



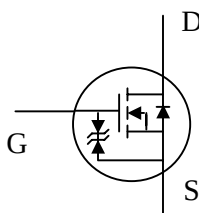
## N-channel Enhancement-mode Power MOSFET

Capable of 2.5V Gate Drive

Small Package Outline

Surface Mount Device

RoHS-compliant, halogen-free



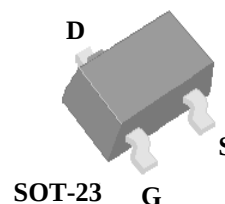
|              |              |
|--------------|--------------|
| $BV_{DSS}$   | 30V          |
| $R_{DS(ON)}$ | 1.5 $\Omega$ |
| $I_D$        | 500mA        |

### Description

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

The AP2318GEN-HF-3 is in the popular SOT-23 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 applications such as load switches.



### Absolute Maximum Ratings

| Symbol                            | Parameter                             | Rating     | Units            |
|-----------------------------------|---------------------------------------|------------|------------------|
| $V_{DS}$                          | Drain-Source Voltage                  | 30         | V                |
| $V_{GS}$                          | Gate-Source Voltage                   | $\pm 16$   | V                |
| $I_D$ at $T_A = 25^\circ\text{C}$ | Continuous Drain Current <sup>3</sup> | 0.5        | A                |
| $I_D$ at $T_A = 70^\circ\text{C}$ | Continuous Drain Current <sup>3</sup> | 0.4        | A                |
| $I_{DM}$                          | Pulsed Drain Current <sup>1</sup>     | 2          | A                |
| $P_D$ at $T_A = 25^\circ\text{C}$ | Total Power Dissipation               | 0.7        | 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-a | Maximum Thermal Resistance, Junction-ambient <sup>3</sup> | 180   | $^\circ\text{C/W}$ |

### Ordering Information

AP2318GEN-HF-3TR    RoHS-compliant halogen-free SOT-23, 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                     |
| $\Delta BV_{DSS}/\Delta T_j$ | Breakdown Voltage Temperature Coefficient                 | Reference to $25^{\circ}\text{C}$ , $I_D=1mA$ | -    | 0.04 | -        | V/ $^{\circ}\text{C}$ |
| $R_{DS(ON)}$                 | Static Drain-Source On-Resistance <sup>2</sup>            | $V_{GS}=4V, I_D=500mA$                        | -    | -    | 1.5      | $\Omega$              |
|                              |                                                           | $V_{GS}=2.5V, I_D=200mA$                      | -    | -    | 2.5      | $\Omega$              |
| $V_{GS(th)}$                 | Gate Threshold Voltage                                    | $V_{DS}=V_{GS}, I_D=250\mu A$                 | 0.4  | -    | 1.3      | V                     |
| $g_{fs}$                     | Forward Transconductance                                  | $V_{DS}=4V, I_D=500mA$                        | -    | 725  | -        | mS                    |
| $I_{DSS}$                    | Drain-Source Leakage Current                              | $V_{DS}=30V, V_{GS}=0V$                       | -    | -    | 1        | $\mu A$               |
|                              | Drain-Source Leakage Current ( $T_j=70^{\circ}\text{C}$ ) | $V_{DS}=24V, V_{GS}=0V$                       | -    | -    | 25       | $\mu A$               |
| $I_{GSS}$                    | Gate-Source Leakage                                       | $V_{GS}=\pm 16V, V_{DS}=0V$                   | -    | -    | $\pm 60$ | $\mu A$               |
| $Q_g$                        | Total Gate Charge <sup>2</sup>                            | $I_D=1A$                                      | -    | 1.1  | 1.8      | nC                    |
| $Q_{gs}$                     | Gate-Source Charge                                        | $V_{DS}=25V$                                  | -    | 0.4  | -        | nC                    |
| $Q_{gd}$                     | Gate-Drain ("Miller") Charge                              | $V_{GS}=4.5V$                                 | -    | 0.4  | -        | nC                    |
| $t_{d(on)}$                  | Turn-on Delay Time <sup>2</sup>                           | $V_{DS}=15V$                                  | -    | 17   | -        | ns                    |
| $t_r$                        | Rise Time                                                 | $I_D=1A$                                      | -    | 44   | -        | ns                    |
| $t_{d(off)}$                 | Turn-off Delay Time                                       | $R_G=3.3\Omega, V_{GS}=5V$                    | -    | 45   | -        | ns                    |
| $t_f$                        | Fall Time                                                 | $R_D=15\Omega$                                | -    | 55   | -        | ns                    |
| $C_{iss}$                    | Input Capacitance                                         | $V_{GS}=0V$                                   | -    | 30   | 48       | pF                    |
| $C_{oss}$                    | Output Capacitance                                        | $V_{DS}=25V$                                  | -    | 12   | -        | pF                    |
| $C_{rss}$                    | Reverse Transfer Capacitance                              | $f=1.0MHz$                                    | -    | 11   | -        | pF                    |

