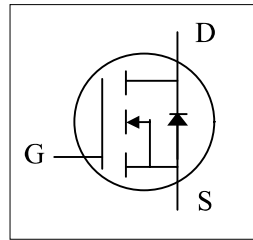


AP2080K

N-Channel Power MOSFET

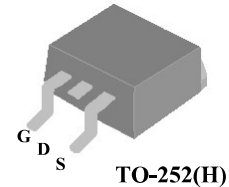
- ▼ Capable of 2.5V Gate Drive
- ▼ Small Size & Ultra_Low $R_{DS(ON)}$
- ▼ RoHS Compliant & Halogen-Free



| | |
|--------------|---------------|
| BV_{DSS} | 20V |
| $R_{DS(ON)}$ | 8.5m Ω |
| I_D^3 | 50A |

Description

AP2080K series are from Advanced Power innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.



Absolute Maximum Ratings@ $T_j=25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | Rating | Units |
|----------------------------|-----------------------------------------|------------|------------------|
| V_{DS} | Drain-Source Voltage | 20 | V |
| V_{GS} | Gate-Source Voltage | ± 12 | V |
| $I_D@T_A=25^\circ\text{C}$ | Drain Current, $V_{GS} @ 4.5\text{V}^3$ | 50 | A |
| $I_D@T_A=70^\circ\text{C}$ | Drain Current, $V_{GS} @ 4.5\text{V}^3$ | 45 | A |
| I_{DM} | Pulsed Drain Current ¹ | 35 | A |
| $P_D@T_A=25^\circ\text{C}$ | Total Power Dissipation | 3.13 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |

Thermal Data

| Symbol | Parameter | Value | Unit |
|--------|-----------------------------------------------------------|-------|---------------------------|
| Rthj-c | Maximum Thermal Resistance, Junction-case | 5 | $^\circ\text{C}/\text{W}$ |
| Rthj-a | Maximum Thermal Resistance, Junction-ambient ³ | 40 | $^\circ\text{C}/\text{W}$ |

N-Channel Power MOSFET

Electrical Characteristics@T_j=25°C(unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|---------------------|------------------------------------------------|--------------------------------------------------------|------|------|------|-------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 20 | - | - | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance ² | V _{GS} =4.5V, I _D =20A | - | 8.5 | 9.8 | mΩ |
| | | V _{GS} =2.5V, I _F =12A | - | - | 14 | mΩ |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =1mA | 0.6 | - | 0.9 | V |
| g _{fs} | Forward Transconductance | V _{DS} =5V, I _D =20A | - | 130 | - | S |
| I _{DSS} | Drain-Source Leakage Current | V _{DS} =16V, V _{GS} =0V | - | - | 10 | uA |
| I _{GSS} | Gate-Source Leakage | V _{GS} =±12V, V _{DS} =0V | - | - | ±100 | nA |
| Q _g | Total Gate Charge | I _D =20A | - | 62 | 99.2 | nC |
| Q _{gs} | Gate-Source Charge | V _{DS} =10V | - | 4 | - | nC |
| Q _{gd} | Gate-Drain ("Miller") Charge | V _{GS} =4.5V | - | 21 | - | nC |
| t _{d(on)} | Turn-on Delay Time | V _{DS} =10V | - | 12 | - | ns |
| t _r | Rise Time | I _D =1A | - | 20 | - | ns |
| t _{d(off)} | Turn-off Delay Time | R _G =3.3Ω | - | 100 | - | ns |
| t _f | Fall Time | V _{GS} =5V | - | 80 | - | ns |
| C _{iss} | Input Capacitance | V _{GS} =0V | - | 4000 | 6400 | pF |
| C _{oss} | Output Capacitance | V _{DS} =10V | - | 780 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | f=1.0MHz | - | 625 | - | pF |
| R _g | Gate Resistance | f=1.0MHz | - | 1.4 | 2.8 | Ω |

Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|-----------------|---------------------------------|-------------------------------------------|------|------|------|-------|
| V _{SD} | Forward On Voltage ² | I _S =2.5A, V _{GS} =0V | - | - | 1.2 | V |
| t _{rr} | Reverse Recovery Time | I _S =20A, V _{GS} =0V, | - | 43 | - | ns |
| Q _{rr} | Reverse Recovery Charge | di/dt=100A/μs | - | 26 | - | nC |

Notes:

- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Surface mounted on 1 in² 2oz copper pad of FR4 board, t_{sec} ≤10sec; 135°C/W when mounted on min. copper pad.
- 4.Maximum current limited by package.

