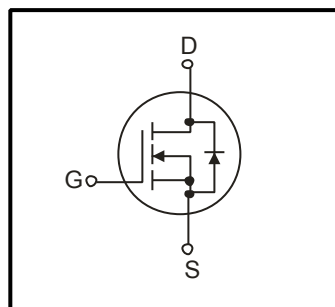


Silicon N-Channel MOSFET

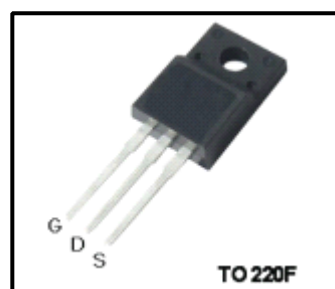
Features

- Ultra low Rdson
- Ultra-low Gate charge(Typical 65nC)
- 100% UIS Tested
- RoHS compliant



General Description

Winsemi Power MOSFET is fabricated using advanced super junction technology. The resulting device has extremely low on resistance, making it especially suitable for applications which require superior power density and outstanding efficiency.



Absolute Maximum Ratings

| Symbol | Parameter | Value | Units |
|----------------------|--|------------|-----------|
| V _{DSS} | Drain Source Voltage | 600 | V |
| I _D | Continuous Drain Current (@T _c =25°C) (@T _c =100°C) | 20 13 | A |
| I _{DM} | Drain Current Pulsed ¹⁾ | 60 | A |
| V _{GS} | Gate to Source Voltage | ±30 | V |
| E _{AS} | Single Pulse Avalanche Energy ²⁾ | 700 | mJ |
| I _{AR} | Single Pulse Avalanche Current ¹⁾ | 20 | A |
| E _{AR} | Repetitive Avalanche Energy ¹⁾ | 20.5 | mJ |
| P _D | Total Power Dissipation (@T _c =25°C) -Derate above 25°C | 34 0.28 | W W/°C |
| T _J | Junction Temperature | 150 | °C |
| T _{stg} | Storage Temperature | -55~150 | °C |
| I _S | Continuous diode forward current | 20 | A |
| I _{S,pulse} | Diode pulse current | 60 | A |

Thermal Characteristics

| Symbol | Parameter | Value | | | Units |
|------------------|--|-------|-----|-----|-------|
| | | Min | Typ | Max | |
| R _{QJC} | Thermal Resistance , Junction -to -Case | - | - | 3.6 | °C/W |
| R _{QJA} | Thermal Resistance , Junction -to -Ambient | - | - | 80 | °C/W |

Electrical Characteristics(Tc=25°C)

| Characteristics | Symbol | Test Condition | Min | Type | Max | Unit |
|--|----------------------|--|-----|------|------|------|
| Gate leakage current | I _{GSS} | V _{GS} =±30V,V _{DS} =0V | - | - | ±100 | nA |
| Drain cut -off current | I _{DSS} | V _{DS} =600V,V _{GS} =0V | - | - | 1 | μA |
| Drain -source breakdown voltage | V _{(BR)DSS} | I _D =250μA,V _{GS} =0V | 600 | - | - | V |
| Gate threshold voltage | V _{GS(th)} | V _{DS} =V _{GS} ,I _D =250uA | 2.5 | - | 4.5 | V |
| Drain -source ON resistance | R _{DS(ON)} | V _{GS} =10V,I _D =10A T _J =25°C T _J =150°C | - | 0.13 | 0.15 | Ω |
| | | | - | 0.39 | - | |
| Gate resistance | R _G | F=1MHz, open drain | - | 1.8 | - | Ω |
| Input capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1MHz | - | 2100 | | pF |
| Reverse transfer capacitance | C _{rss} | | - | 17 | | |
| Output capacitance | C _{oss} | | - | 1700 | | |
| Turn-on delay time | t _{d(on)} | V _{DD} = 380V, I _D = 10A R _G = 4.7Ω, V _{GS} = 10V | - | 25 | - | |
| Rise time | t _r | | - | 21 | - | |
| Turn-off delay time | t _{d(off)} | | - | 60 | - | |
| Fall time | t _f | | - | 4 | - | |
| Total gate charge(gate-source plus gate-drain) | Q _g | V _{DS} =480V, V _{GS} =0 to 10V, I _D =10A | - | 65 | - | nC |
| Gate-source charge | Q _{gs} | | - | 12 | - | |
| Gate-drain("miller") Charge | Q _{gd} | | - | 31 | - | |
| Gate plateau voltage | V _{plateau} | | - | 5.7 | - | |

