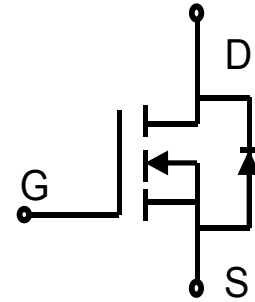




Description

These N-Channel enhancement mode power field effect transistors are using Shielded Gate Trench technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and with stand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.



N-Channel MOSFET

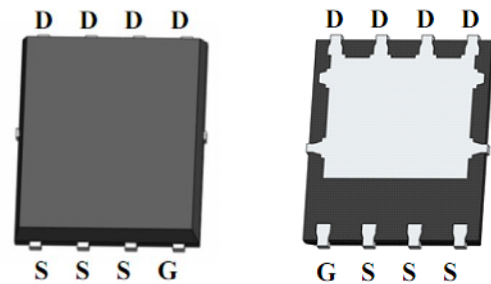
Features

- ◆ 40V, 180A, $R_{DS(on),max} = 1.3m\Omega @ V_{GS} = 10V$
- ◆ Advanced trench cell design
- ◆ Low Thermal Resistance
- ◆ Super Trench
- ◆ 100% EAS Guaranteed
- ◆ Green device available

Applications

- ◆ Motor Drives
- ◆ UPS
- ◆ DC-DC Converter

Pin Configuration



PDFN5*6-8

Product Summary

| | |
|---------------------------------|---------------|
| V_{DSS} | 40V |
| $R_{DS(on),max} @ V_{GS} = 10V$ | 1.3m Ω |
| I_D | 180A |

Absolute Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

| Symbol | Parameter | Value | Unit |
|-----------|--|-------------|------------|
| V_{DSS} | Drain-Source Voltage | 40 | V |
| I_D | Continuous drain current ($T_C = 25^\circ C$) ($T_C = 100^\circ C$) | 180 110 | A |
| I_{DM} | Pulsed drain current ^① | 720 | A |
| V_{GSS} | Gate-Source voltage | ± 20 | V |
| EAS | Avalanche energy ^② | 714 | mJ |
| P_D | Power Dissipation | 62.8 | W |
| T_{STG} | Storage Temperature Range | -55 to +150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to +150 | $^\circ C$ |



Thermal Characteristics

| Symbol | Parameter | Typical | Max | Unit |
|------------------|--|---------|-----|------|
| R _{θJC} | Thermal Resistance, Junction-to-Case | -- | 1.1 | °C/W |
| R _{θJA} | Thermal Resistance, Junction-to-Ambient ^③ | -- | 42 | °C/W |

