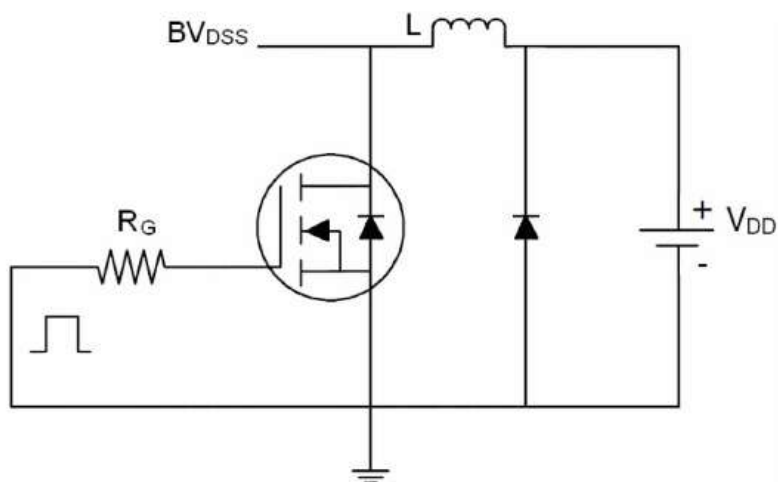
Electrical Characteristics (T_c=25°C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---------------------|---|-----|------|------|------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V I _D =250μA | 82 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =82V,V _{GS} =0V | - | - | 1 | μA |
| Gate-Body Leakage Current | I _{GSS} | V _{DS} =±20V,V _{GS} =0V | - | - | ±100 | nA |
| On Characteristics ^(Note 3) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} ,I _D =250μA | 2 | 3 | 4 | V |
| Drain-Source On-State Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =20A | - | 5.9 | 7.0 | mΩ |
| Forward Transconductance | g _{FS} | V _{DS} =5V,I _D =20A | 60 | - | - | S |
| Dynamic Characteristics ^(Note 4) | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =40V,V _{GS} =0V F=1.0MHz | - | 6400 | - | PF |
| Output Capacitance | C _{oss} | | - | 334 | - | PF |
| Reverse Transfer Capacitance | C _{rss} | | - | 318 | - | PF |
| Switching Characteristics ^(Note 4) | | | | | | |
| Turn-on Delay Time | t _{d(on)} | V _{DD} =30V, R _L =1Ω V _{GS} =10V,R _{GEN} =2.5Ω | - | 21 | - | nS |
| Turn-on Rise Time | t _r | | - | 39 | - | nS |
| Turn-Off Delay Time | t _{d(off)} | | - | 70 | - | nS |
| Turn-Off Fall Time | t _f | | - | 24 | - | nS |
| Total Gate Charge | Q _g | V _{DS} =40V,I _D =20A V _{GS} =10V | - | 120 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 25.4 | - | nC |
| Gate-Drain Charge | Q _{gd} | | - | 39.4 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage ^(Note 3) | V _{SD} | V _{GS} =0V,I _S =110A | - | - | 1.2 | V |
| Diode Forward Current ^(Note 2) | I _S | | - | - | 110 | A |
| Reverse Recovery Time | t _{rr} | T _J =25°C, I _F =20A di/dt=100A/μs ^(Note 3) | - | 43 | - | nS |
| Reverse Recovery Charge | Q _{rr} | | - | 93 | - | nC |

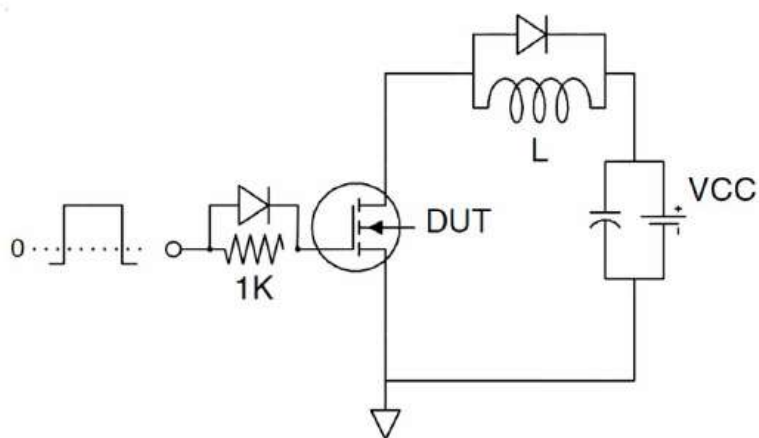
Notes:

- ① Repetitive Rating: Pulse width limited by maximum junction temperature.
- ② Surface Mounted on FR4 Board, t ≤ 10 sec.
- ③ Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
- ④ Guaranteed by design, not subject to production
- ⑤ EAS condition: T_J=25°C, V_{DS}=40V,V_G=10V,L=0.5mH,R_g=25Ω

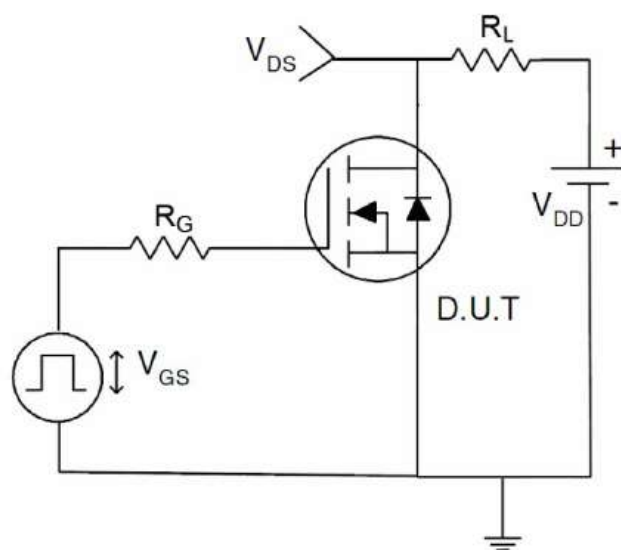
Test circuit



EAS test Circuit

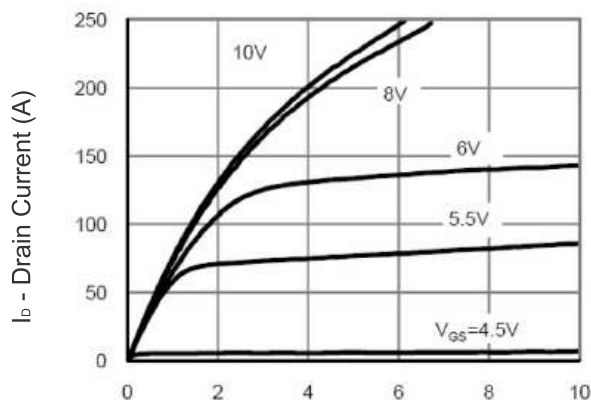


Gate charge test Circuit

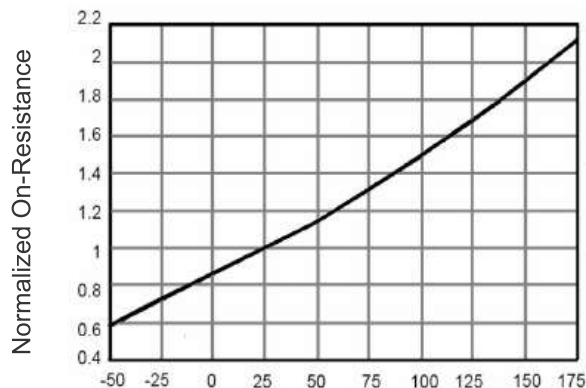


Switch Time Test Circuit

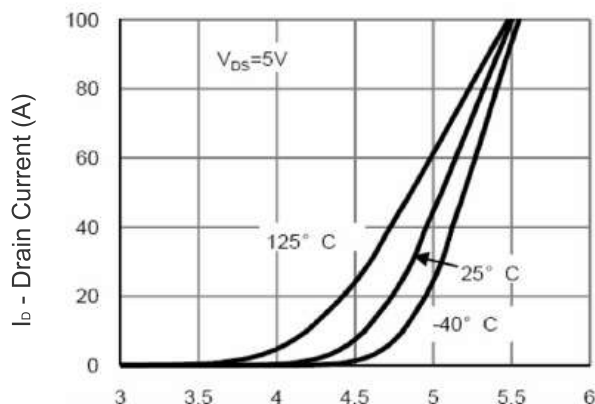
Typical Electrical and Thermal Characteristics (Curves)



