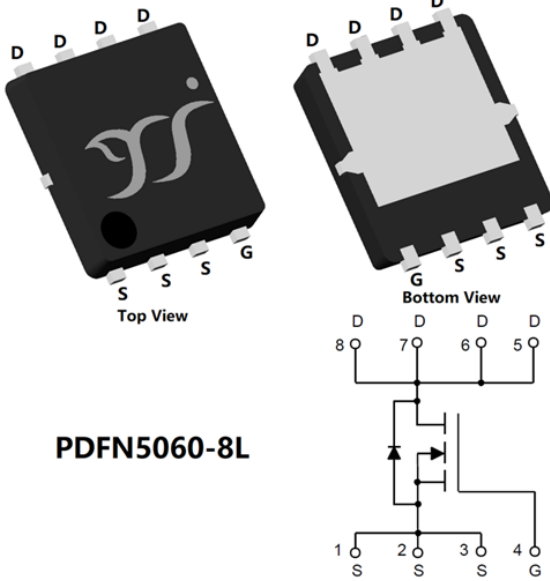


N-Channel Enhancement Mode Field Effect Transistor



PDFN5060-8L

Product Summary

- V_{DS} 40V
- I_D 300A
- $R_{DS(ON)}$ (at $V_{GS}=10V$) $<0.85m\Omega$
- 100% EAS Tested
- 100% ∇V_{DS} Tested

General Description

- Split gate trench MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free
- Moisture Sensitivity Level 1
- Part no. with suffix "Q" means AEC-Q101 qualified

Applications

- Power switching application
- Uninterruptible power supply
- DC-DC convertor
- 12V Automotive systems

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

| Parameter | | Symbol | Limit | Unit |
|--|-------------------|----------------|----------|------------|
| Drain-source Voltage | | V_{DS} | 40 | V |
| Gate-source Voltage | | V_{GS} | ± 20 | V |
| Drain Current | $T_A=25^\circ C$ | I_D | 43 | A |
| | $T_A=100^\circ C$ | | 30 | |
| | $T_C=25^\circ C$ | | 300 | |
| | $T_C=100^\circ C$ | | 212 | |
| Pulsed Drain Current ^A | | I_{DM} | 1200 | A |
| Avalanche energy ^B | | EAS | 1458 | mJ |
| Total Power Dissipation ^C | $T_A=25^\circ C$ | P_D | 3 | W |
| | $T_A=100^\circ C$ | | 1.5 | |
| | $T_C=25^\circ C$ | | 136 | |
| | $T_C=100^\circ C$ | | 68 | |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55~+175 | $^\circ C$ |

■ Thermal resistance

| Parameter | | Symbol | Typ | Max | Units |
|---|--------------|-----------------|-----|-----|--------------|
| Thermal Resistance Junction-to-Ambient ^D | Steady-State | $R_{\theta JA}$ | 40 | 50 | $^\circ C/W$ |
| Thermal Resistance Junction-to-Case | Steady-State | $R_{\theta JC}$ | 0.9 | 1.1 | |

■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-----------|----------------------|-------------------------|----------------------------|---------------|
| YJG300G04HRQ | F1 | G300G04HR | 5000 | 10000 | 100000 | 13" reel |



YJG300G04HRQ

■ Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|---|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D =1mA | 40 | - | - | V |
| | | V _{GS} = 0V, I _D =10mA | 40 | - | - | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =32V, V _{GS} =0V | - | - | 1 | μA |
| | | V _{DS} =32V, V _{GS} =0V, T _J =125°C | - | - | 100 | |
| Gate-Body Leakage Current | I _{GSS} | V _{GS} = ±20V, V _{DS} =0V | - | - | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =250μA | 2.0 | 2.8 | 4.0 | V |
| Static Drain-Source On-Resistance | R _{DS(ON)} | V _{GS} =10V, I _D =50A | - | 0.6 | 0.85 | mΩ |
| | | V _{GS} =10V, I _D =20A | - | 0.6 | 0.85 | |
| Diode Forward Voltage | V _{SD} | I _S =50A, V _{GS} =0V | - | - | 1.2 | V |
| Gate resistance | R _G | f=1MHz | - | 2 | - | Ω |
| Maximum Body-Diode Continuous Current | I _S | | - | - | 300 | A |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =20V, V _{GS} =0V, f=1MHz | - | 5410 | - | pF |
| Output Capacitance | C _{oss} | | - | 3390 | - | |
| Reverse Transfer Capacitance | C _{riss} | | - | 230 | - | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =10V, V _{DS} =20V, I _D =50A | - | 79 | - | nC |
| Gate-Source Charge | Q _{gs} | | - | 24 | - | |
| Gate-Drain Charge | Q _{gd} | | - | 17 | - | |
| Reverse Recovery Charge | Q _{rr} | I _F =50A, di/dt=100A/us | - | 87 | - | nC |
| Reverse Recovery Time | t _{rr} | | - | 78 | - | ns |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DD} =20V, I _D =50A R _{GEN} =6Ω | - | 26 | - | ns |
| Turn-on Rise Time | t _r | | - | 36 | - | |
| Turn-off Delay Time | t _{D(off)} | | - | 60 | - | |
| Turn-off fall Time | t _f | | - | 47 | - | |

A. Repetitive rating; pulse width limited by max. junction temperature.

B. T_J=25°C, V_G=10V, R_G=25Ω, L=4mH, I_{AS}=27A.

C. P_d is based on max. junction temperature, using junction-case thermal resistance.

D. The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in the still air environment with T_A =25°C. The maximum allowed junction temperature of 175°C. The value in any given application depends on the user's specific board design.



YJG300G04HRQ

Typical Electrical and Thermal Characteristics Diagrams

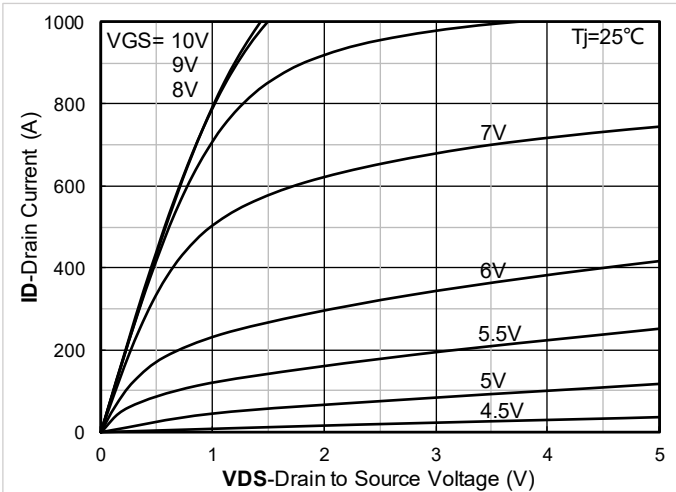