**Source-Drain Diode**

| Symbol   | Parameter                       | Test Conditions       | Min. | Typ. | Max. | Units |
|----------|---------------------------------|-----------------------|------|------|------|-------|
| $V_{SD}$ | Forward On Voltage <sup>2</sup> | $I_S=0.5A, V_{GS}=0V$ | -    | -    | 1.3  | V     |

**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,  $t \leq 10sec$ ;  $400^{\circ}\text{C/W}$  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.

APEC DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

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## Typical Electrical Characteristics

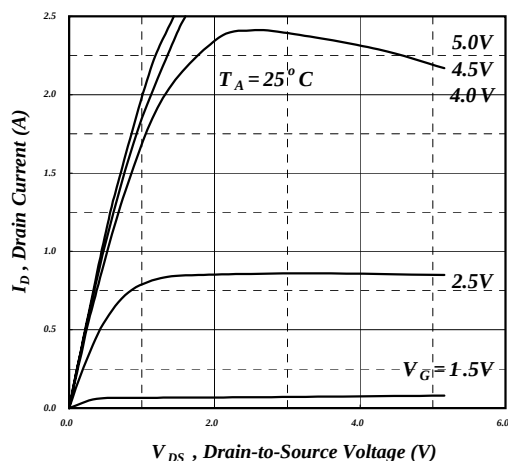


Fig 1. Typical Output Characteristics

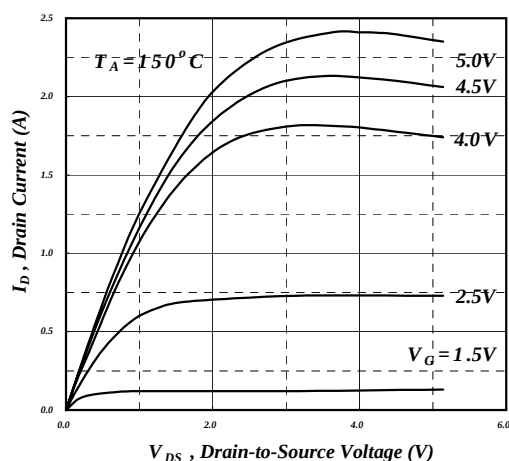


Fig 2. Typical Output Characteristics

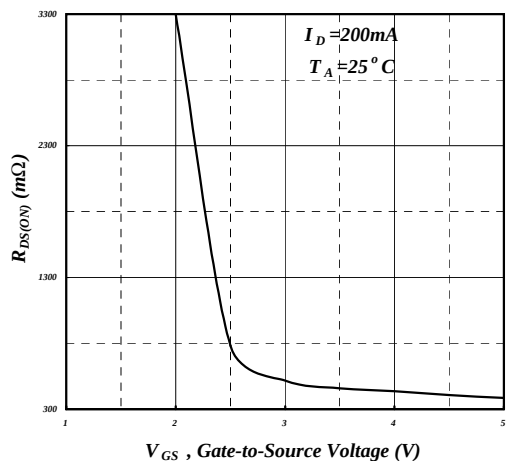


Fig 3. On-Resistance vs.  
Gate Voltage

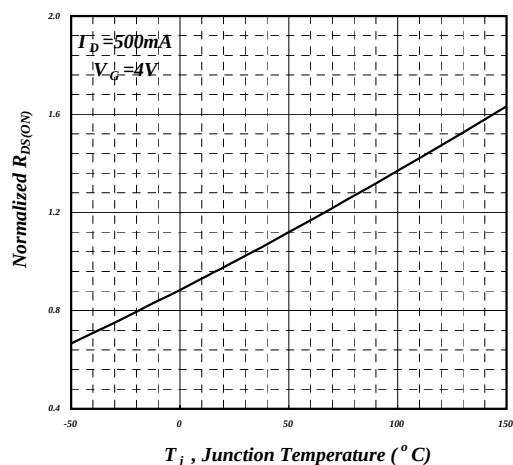


Fig 4. Normalized On-Resistance  
vs. Junction Temperature

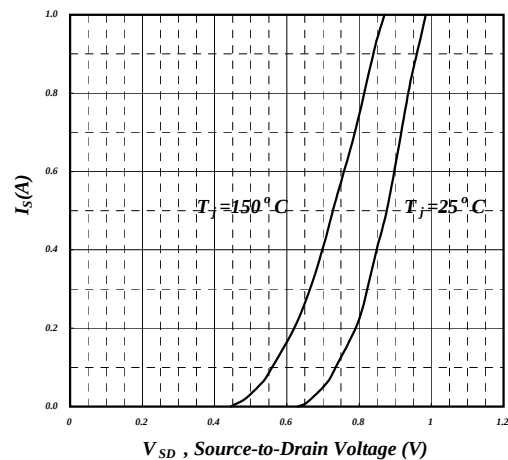


Fig 5. Forward Characteristic of  
Reverse Diode

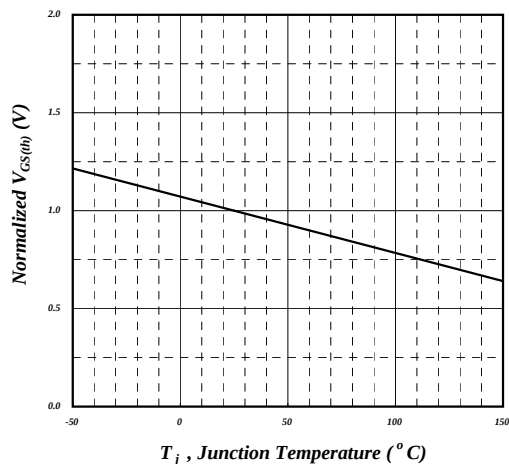


Fig 6. Gate Threshold Voltage vs.  
Junction Temperature



Typical Electrical Characteristics (cont.)