Electrical Characteristics T_J = 25°C unless otherwise noted

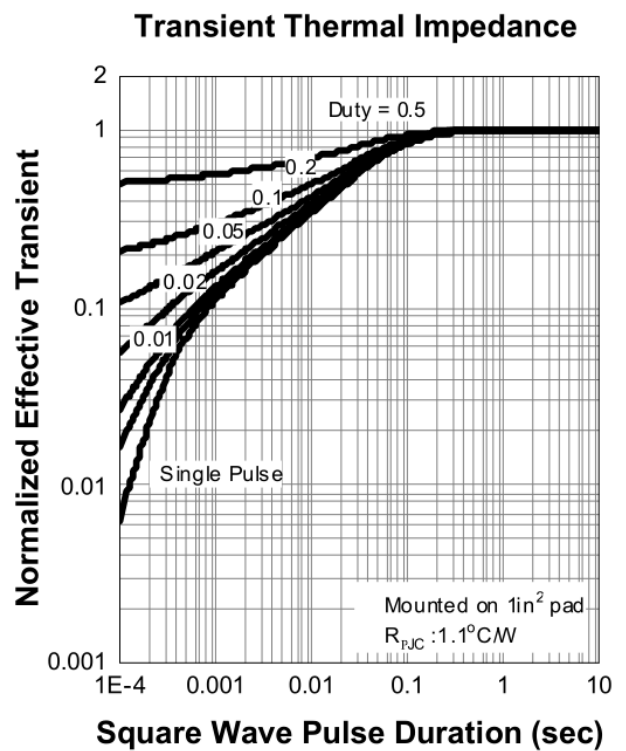
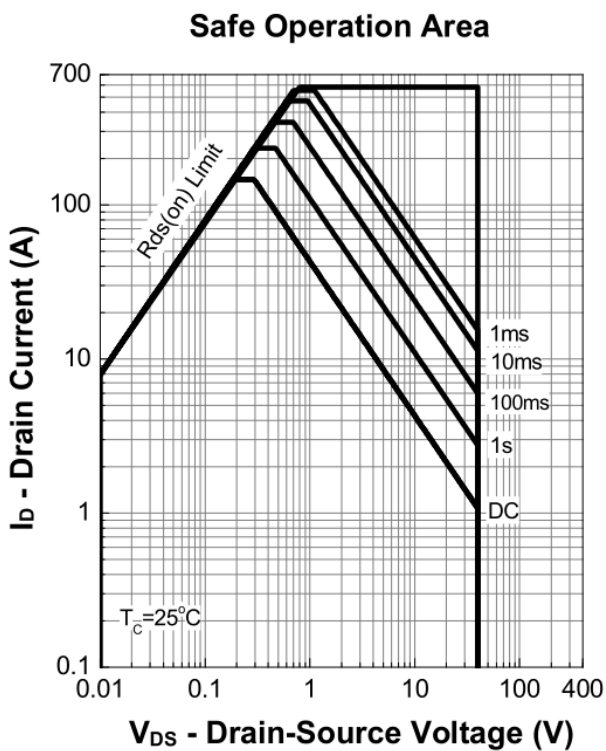
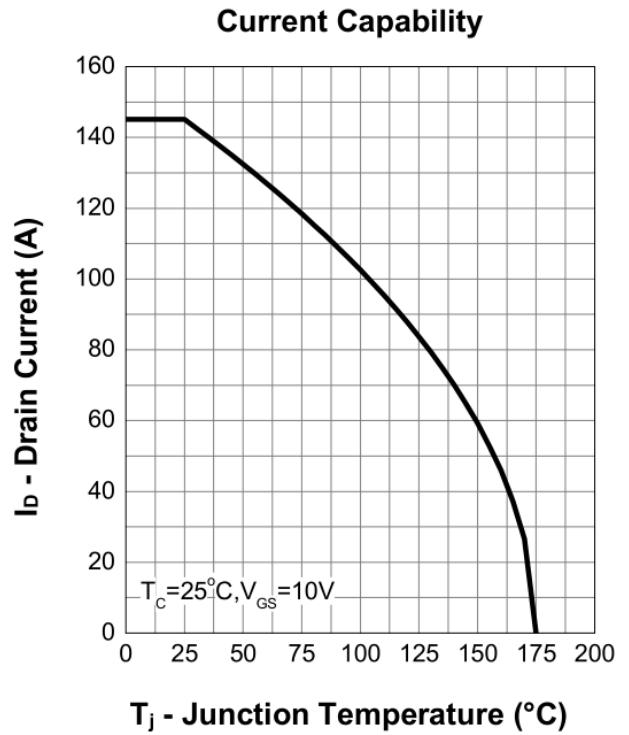
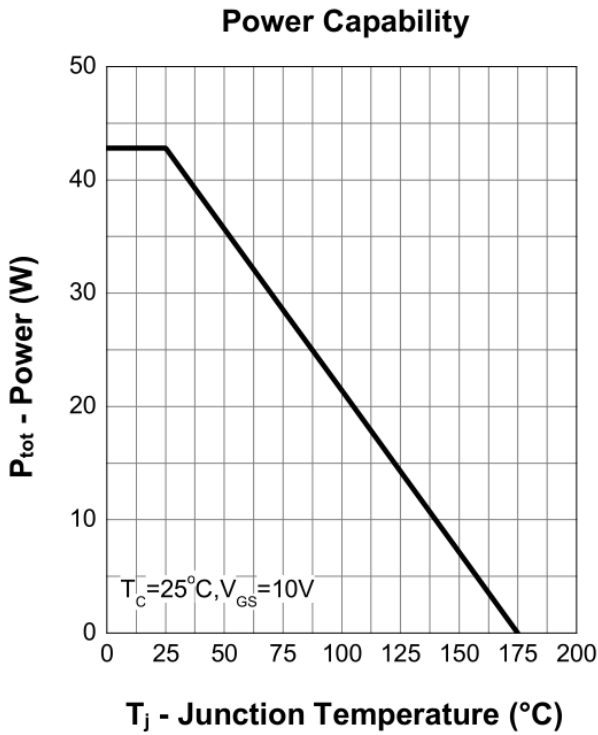
| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Unit |
|---|----------------------------------|--|------|------|------|------|
| Static Electrical Characteristics | | | | | | |
| BV _{DSS} | Drain-source breakdown voltage | V _{GS} =0V, I _D =250uA | 40 | -- | -- | V |
| V _{GS(th)} | Gate threshold voltage | V _{DS} =V _{GS} , I _D =250uA | 2 | -- | 4 | V |
| I _{DSS} | Drain-source leakage current | V _{DS} =40V, V _{GS} =0V, T _J = 25°C | -- | -- | 1 | uA |
| | | V _{DS} =40V, V _{GS} =0V, T _J =150°C | -- | -- | 10 | mA |
| I _{GSS} | Gate-Body Leakage current | V _{DS} =0V, V _{GS} =±20V | -- | -- | ±100 | nA |
| R _{DS(on)} | Drain-source on-state resistance | V _{GS} =10V, I _D =30A | -- | 1.3 | 1.5 | mΩ |
| | | V _{GS} =4.5V, I _D =20A, | -- | 2.1 | 2.6 | |
| g _{fs} | Forward transconductance | V _{DS} =5V, I _D =30A | -- | 80 | -- | S |
| Dynamic characteristics | | | | | | |
| C _{iss} | Input capacitance | V _{DS} =20V, V _{GS} =0V, f=1MHz | -- | 4533 | -- | pF |
| C _{oss} | Output capacitance | | | | | |
