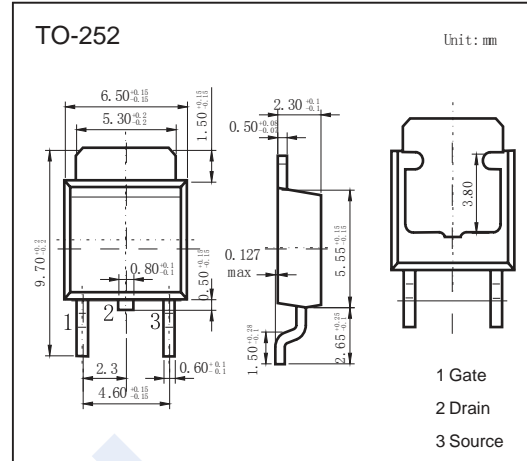
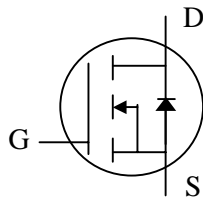


N-Channel MOSFET

AP9974

■ Features

- $V_{DS} = 60V$
- $I_D = 68 A$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 12m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 15m\Omega$ ($V_{GS} = 4.5V$)
- Single Drive Requirement



■ Absolute Maximum Ratings $T_a = 25^\circ C$

| Parameter | Symbol | Rating | Unit |
|---|------------------|-------------------|--------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | |
| Continuous Drain Current | I_D | $T_C=25^\circ C$ | 68 |
| | | $T_C=100^\circ C$ | 43 |
| Pulsed Drain Current | I_{DM} | 272 | A |
| Power Dissipation | $T_C=25^\circ C$ | P_D | 104 |
| Thermal Resistance.Junction- to-Ambient | R_{thJA} | 62.5 | $^\circ C/W$ |
| Thermal Resistance.Junction- to-Case | R_{thJC} | 1.2 | |
| Junction Temperature | T_J | 150 | $^\circ C$ |
| Storage Temperature Range | T_{stg} | -55 to 150 | |

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■ Electrical Characteristics Ta = 25°C

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|------------------------------------|---------------------|--|-----|------|------|------|
| Drain-Source Breakdown Voltage | V _{DSS} | I _D =250 μ A, V _{GS} =0V | 60 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | | | 10 | μA |
| | | V _{DS} =48V, V _{GS} =0V | | | 250 | |
| Gate-Body Leakage Current | I _{GSS} | V _{DS} =0V, V _{GS} =±20V | | | ±100 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} =V _{GS} , I _D =250 μ A | 1 | | 3 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} =10V, I _D =45A | | | 12 | mΩ |
| | | V _{GS} =4.5V, I _D =30A | | | 15 | |
| Forward Transconductance | g _{FS} | V _{DS} =10V, I _D =30A | | 55 | | S |
| Input Capacitance | C _{iss} | V _{GS} =0V, V _{DS} =25V, f=1MHz | | 2055 | 3300 | pF |
| Output Capacitance | C _{oss} | | | 260 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 200 | | |
| Total Gate Charge | Q _g | V _{GS} =4.5V, V _{DS} =48V, I _D =30A | | 28 | 45 | nC |
| Gate Source Charge | Q _{gs} | | | 5 | | |
| Gate Drain Charge | Q _{gd} | | | 19 | | |
| Turn-On DelayTime | t _{d(on)} | V _{GS} =10V, V _{DS} =30V, I _D =30A, R _L =1 Ω, R _G =3.3 Ω | | 9 | | ns |
| Turn-On Rise Time | t _r | | | 8 | | |
| Turn-Off DelayTime | t _{d(off)} | | | 42 | | |
| Turn-Off Fall Time | t _f | | | 20 | | |
| Body Diode Reverse Recovery Time | t _{rr} | | | 35 | | |
| Body Diode Reverse Recovery Charge | Q _{rr} | I _F = 10A, V _{GS} =0, di/dt= 100A/μ s | | 43 | | nC |
| Diode Forward Voltage | V _{SD} | I _S =45A, V _{GS} =0V | | | 1.3 | V |