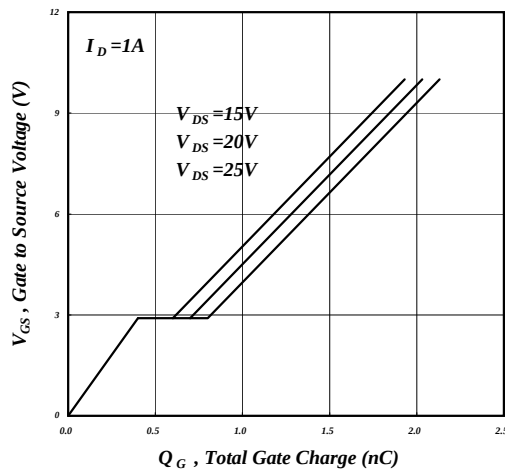


Fig 7. Gate Charge Characteristics

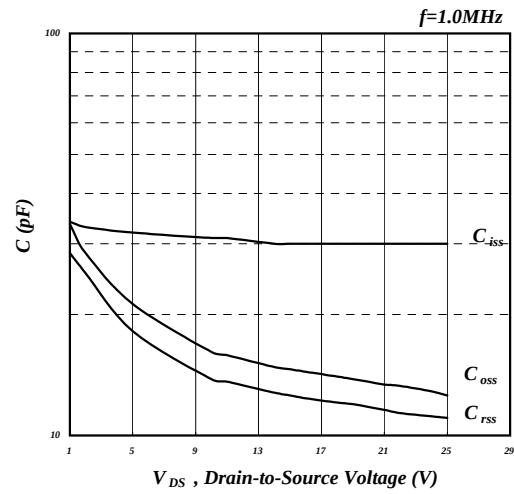


Fig 8. Typical Capacitance Characteristics

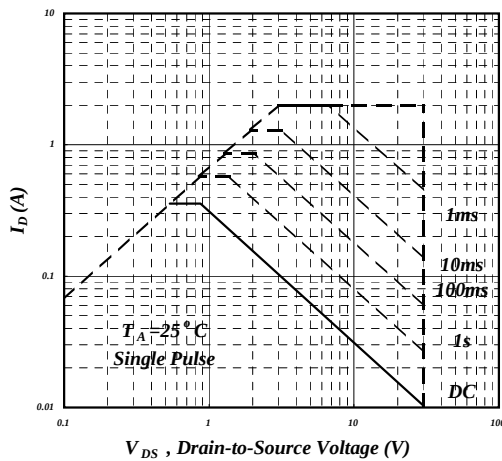


Fig 9. Maximum Safe Operating Area

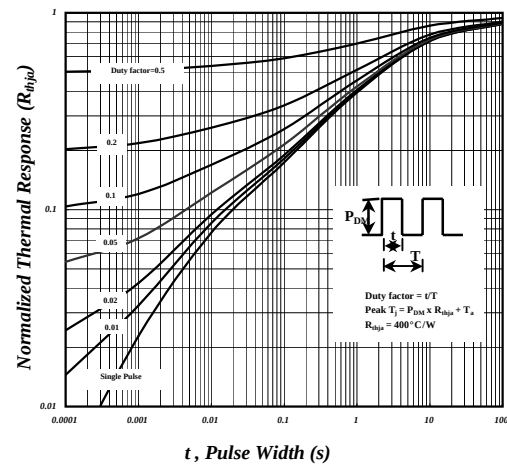


Fig 10. Effective Transient Thermal Impedance

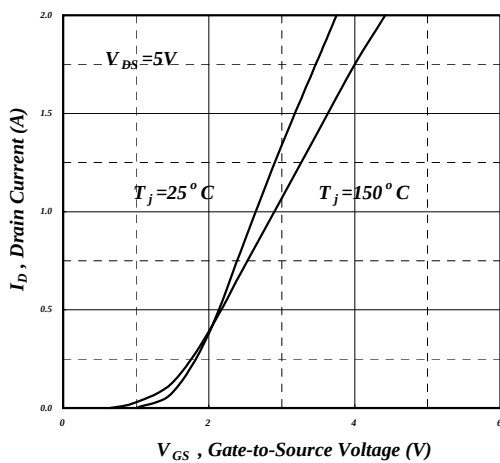


Fig 11. Transfer Characteristics

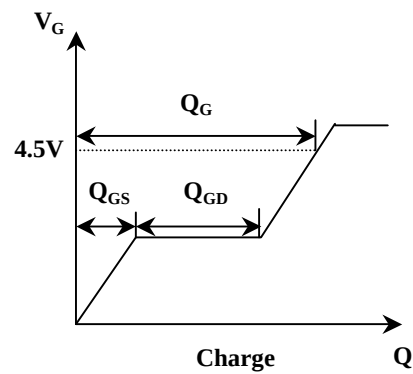
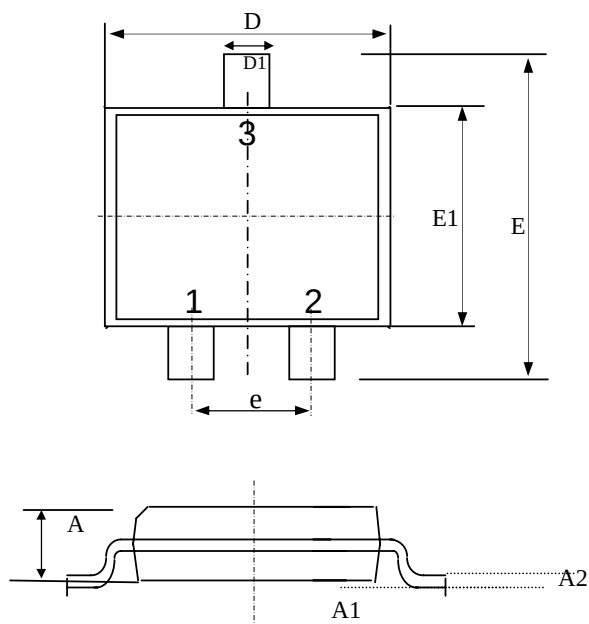


Fig 12. Gate Charge Waveform



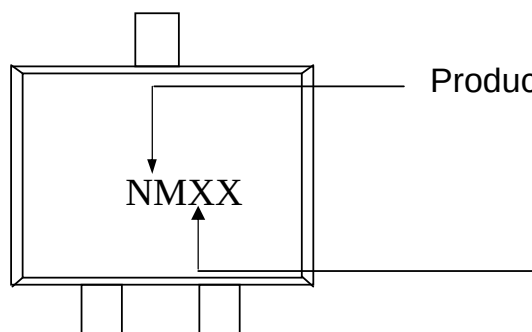
## Package Dimensions: SOT-23



| SYMBOLS | Millimeters |      |      |
|---------|-------------|------|------|
|         | MIN         | NOM  | MAX  |
| A       | 1.00        | 1.15 | 1.30 |
| A1      | 0.00        | --   | 0.10 |
| A2      | 0.10        | 0.15 | 0.25 |
| D1      | 0.30        | 0.40 | 0.50 |
| e       | 1.70        | 2.00 | 2.30 |
| D       | 2.70        | 2.90 | 3.10 |
| E       | 2.40        | 2.65 | 3.00 |
| E1      | 1.40        | 1.50 | 1.60 |

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

## Marking Information: SOT-23



Date/lot code

For details of how to convert this  
to standard YYWW date code format,  
please contact us directly.