| C _{rss} | Reverse transfer capacitance | | | | | |
| Switching Characteristics | | | | | | |
| R _g | Gate Resistance | V _{DS} =0V, V _{GS} =0V, f=1MH | -- | 1.8 | -- | Ω |
| Q _g | Total Gate Charge | V _{DS} =20V, I _D =30A, V _{GS} =10V | -- | 80 | -- | nC |
| Q _{gs} | Gate-Source Charge | | | | | |
| Q _{gd} | Gate-Drain Charge | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =20V, V _{GS} =10V, I _D =30 A | -- | 19 | -- | nS |
| t _r | Rise Time | | | | | |
| t _{d(off)} | Turn-off Delay Time | | | | | |
| t _f | Fall Time | | | | | |
| Drain-Source diode characteristics and Maximum Ratings | | | | | | |
| I _S | Continuous Source Current | | -- | -- | 180 | A |
| I _{SM} | Pulsed Source Current | | -- | -- | 720 | A |
| V _{SD} | Diode Forward Voltage | V _{GS} =0V, I _S =30A, T _J =25°C | -- | -- | 1.3 | V |
| t _{rr} | Reverse Recovery Time | I _S =30A, di/dt=100A/us, T _J =25°C | -- | 62.3 | -- | nS |
| Q _{rr} | Reverse Recovery Charge | | -- | 66.6 | -- | nC |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. V_{DD}=40V, V_{GS}=10V, L=0.3mH, I_{AS}=69A, R_G=25Ω, Starting T_J=25°C.
3. The value of R_{thJA} is measured by placing the device in a still air box which is one cubic foot.