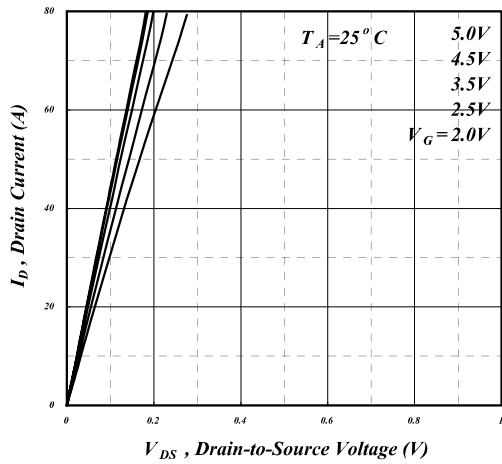


Fig 1. Typical Output Characteristics

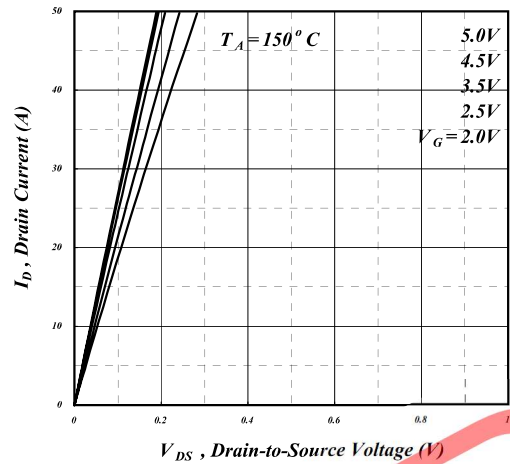


Fig 2. Typical Output Characteristics

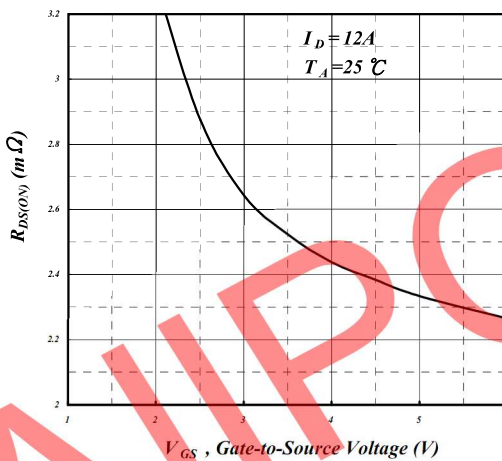


Fig 3. On-Resistance v.s. Gate Voltage

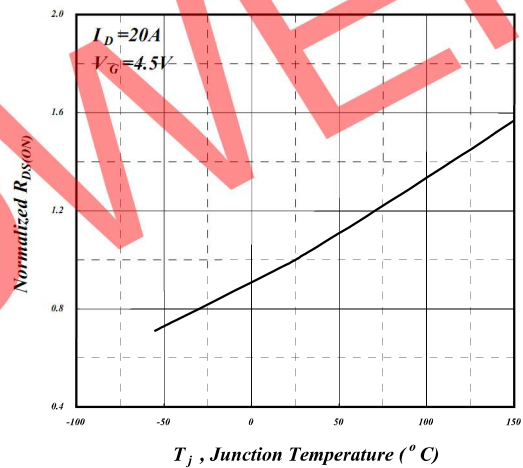


Fig 4. Normalized On-Resistance v.s. Junction Temperature

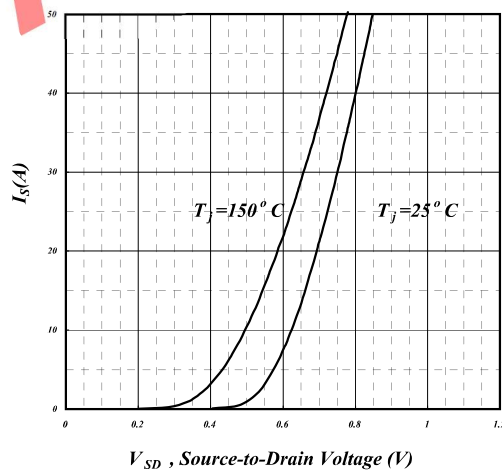


Fig 5. Forward Characteristic of Reverse Diode

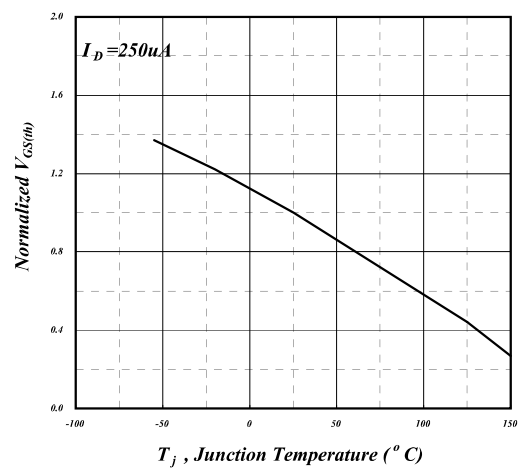