Figure 1. Output Characteristics

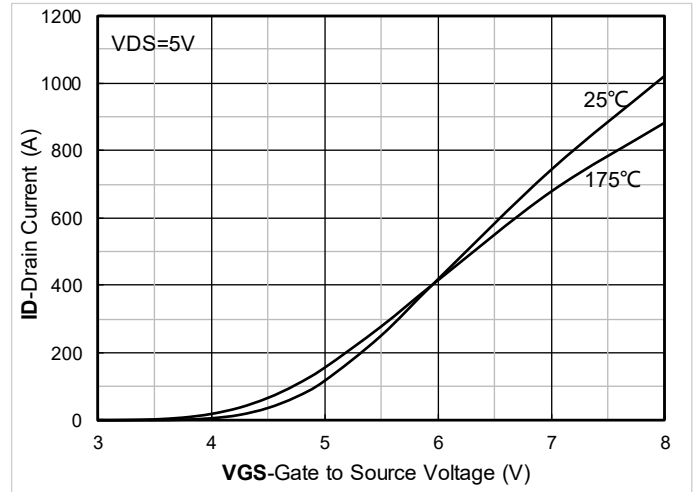


Figure 2. Transfer Characteristics

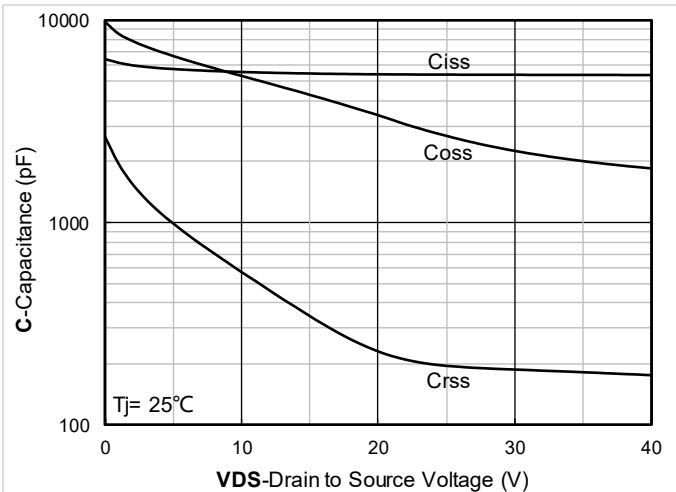


Figure 3. Capacitance Characteristics

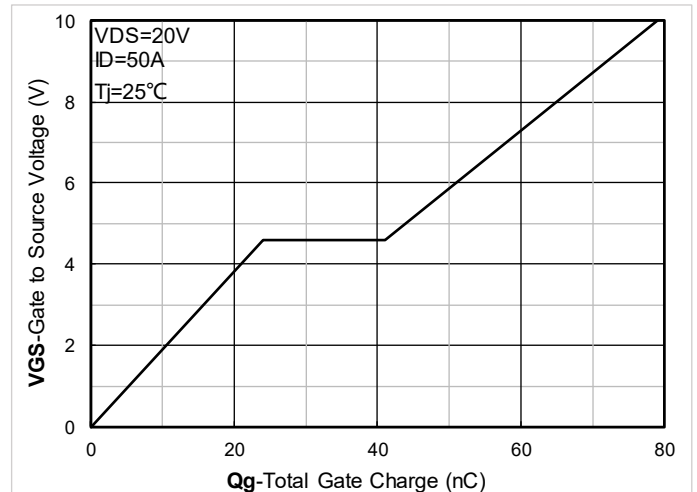


Figure 4. Gate Charge

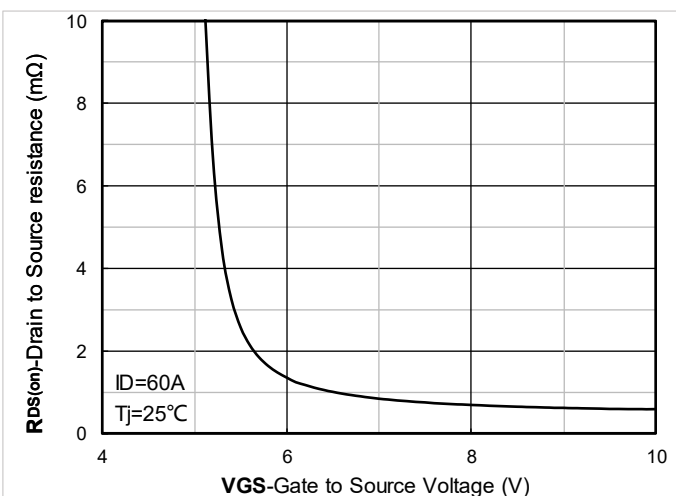


Figure 5. On-Resistance vs Gate to Source Voltage

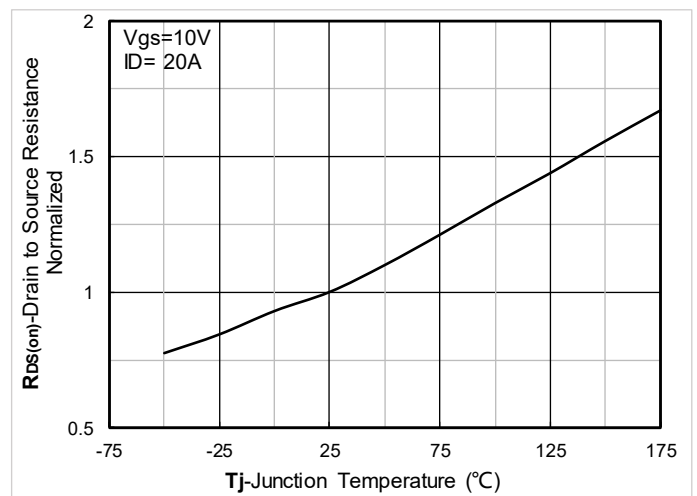


Figure 6. Normalized On-Resistance



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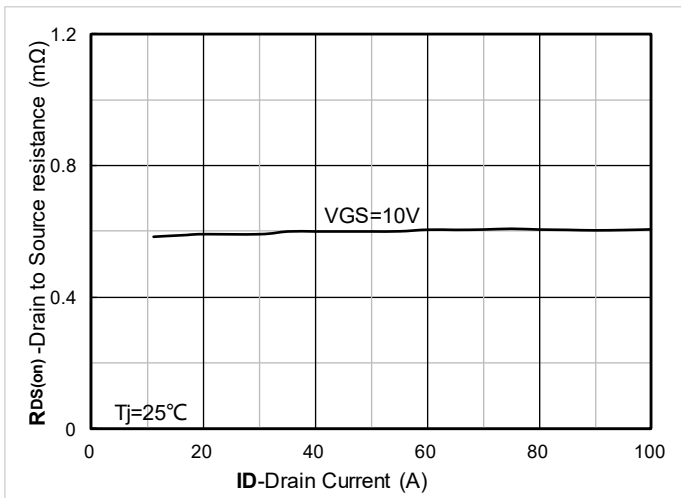