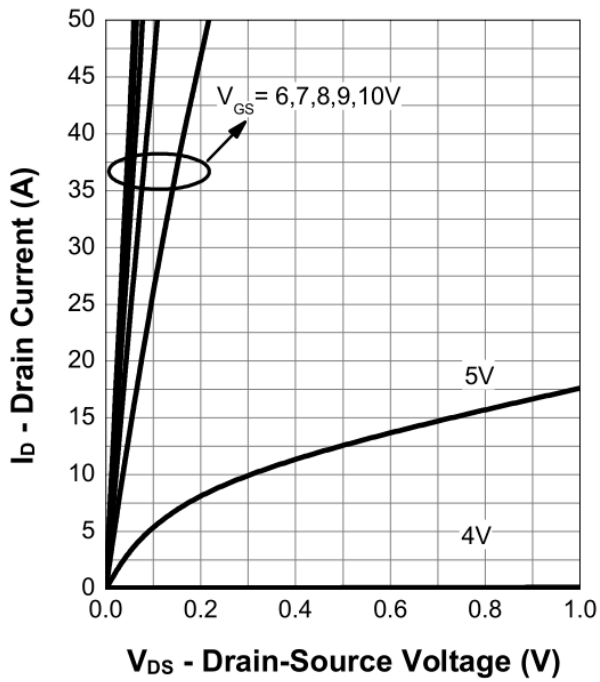


4. Typical Characteristics

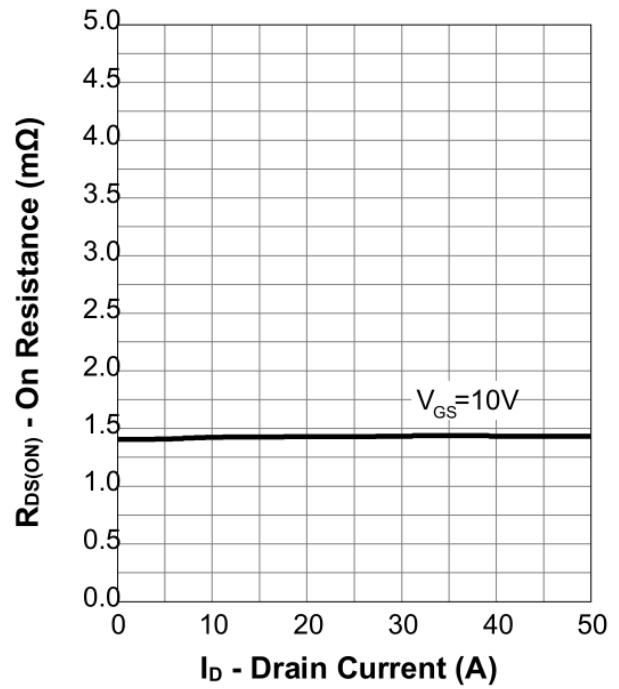




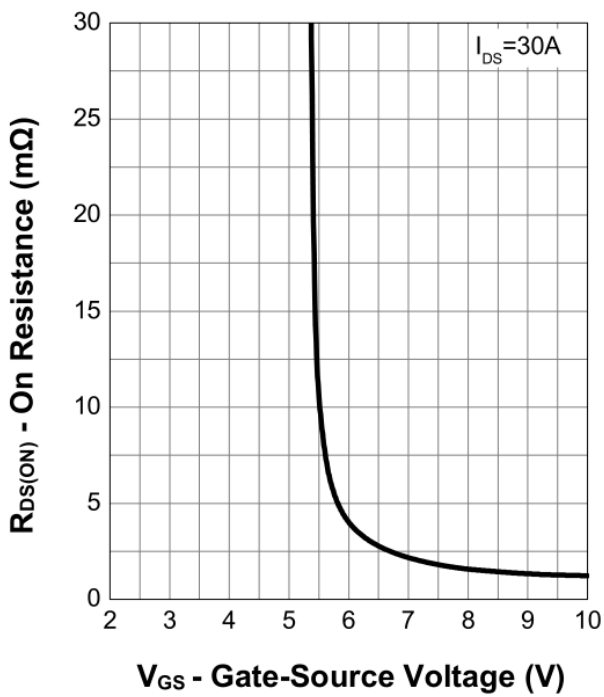
Output Characteristics



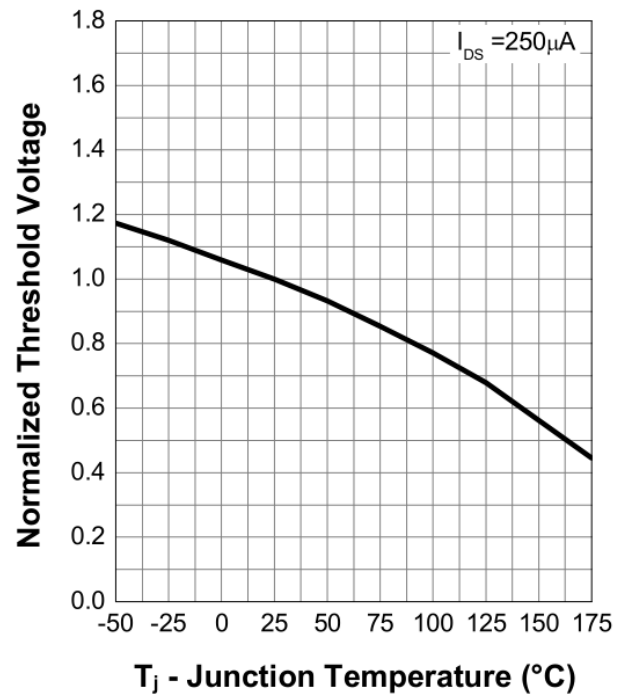
On Resistance