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

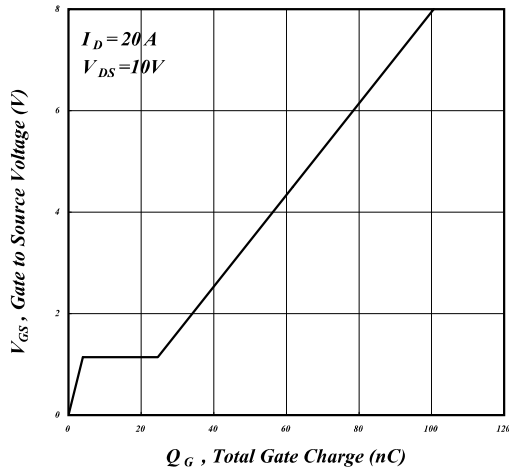


Fig 7. Gate Charge Characteristics

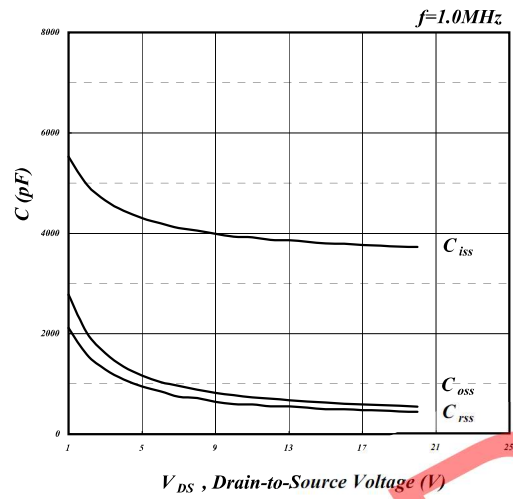


Fig 8. Typical Capacitance Characteristics

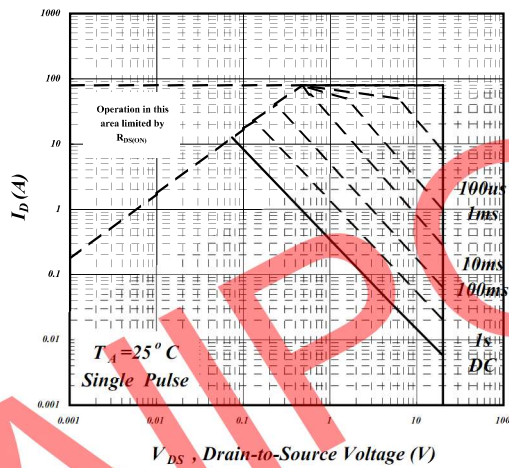


Fig 9. Maximum Safe Operating Area

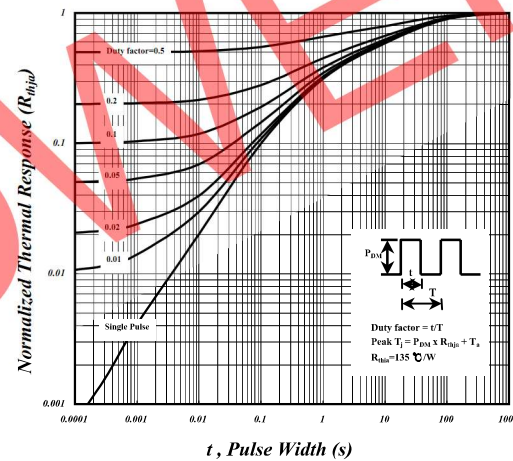


Fig 10. Effective Transient Thermal Impedance

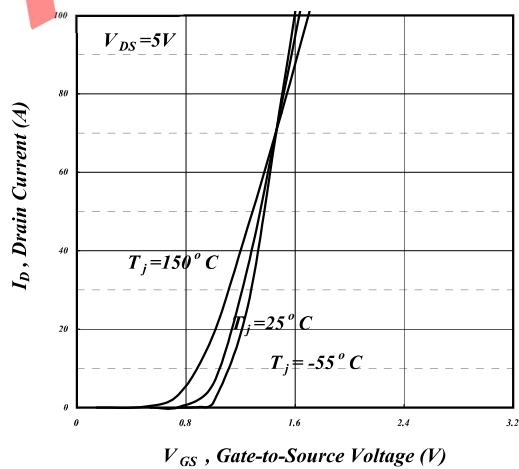


Fig 11. Transfer Characteristics