Source-Drain Ratings and Characteristics(Ta=25°C)

| Characteristics | Symbol | Test Condition | Min | Type | Max | Unit |
|-------------------------------|------------------|---|-----|------|-----|------|
| Body Diode Voltage | V _{SD} | I _{SD} =10A,V _{GS} =0V | - | - | 1.4 | V |
| Pulse Diode Forward Current | I _{tr} | V _R =50V,I _F =20A,dI _F /dt= 100A/μs | - | 520 | - | |
| Reverse recovery time | Q _{rr} | | - | 5.7 | - | |
| Peak reverse recovery current | I _{rrm} | | - | 19 | - | |

Notes:

1. Repetitive Rating:Pulse width limited by maximum junction temperature
2. I_{AS}=7A,V_{DD}=60V,R_G=25 Ω,Starting T_J=25 °C

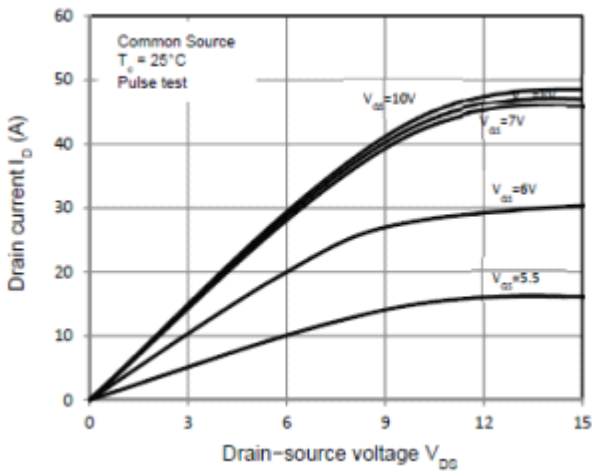


Fig.1 On-Region Characteristics

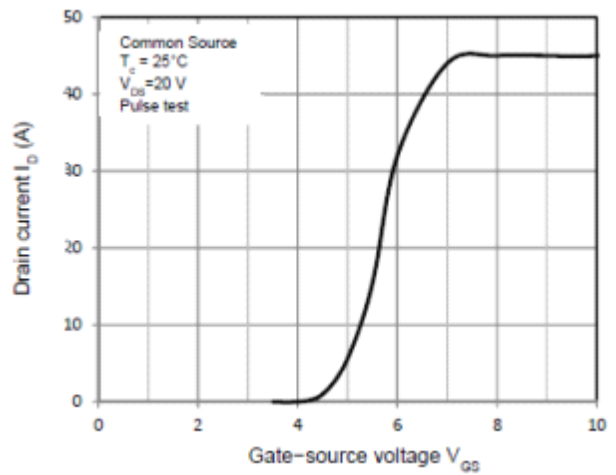


Fig.2 Transfer Characteristics

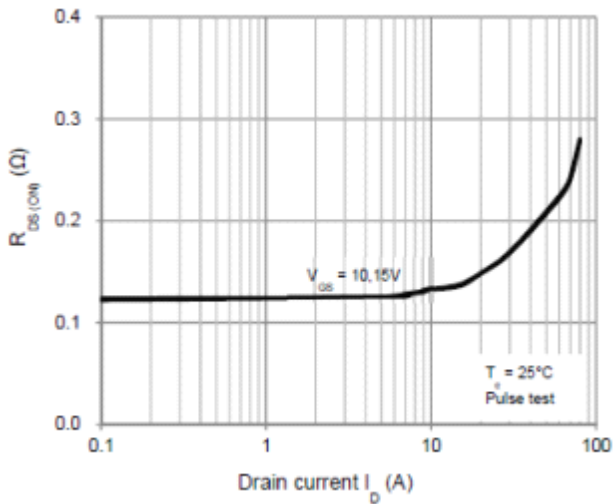


Fig.3 On-Resistance Variation vs Drain Current

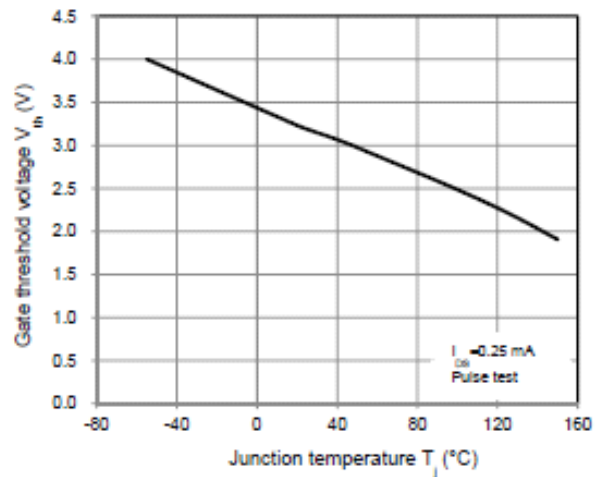