Transfer Characteristics

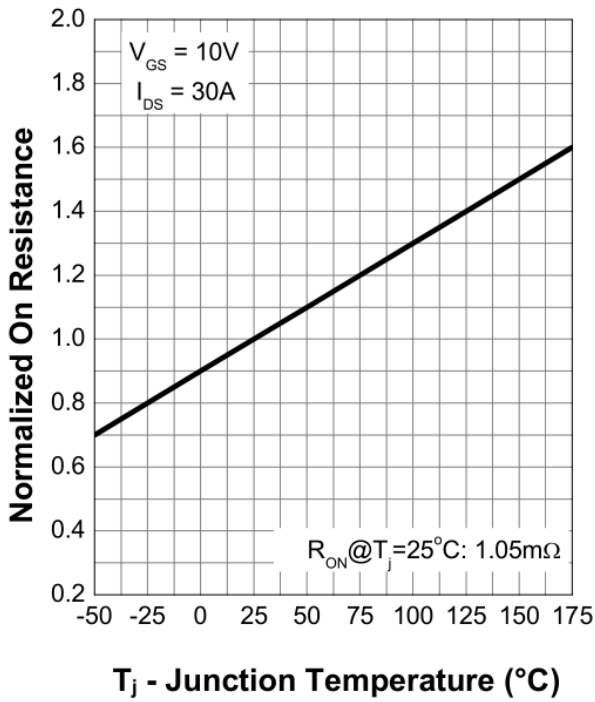


Normalized Threshold Voltage

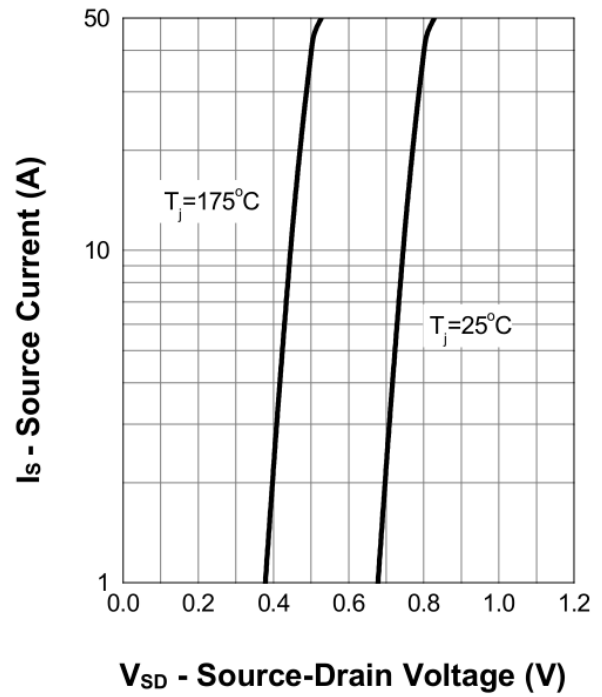




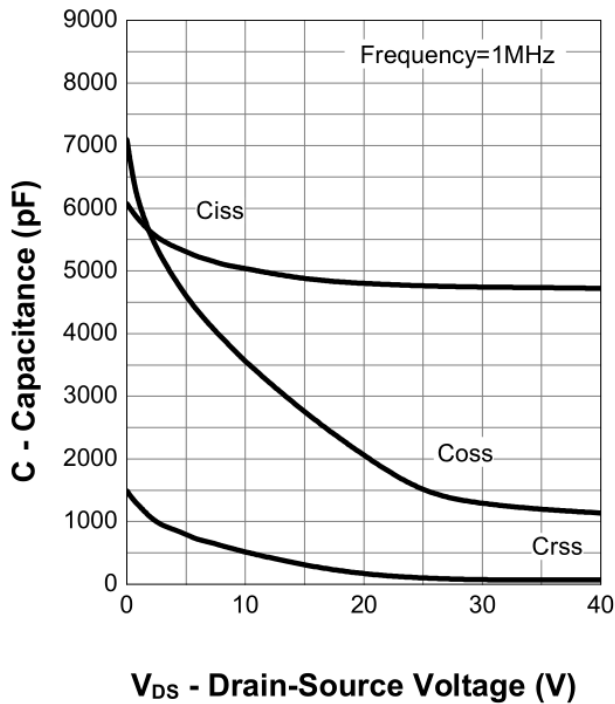
Normalized On Resistance



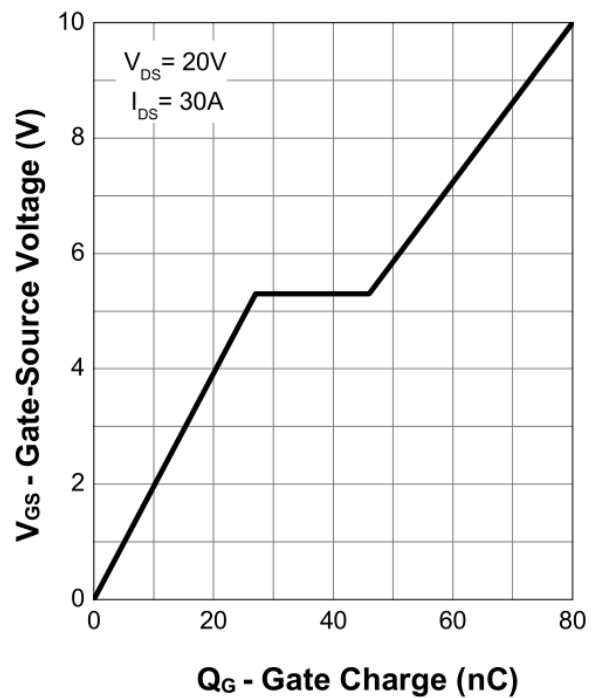