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■ Typical Characteristics

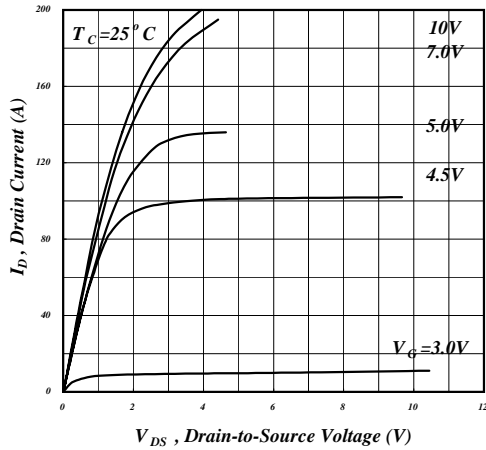


Fig 1. Typical Output Characteristics

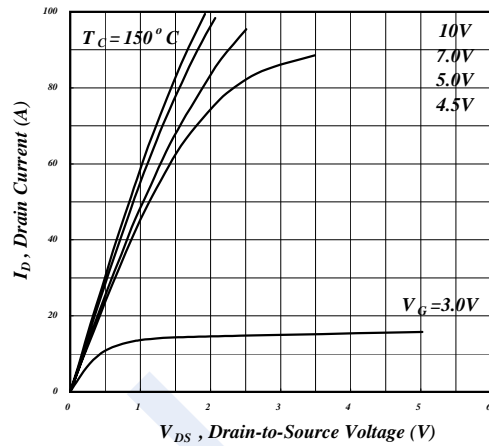


Fig 2. Typical Output Characteristics

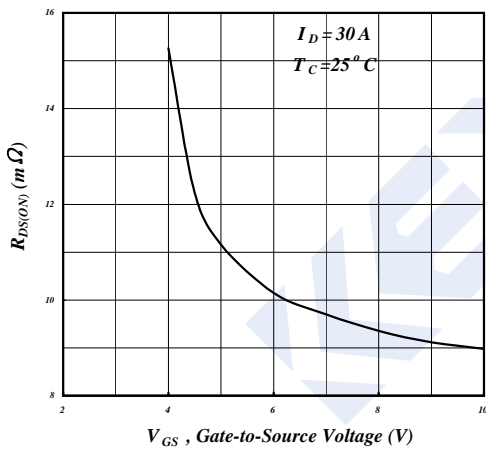


Fig 3. On-Resistance v.s. Gate Voltage

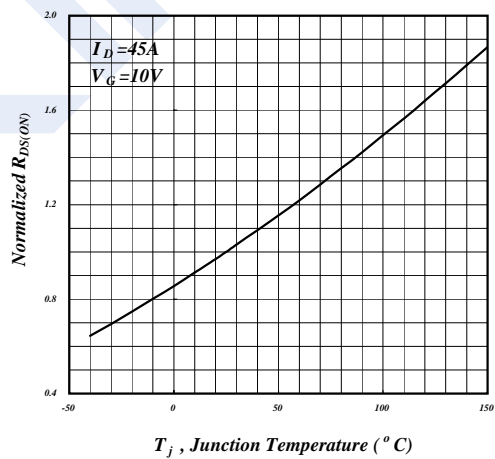


Fig 4. Normalized On-Resistance v.s. Junction Temperature

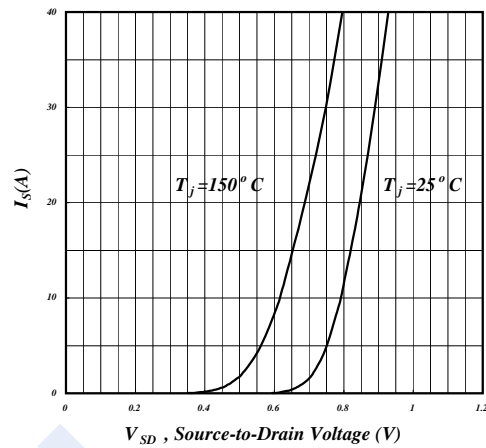


Fig 5. Forward Characteristic of Reverse Diode

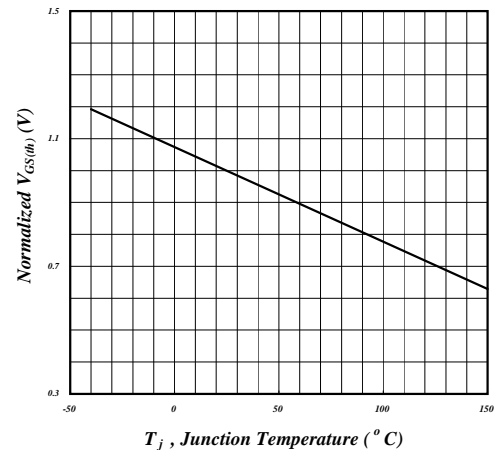