Fig.4 Threshold Voltage vs. Temperature

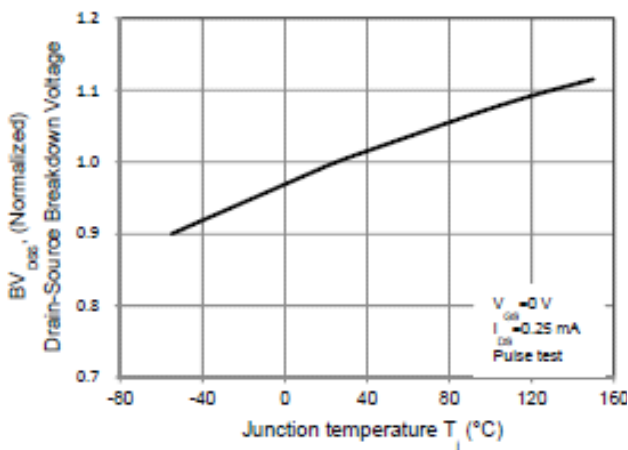


Fig.5 Breakdown Voltage vs. Temperature

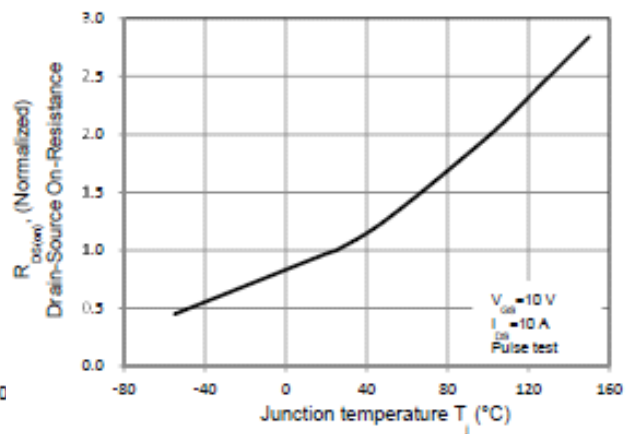


Fig.6 On-Resistance vs. Temperature

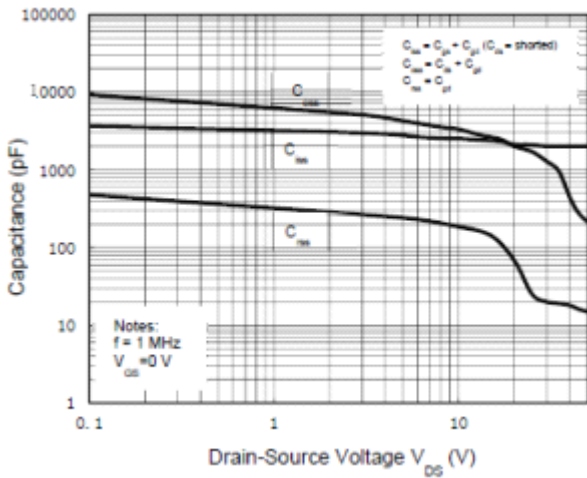


Fig.7 Capacitance Characteristics

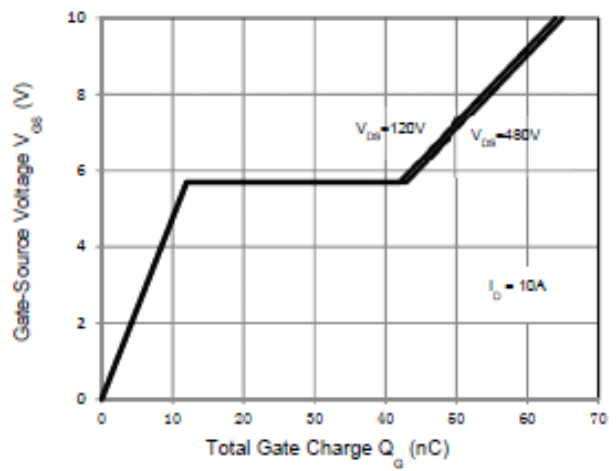


Fig.8 Gate Charge Characteristics

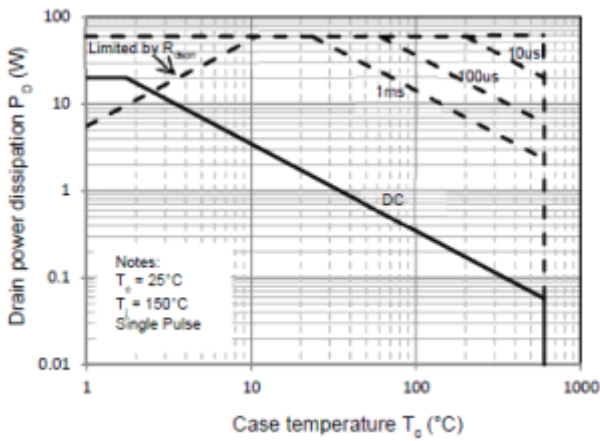


Fig.9 Maximum Safe Operating Area