Diode Forward Current



Capacitance

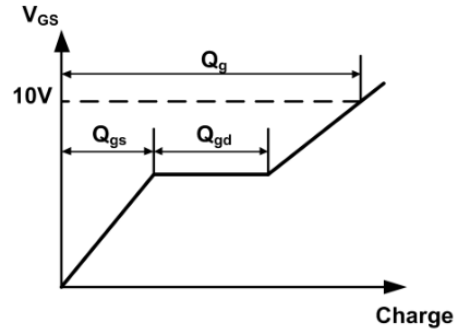
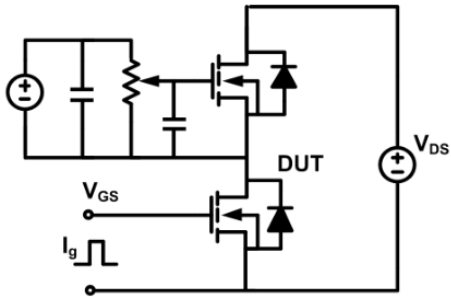


Gate Charge

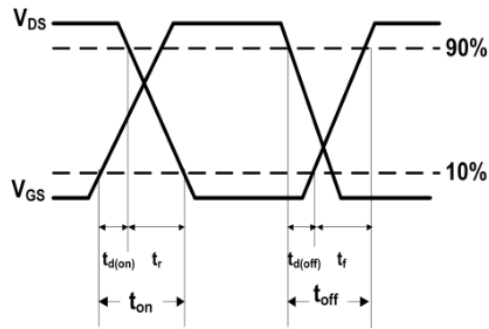
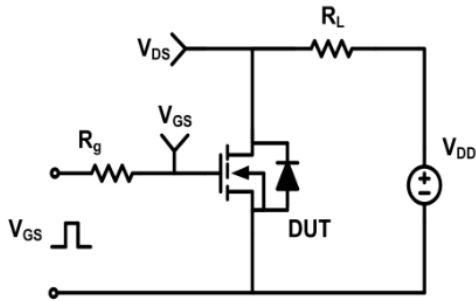




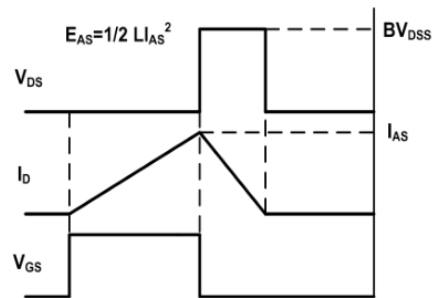
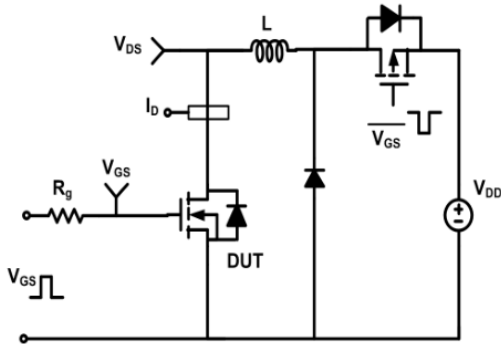
Test Circuit & Waveforms



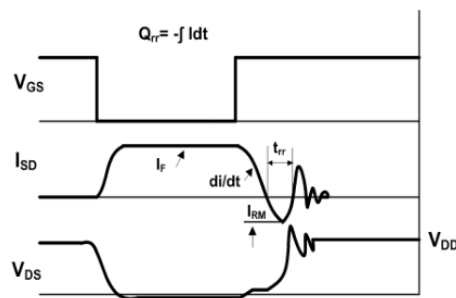
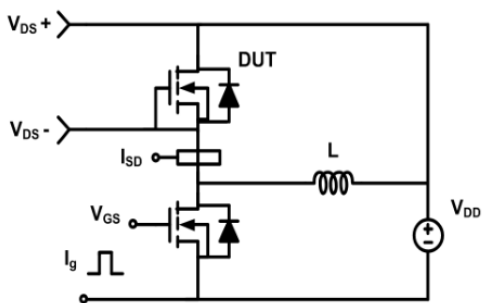
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



