



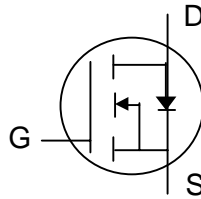
P-channel Enhancement-mode Power MOSFET

Simple Drive Requirement

Low Gate Charge

Fast Switching Characteristics

RoHS-compliant, Halogen-free



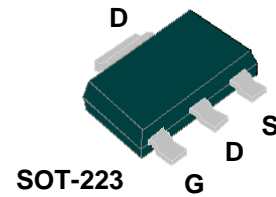
| | |
|--------------|------|
| BV_{DSS} | -30V |
| $R_{DS(ON)}$ | 50mΩ |
| I_D | -6A |

Description

Advanced Power MOSFETs from APEC provide the designer with the best combination of fast switching, low on-resistance and cost-effectiveness.

The AP9435GK-HF-3 is in the popular SOT-223 small surface-mount package which is widely used in commercial and industrial applications where a small board footprint is required.

This device is well suited for use in medium current applications such as load switches.



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|----------------------------|---------------------------------------|------------|-------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ±20 | V |
| I_D at $T_A=25^{\circ}C$ | Continuous Drain Current ³ | -6 | A |
| I_D at $T_A=70^{\circ}C$ | Continuous Drain Current ³ | -4.8 | A |
| I_{DM} | Pulsed Drain Current ¹ | -20 | A |
| P_D at $T_A=25^{\circ}C$ | Total Power Dissipation | 2.7 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | °C |
| T_J | Operating Junction Temperature Range | -55 to 150 | °C |

Thermal Data

| Symbol | Parameter | Value | Unit |
|--------|--|-------|------|
| Rthj-a | Maximum Thermal Resistance, Junction-ambient | 45 | °C/W |

Ordering Information

AP9435GK-HF-3TR RoHS-compliant halogen-free SOT-223, shipped on tape and reel, 3000pcs/reel



Electrical Specifications at $T_j=25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|--------------|---|--------------------------------|------|------|-----------|------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -30 | - | - | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=-10V, I_D=-5.3A$ | - | - | 50 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-4.2A$ | - | - | 100 | m Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=-250\mu A$ | -1 | - | -3 | V |
| g_{fs} | Forward Transconductance | $V_{DS}=-10V, I_D=-4A$ | - | 4 | - | S |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=-30V, V_{GS}=0V$ | - | - | -1 | μA |
| | Drain-Source Leakage Current ($T_j=70^\circ\text{C}$) | $V_{DS}=-24V, V_{GS}=0V$ | - | - | -25 | μA |
| I_{GSS} | Gate-Source Leakage | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Q_g | Total Gate Charge ² | $I_D=-4A$ | - | 8 | 16 | nC |
| Q_{gs} | Gate-Source Charge | $V_{DS}=-24V$ | - | 1.5 | - | nC |
| Q_{gd} | Gate-Drain ("Miller") Charge | $V_{GS}=-4.5V$ | - | 4 | - | nC |
| $t_{d(on)}$ | Turn-on Delay Time ² | $V_{DS}=-15V$ | - | 6.6 | - | ns |
| t_r | Rise Time | $I_D=-1A$ | - | 7.7 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | $R_G=6\Omega, V_{GS}=-10V$ | - | 22 | - | ns |
| t_f | Fall Time | $R_D=15\Omega$ | - | 9.3 | - | ns |
| C_{iss} | Input Capacitance | $V_{GS}=0V$ | - | 570 | 912 | pF |
| C_{oss} | Output Capacitance | $V_{DS}=-25V$ | - | 80 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | $f=1.0\text{MHz}$ | - | 75 | - | pF |

Source-Drain Diode

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Units |
|----------|---------------------------------|------------------------|------|------|------|-------|
| V_{SD} | Forward On Voltage ² | $I_S=-2.3A, V_{GS}=0V$ | - | - | -1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_S=-4A, V_{GS}=0V,$ | - | 18 | - | ns |
| Q_{rr} | Reverse Recovery Charge | $di/dt=100A/\mu s$ | - | 10 | - | nC |

Notes:

1. Pulse width limited by maximum junction temperature.
2. Pulse test - pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
3. Surface mounted on 1in^2 copper pad of FR4 board, $t \leq 10\text{sec}$; 120°C/W when mounted on minimum copper pad.

THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

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Typical Electrical Characteristics

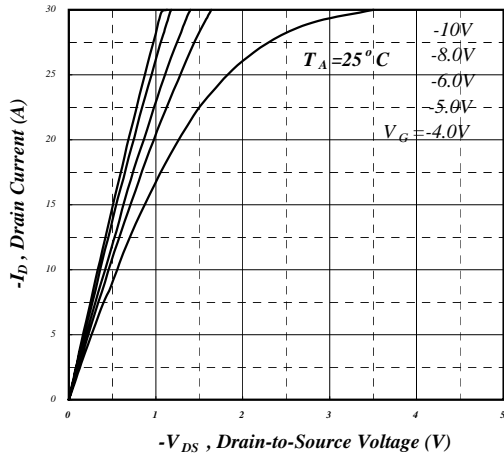


Fig 1. Typical Output Characteristics

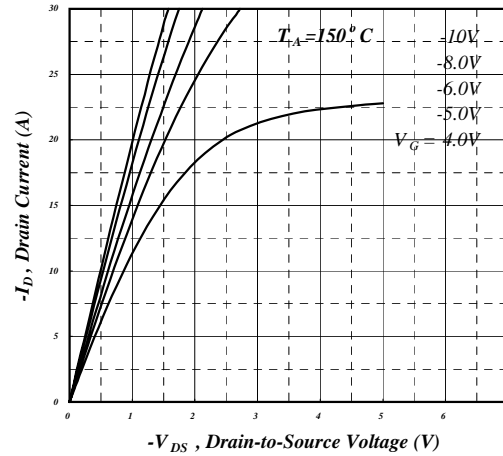


Fig 2. Typical Output Characteristics

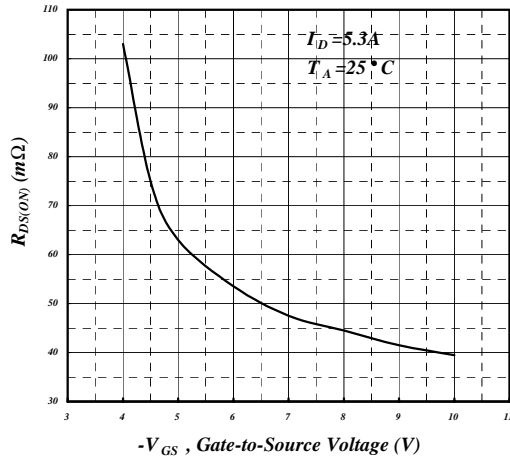


Fig 3. On-Resistance vs. Gate Voltage

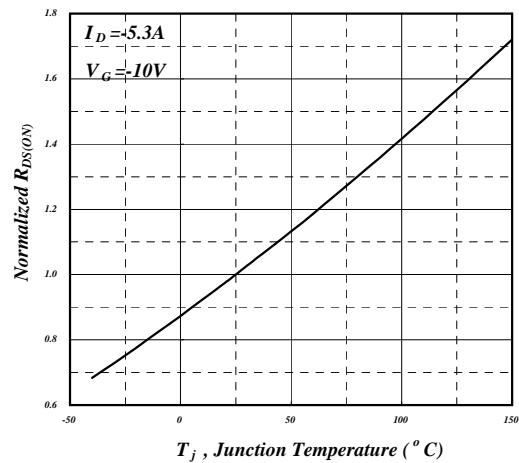


Fig 4. Normalized On-Resistance vs. Junction Temperature

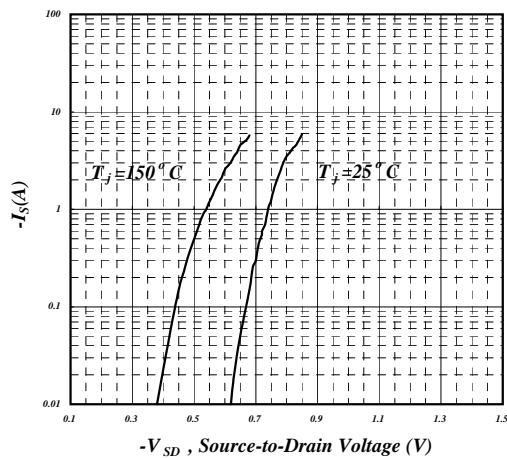


Fig 5. Forward Characteristic of Reverse Diode

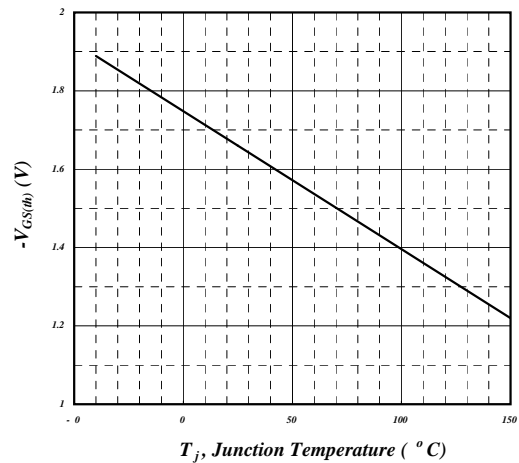


Fig 6. Gate Threshold Voltage vs. Junction Temperature



Typical Electrical Characteristics (cont.)