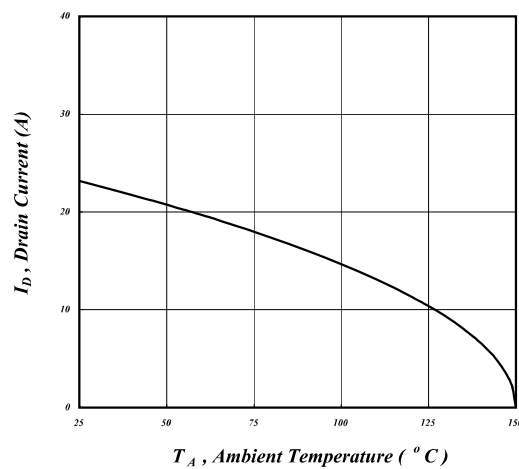


Fig 12. Drain Current v.s. Ambient Temperature

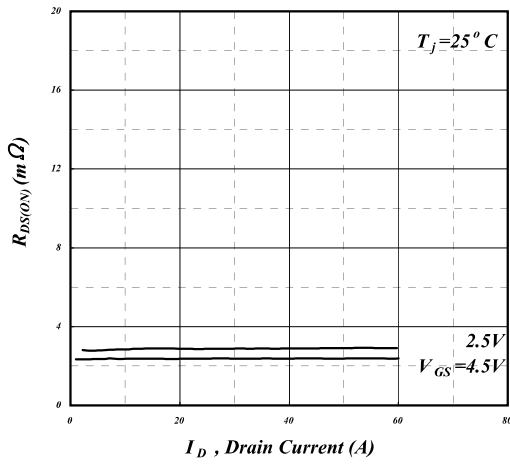


Fig 13. Typ. Drain-Source on State Resistance

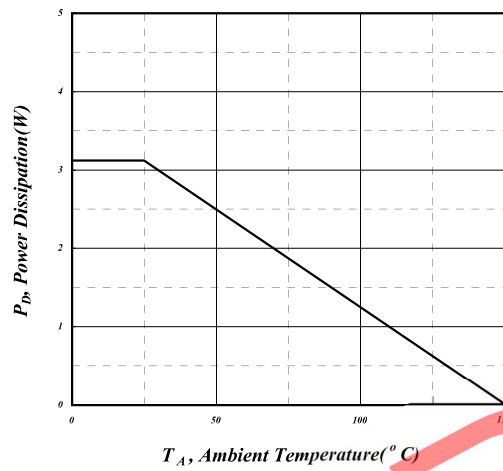
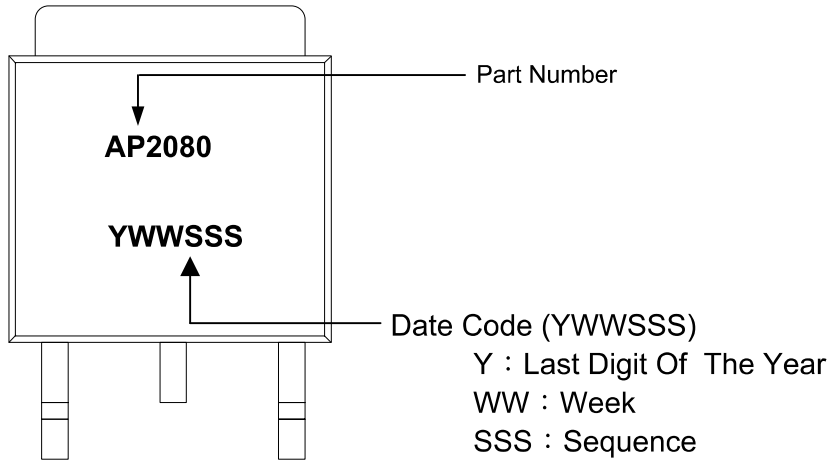


Fig 14. Total Power Dissipation

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AP2080**N-Channel Power MOSFET****MARKING INFORMATION**

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