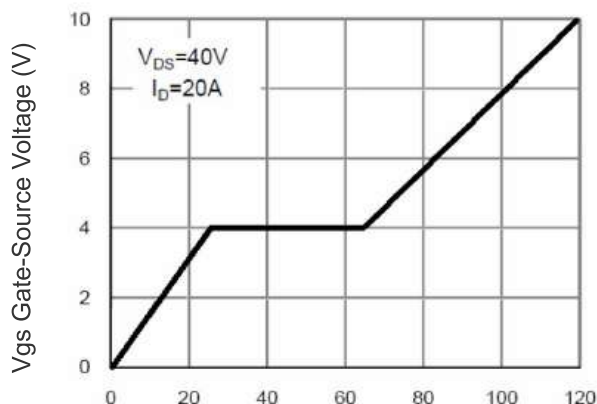
V_{DS} Drain-Source Voltage (V)
Figure 1 Output Characteristics



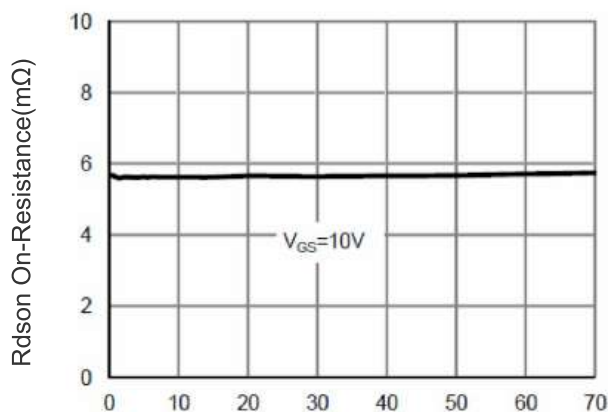
T_J -Junction Temperature(°C)
Figure 4 Rdson-Junction Temperature



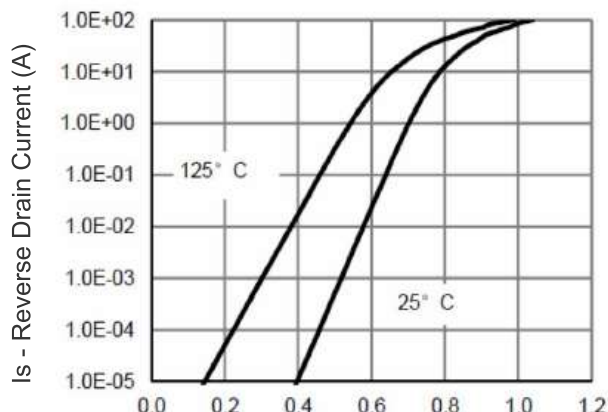
V_{GS} Gate-Source Voltage (V)
Figure 2 Transfer Characteristics



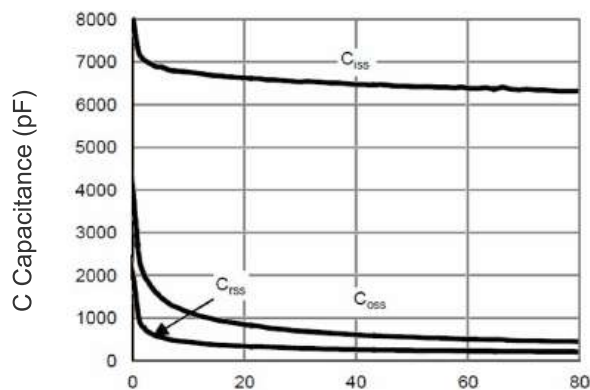
Q_g Gate Charge (nC)
Figure 5 Gate Charge



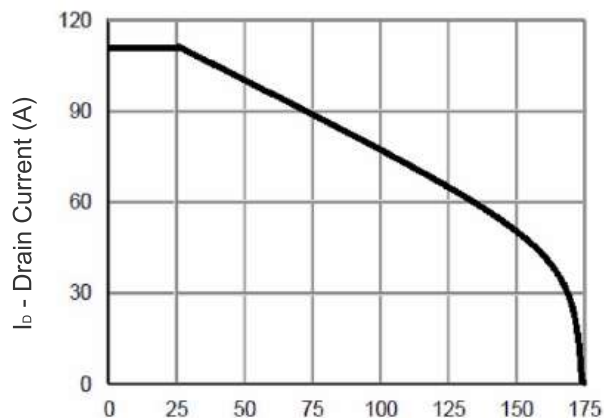
I_D - Drain Current (A)
Figure 3 Rdson- Drain Current