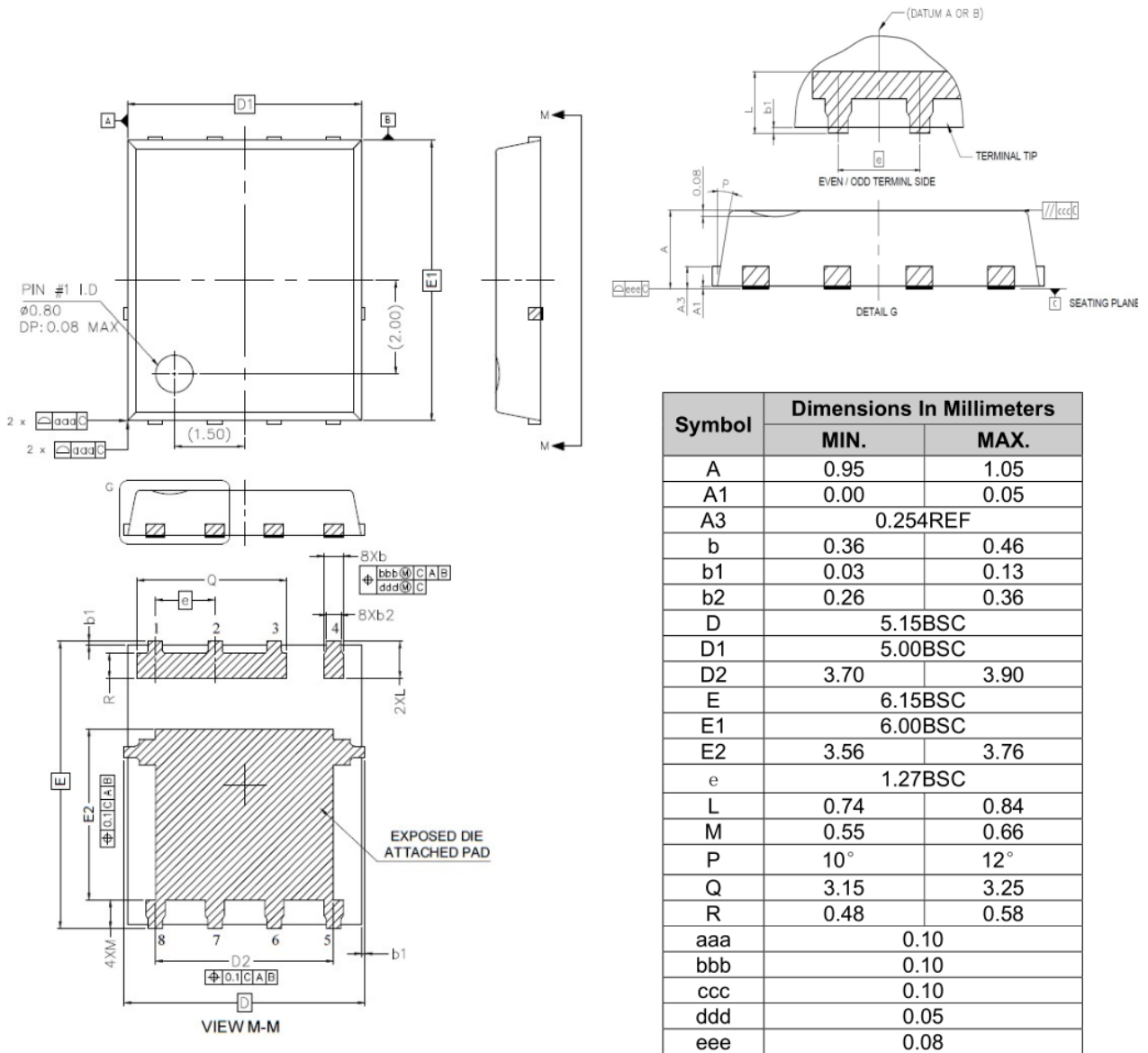
Unclamped Inductive Switching (UIS) Test Circuit & Waveform



Diode Recovery Test Circuit & Waveform



PDFN5*6-8L PACKAGE INFORMATION





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