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

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■ Typical Characteristics

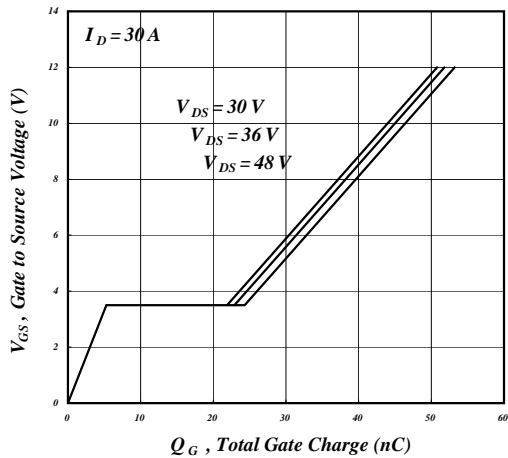


Fig 7. Gate Charge Characteristics

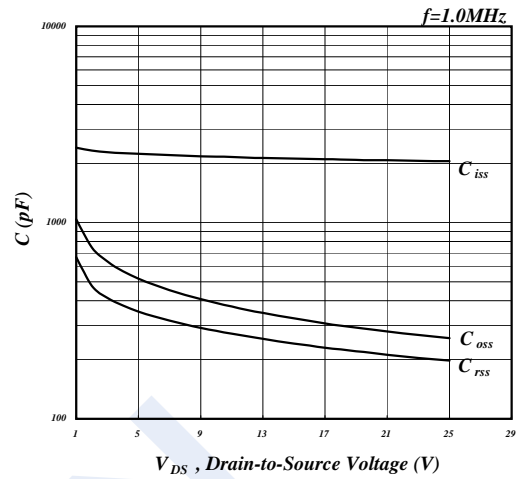


Fig 8. Typical Capacitance Characteristics

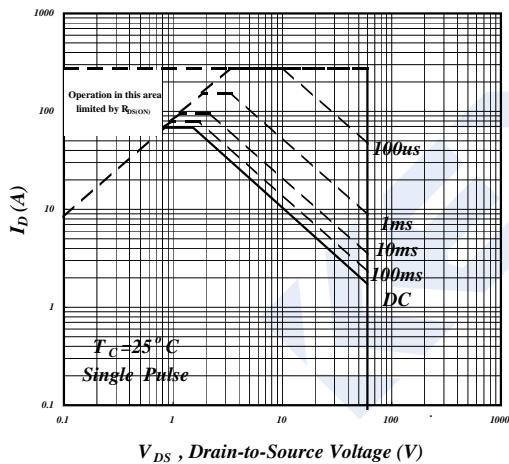


Fig 9. Maximum Safe Operating Area

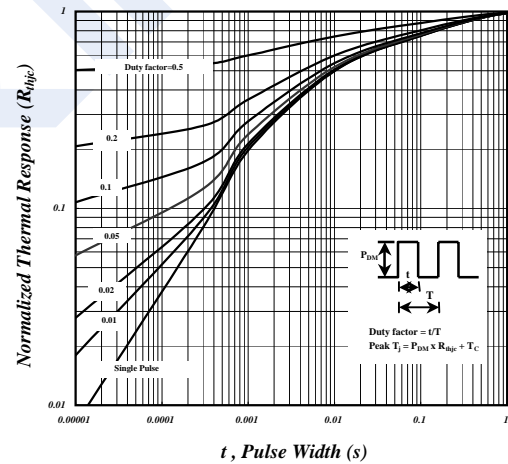


Fig 10. Effective Transient Thermal Impedance

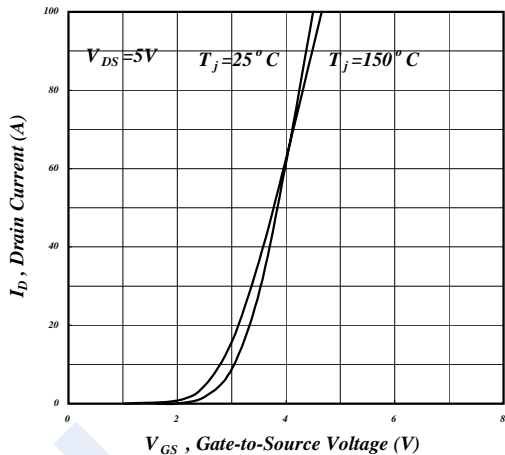


Fig 11. Transfer Characteristics

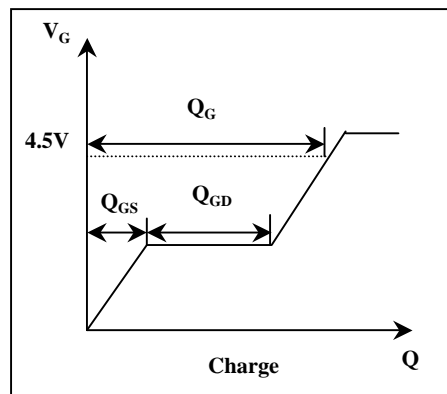


Fig 12. Gate Charge Waveform