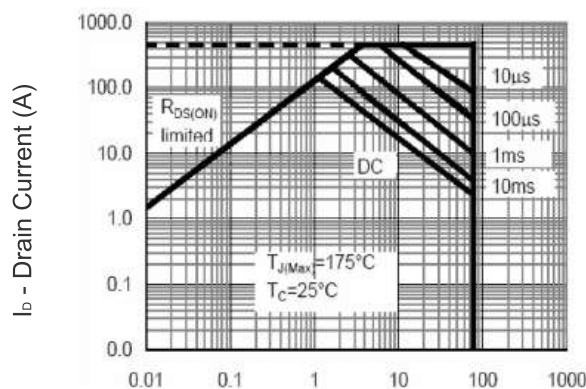
V_{SD} Source-Drain Voltage (V)
Figure 6 Source- Drain Diode Forward



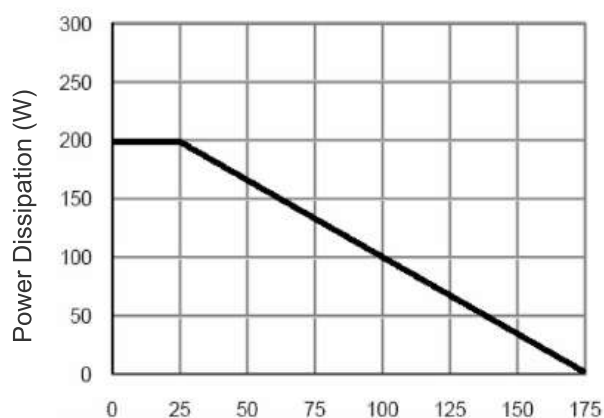
Vds Drain-Source Voltage (V)
Figure 7 Capacitance vs Vds



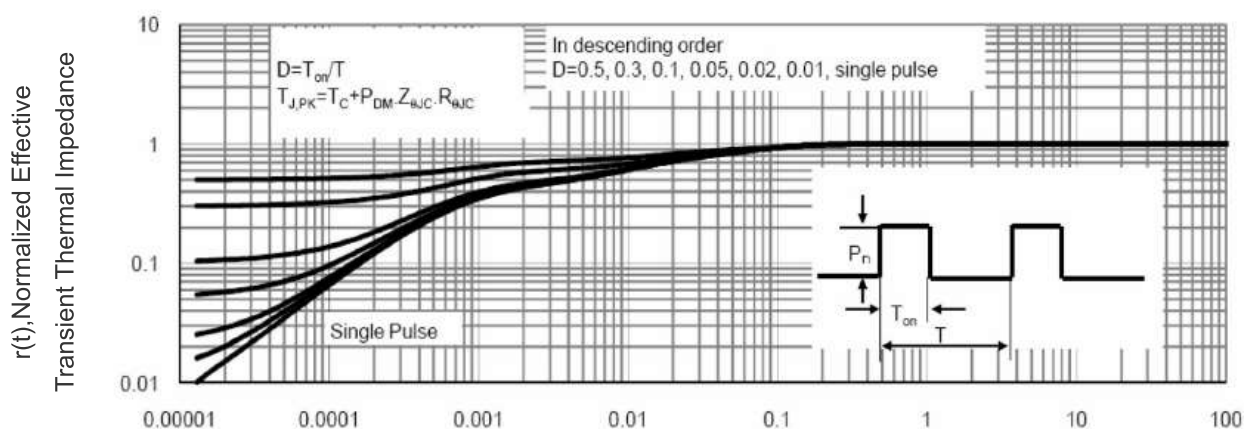
Tj - Junction Temperature(°C)
Figure 9 Current De-rating



Vds Drain-Source Voltage (V)
Figure 8 Safe Operation Area

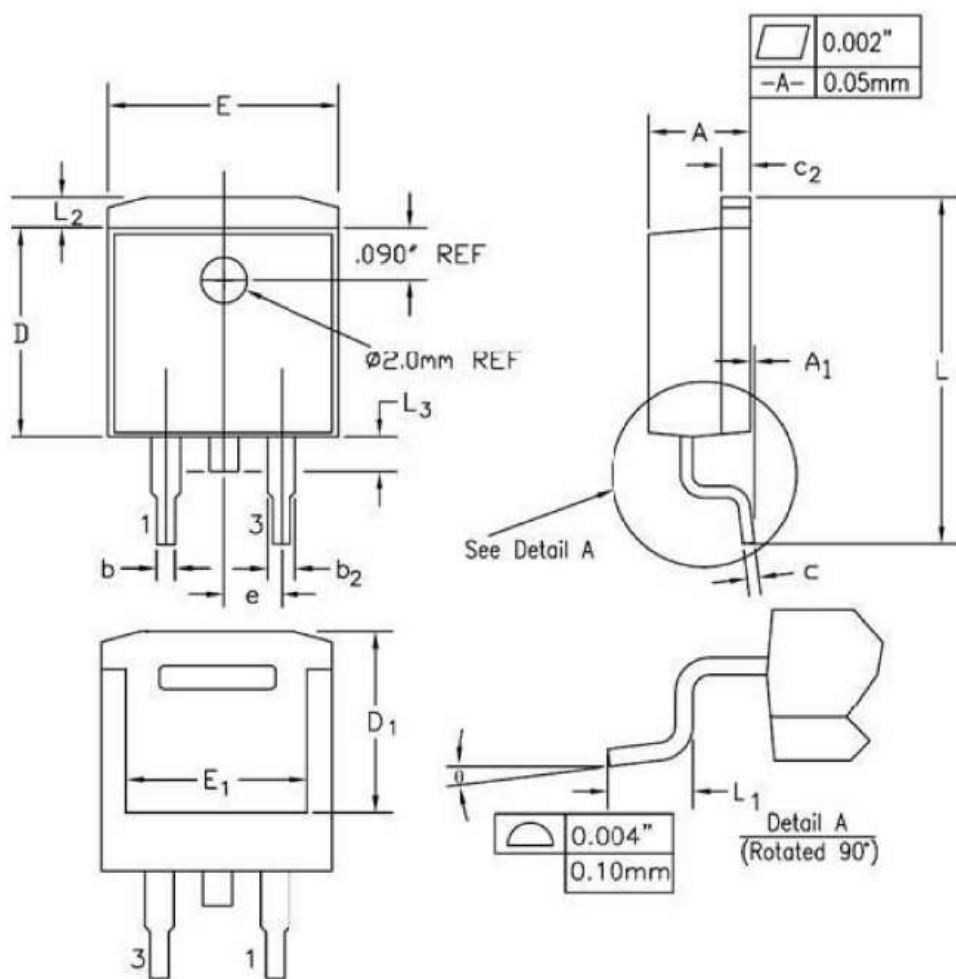


Tj - Junction Temperature(°C)
Figure 10 Power De-rating



Square Wave Pluse Duration(sec)
Figure 11 Normalized Maximum Transient Thermal Impedance

TO-263-2L Package Information



| SYMBOL | INCHES | | MILLIMETERS | | NOTES |
|--------|------------|-------|-------------|-------|-------|
| | MIN | MAX | MIN | MAX | |
| A | 0.170 | 0.180 | 4.32 | 4.57 | |
| A1 | - | 0.010 | - | 0.25 | |
| b | 0.028 | 0.037 | 0.71 | 0.94 | |
| b2 | 0.045 | 0.055 | 1.15 | 1.40 | |
| c | 0.018 | 0.024 | 0.46 | 0.61 | |
| c2 | 0.048 | 0.055 | 1.22 | 1.40 | |
| D | 0.350 | 0.370 | 8.89 | 9.40 | |
| D1 | 0.315 | 0.324 | 8.01 | 8.23 | |
| E | 0.395 | 0.405 | 10.04 | 10.28 | |
| E1 | 0.310 | 0.318 | 7.88 | 8.08 | |
| e | 0.100 BSC. | | 2.54 BSC. | | |
| L | 0.580 | 0.620 | 14.73 | 15.75 | |
| L1 | 0.090 | 0.110 | 2.29 | 2.79 | |
| L2 | 0.045 | 0.055 | 1.15 | 1.39 | |
| L3 | 0.050 | 0.070 | 1.27 | 1.77 | |
| θ | 0° | 8° | 0° | 8° | |

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