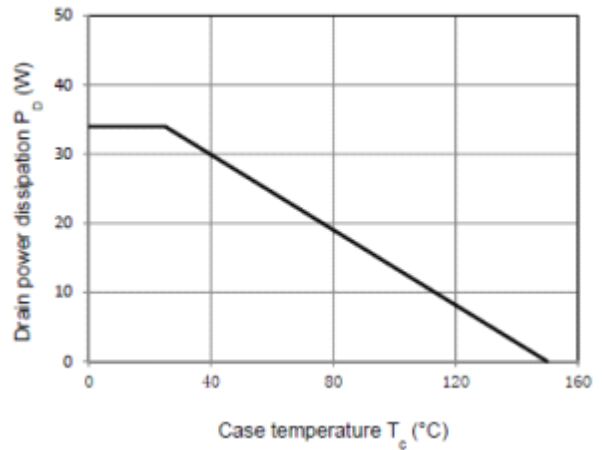


Fig.10 Power Dissipation vs. Temperature

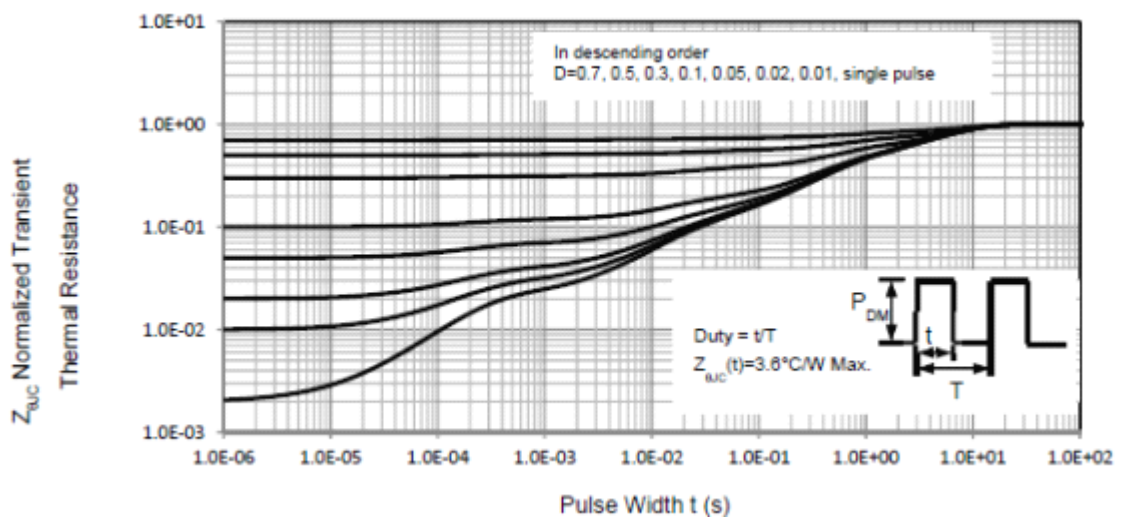


Fig.11 Transient Thermal Response Curve

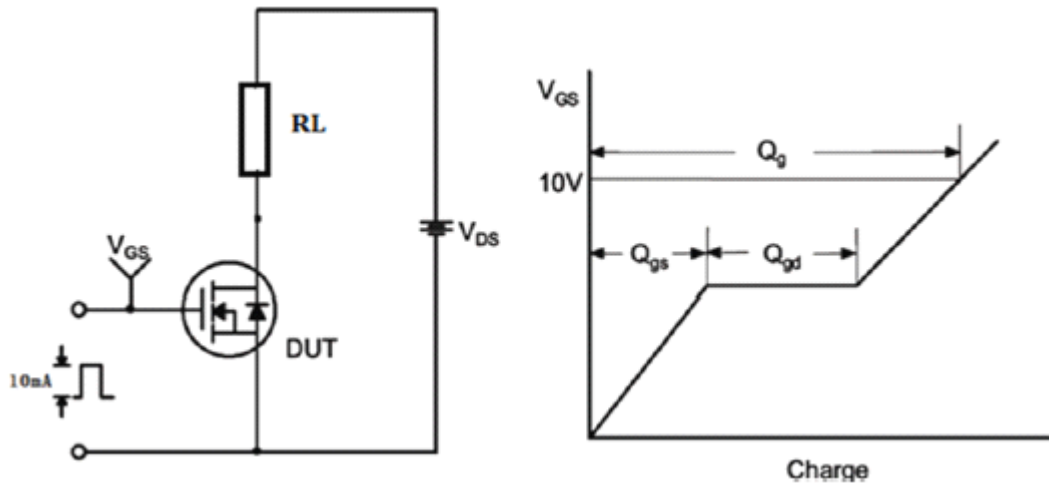


Fig.11 Gate Charge Test Circuit & Waveform

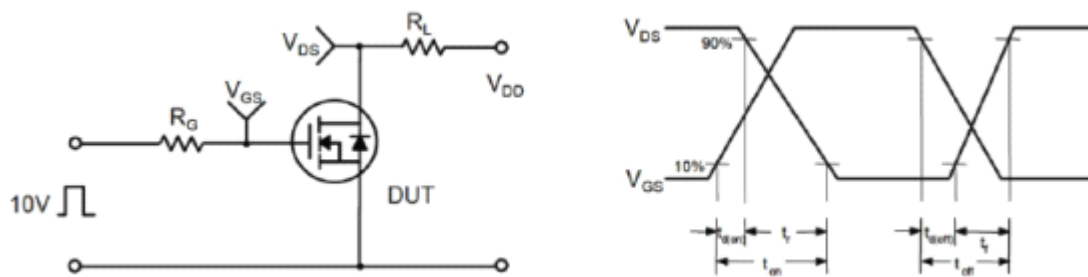


Fig.12 Switching Test Circuit & Waveforms

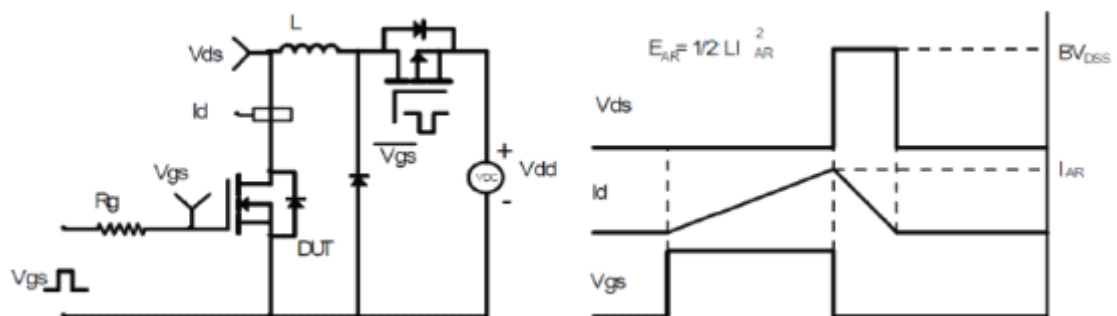


Fig.13 Unclamped Inductive Switching Test Circuit & Waveforms

TO-220F Package Dimension