Figure 7. RDS(on) VS Drain Current

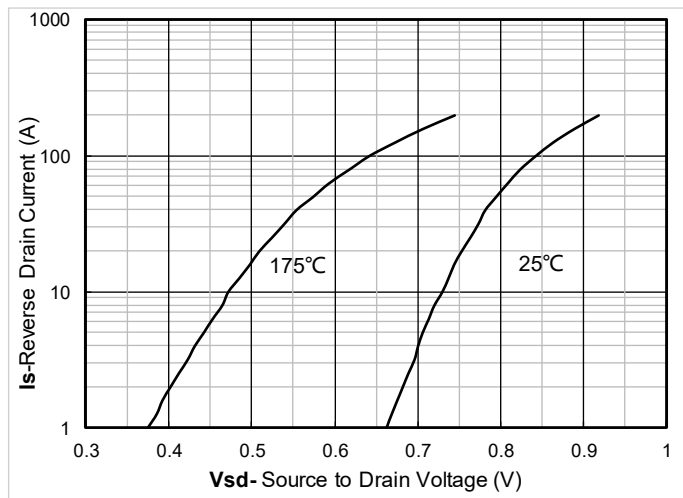


Figure 8. Forward characteristics of reverse diode

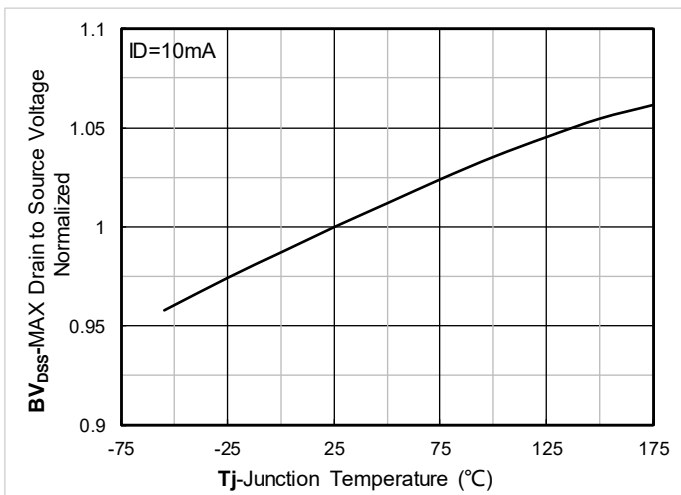


Figure 9. Normalized breakdown voltage

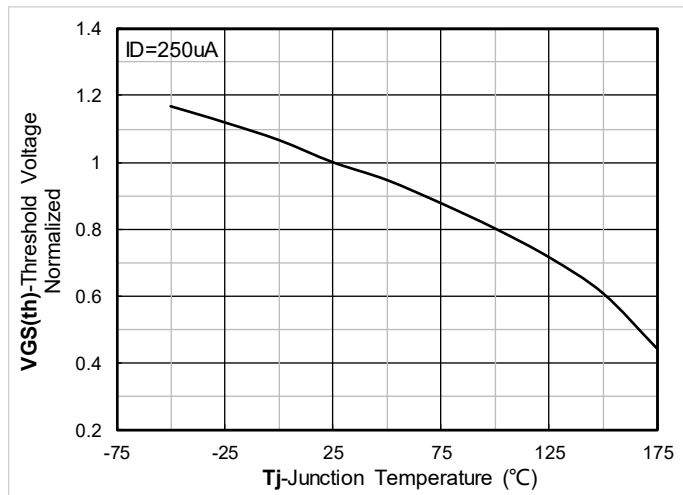


Figure 10. Normalized Threshold voltage

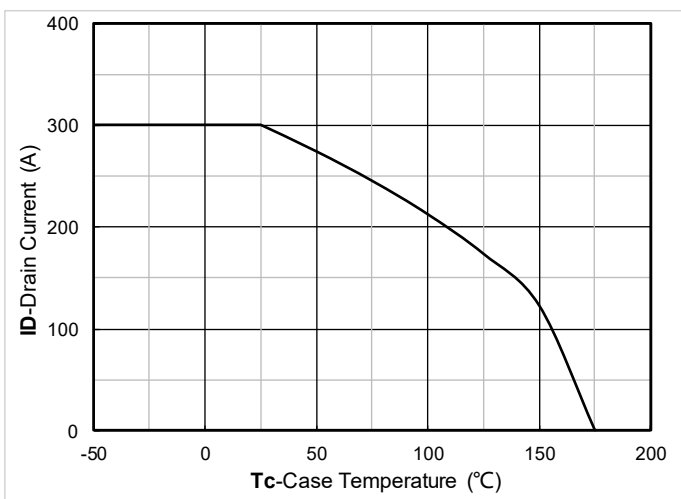


Figure 11. Current dissipation

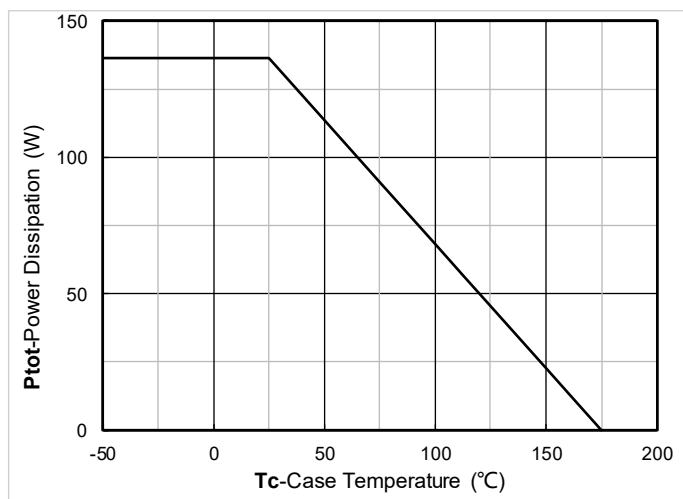


Figure 12. Power dissipation

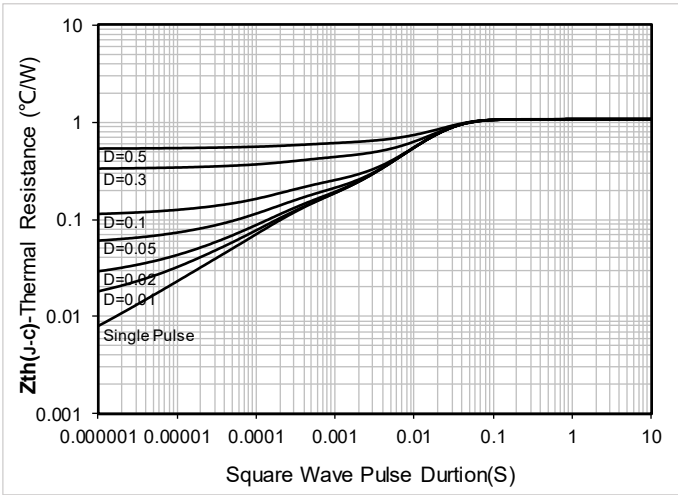


Figure 13. Maximum Transient Thermal Impedance

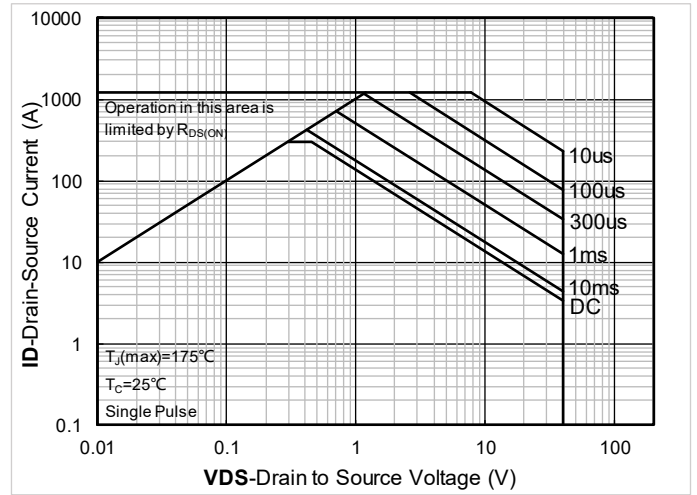


Figure 14. Safe Operation Area

■ Test Circuits & Waveforms

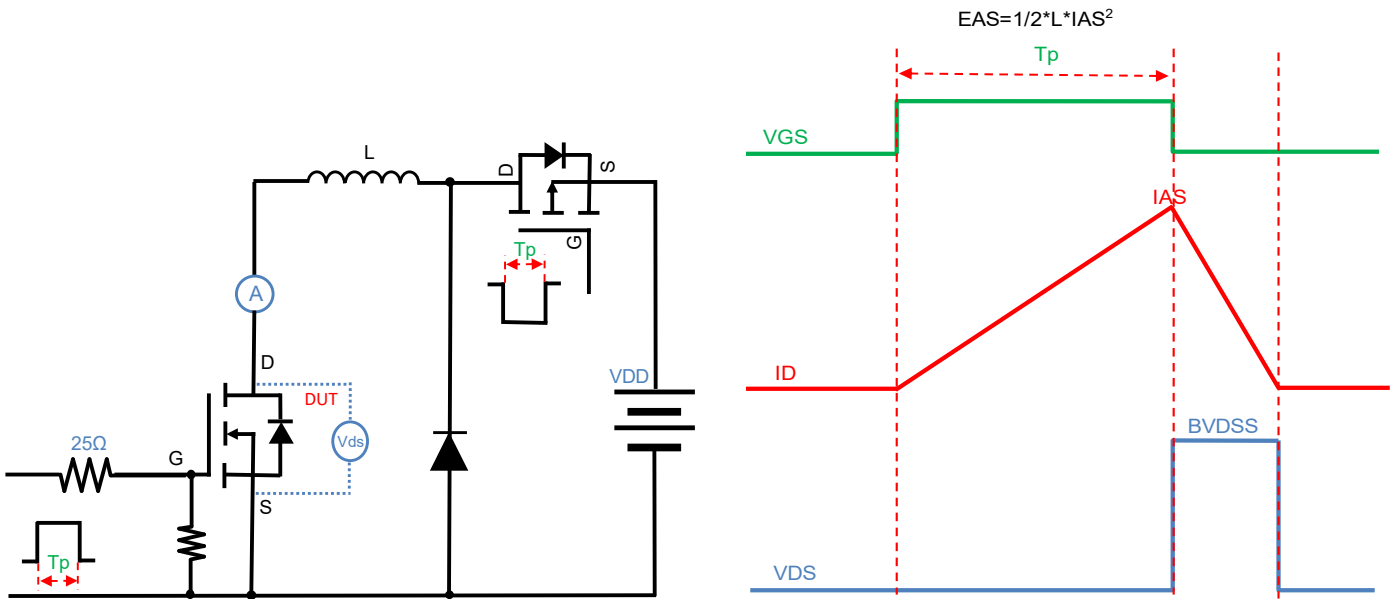


Figure A. Unclamped Inductive Switching (UIS) Test Circuit & Waveform

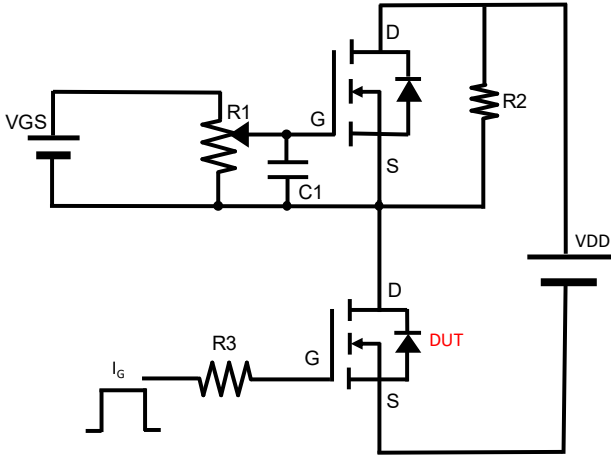


Figure B. Gate Charge Test Circuit & Waveform

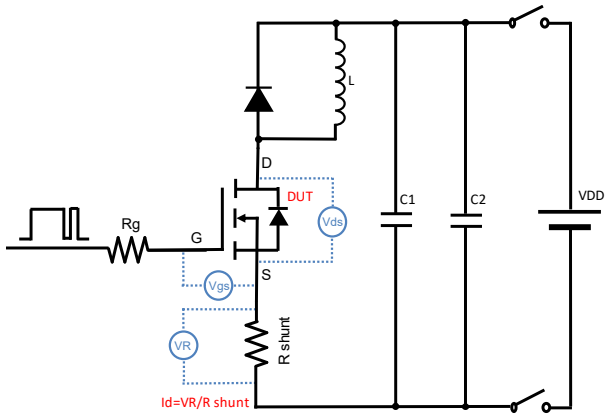


Figure C. Resistive Switching Test Circuit & Waveform

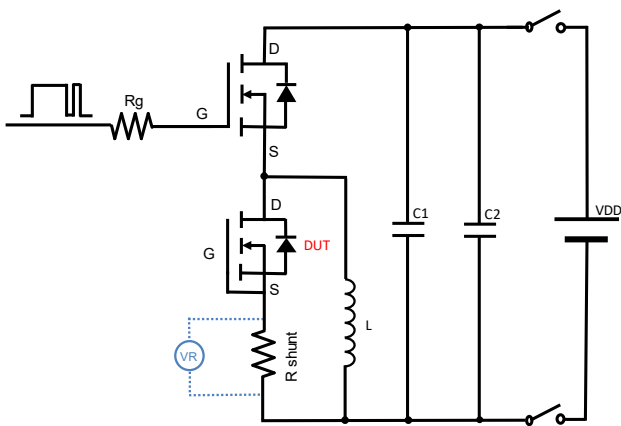
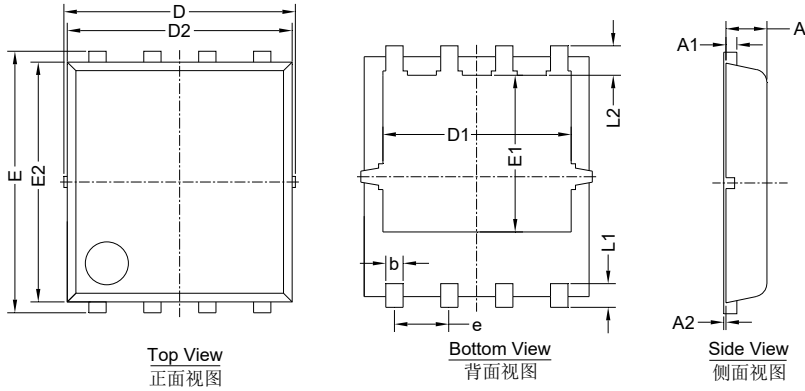


Figure D. Diode Recovery Test Circuit & Waveform

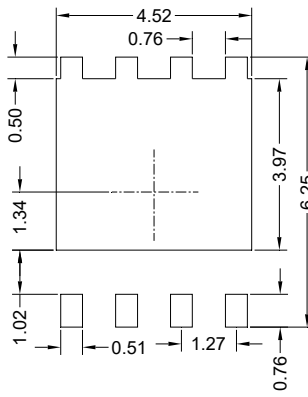


YJG300G04HRQ

■ PDFN5060-8L-D-0.95MM Package information



| SYMBOL | MILLIMETER | | |
|--------|------------|-------|-------|
| | MIN | NOM | MAX |
| D | 5.15 | 5.35 | 5.55 |
| E | 5.95 | 6.05 | 6.15 |
| A | 0.85 | 0.95 | 1.00 |
| A1 | 0.203 BSC | | |
| A2 | | | 0.08 |
| D1 | 4.25 | 4.35 | 4.45 |
| E1 | 3.525 | 3.625 | 3.725 |
| D2 | | 5.20 | |
| E2 | | 5.55 | |
| L1 | 0.45 | 0.55 | 0.65 |
| L2 | 0.68 BSC | | |
| b | 0.3 | 0.4 | 0.5 |
| e | 1.27 BSC | | |



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: ± 0.10 mm.
 3. The pad layout is for reference purposes only.



YJG300G04HRQ

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