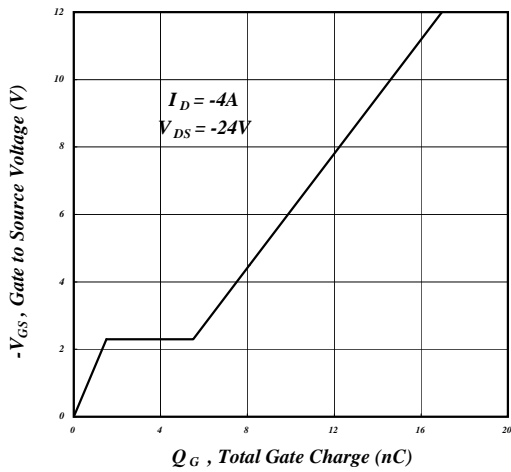


Fig 7. Gate Charge Characteristics

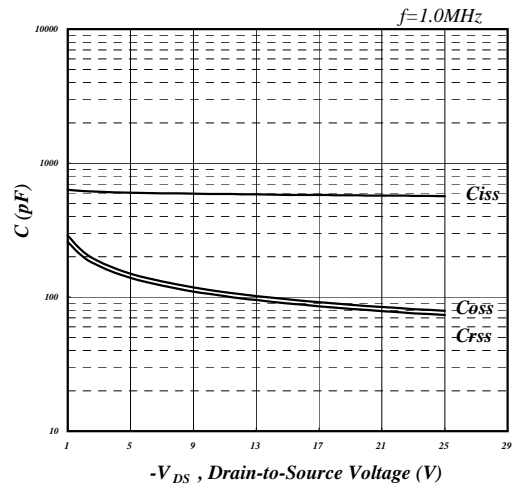


Fig 8. Typical Capacitance Characteristics

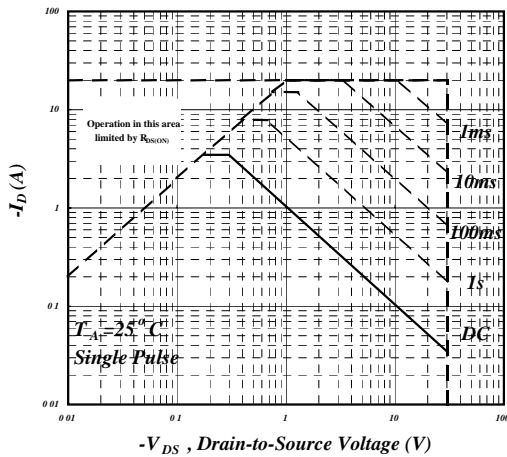


Fig 9. Maximum Safe Operating Area

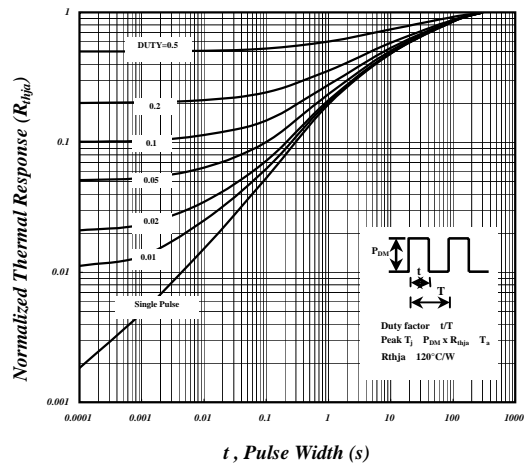


Fig 10. Effective Transient Thermal Impedance

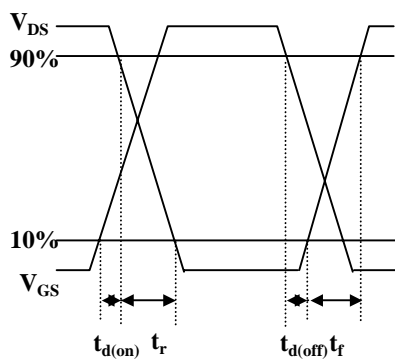


Fig 11. Switching Time Waveform

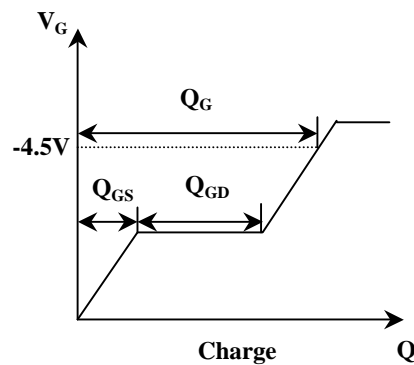
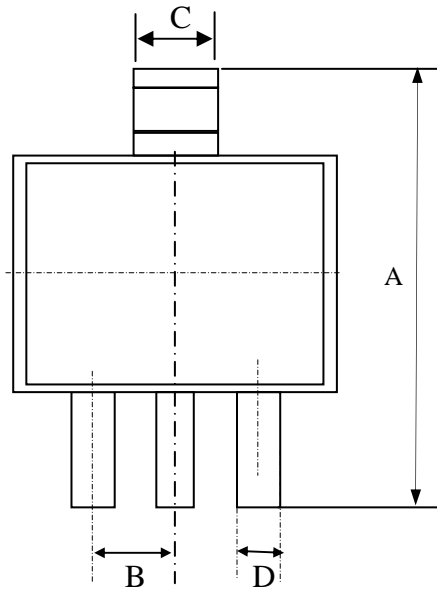


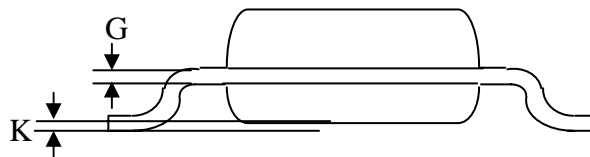
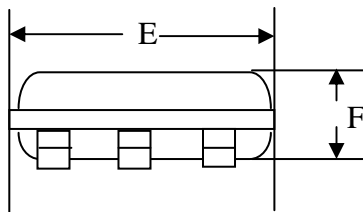
Fig 12. Gate Charge Waveform



Package Dimensions: SOT-223



| SYMBOLS | Millimeters | | |
|---------|-------------|------|------|
| | MIN | NOM | MAX |
| A | 6.70 | 7.00 | 7.30 |
| B | --- | 2.3 | --- |
| C | 2.90 | 3.00 | 3.10 |
| D | 0.60 | 0.70 | 0.80 |
| G | 0.25 | 0.30 | 0.35 |
| E | 6.30 | 6.50 | 6.70 |
| F | 1.40 | 1.60 | 1.80 |
| K | 0.02 | 0.06 | 0.10 |



1. All dimensions are in millimeters.
2. Dimensions do not include mold protrusions.

Marking Information:

