

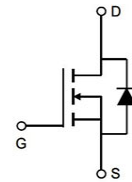
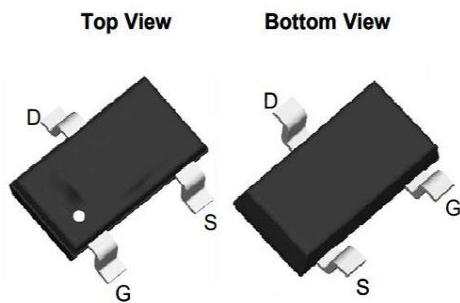
**General Description**

20V /3A Single N Power MOSFET

 Very low on-resistance  $R_{DS(on)}$  @  $V_{GS}=4.5\text{ V}$ 

Pb-free lead plating; RoHS compliant

|                             |      |            |
|-----------------------------|------|------------|
| $V_{DS}$                    | 20   | V          |
| $R_{DS(on),TYP@V_{GS}=10V}$ | 43.4 | m $\Omega$ |
| $R_{DS(on),TYP@V_{GS}=4.5}$ | 70.0 | m $\Omega$ |
| $I_D$                       | 3    | A          |



| Part ID | Package Type | Marking | Tape and reel information |
|---------|--------------|---------|---------------------------|
| AC2302  | SOT23-3      | 2302    | 3000                      |


 100% UIS Tested  
 100% kg tested

| Parameter   | Symbol         | Maximum                | Units            |
|---|----------------|------------------------|------------------|
| Drain-Source Voltage                                      | $V_{DS}$       | 20                     | V                |
| Gate-Source Voltage                                       | $V_{GS}$       | 8                      | $\pm V$          |
| Continuous Drain Current <sup>A</sup>                     | $I_D$          | $T_A=25^\circ\text{C}$ | A                |
|   |                | $T_A=70^\circ\text{C}$ |                  |
| Pulsed Drain Current <sup>B</sup>                         | $I_{DM}$       | 4.8                    |                  |
| Avalanche Current <sup>G</sup>                            | $I_{AR}$       | 1.0                    |                  |
| Repetitive avalanche energy $L=0.1\text{mH}$ <sup>G</sup> | $E_{AR}$       | 2.2                    | mJ               |
| Power Dissipation <sup>A</sup>                            | $P_D$          | $T_A=25^\circ\text{C}$ | W                |
|   |                | $T_A=70^\circ\text{C}$ |                  |
| Junction and Storage Temperature Range                    | $T_J, T_{STG}$ | -55 to 150             | $^\circ\text{C}$ |

**Thermal Characteristics**

| Parameter                                | Symbol          | Typ          | Max | Units              |
|--|-----------------|--------------|-----|--------------------|
| Maximum Junction-to-Ambient <sup>A</sup> | $R_{\theta JA}$ | 155          | 232 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient <sup>A</sup> |                 | Steady State | 310 | 372                |
| Maximum Junction-to-Lead <sup>C</sup>    | $R_{\theta JL}$ | 93           | 148 | $^\circ\text{C/W}$ |

**STATIC PARAMETERS**

| Symbol              | Parameter                             | Conditions   | Min | Typ  | Max  | Units |
|---------------------|---------------------------------------|--|-----|------|------|-------|
| BV <sub>DSS</sub>   | Drain-Source Breakdown Voltage        | I <sub>D</sub> = -250uA, V <sub>GS</sub> = 0V            | 20  |      |      | V     |
| I <sub>DSS</sub>    | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =20V, V <sub>GS</sub> =0V                |     |      | 1    | uA    |
|                     |                                       |  |     |      | 5    |       |
| I <sub>GSS</sub>    | Gate-Body leakage current             | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V             |     |      | ±100 | nA    |
| V <sub>GS(th)</sub> | Gate Threshold Voltage                | V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 250μA | 0.5 | 0.8  | 1    | V     |
| R <sub>DS(on)</sub> | Static Drain-Source On-Resistance     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =3A               |     | 43.4 | 62.0 | mΩ    |
|                     |                                       | V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A                |     | 70.0 | 85.0 |       |
| g <sub>FS</sub>     | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =3A                  |     | 68   |      | S     |
| V <sub>SD</sub>     | Diode Forward Voltage                 | I <sub>S</sub> =1A, V <sub>GS</sub> =3V                  |     | 0.72 | 1    | V     |
| I <sub>S</sub>      | Maximum Body-Diode Continuous Current |  |     |      | 3    | A     |

**DYNAMIC PARAMETERS**

| Symbol           | Parameter                    | Conditions  | Min | Typ | Max | Units |
|------------------|------------------------------|---|-----|-----|-----|-------|
| C <sub>iss</sub> | Input Capacitance            | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz |     | 260 | 317 | pF    |
| C <sub>oss</sub> | Output Capacitance           |   |     | 48  | 59  | pF    |
| C <sub>rss</sub> | Reverse Transfer Capacitance |   |     |     | 27  | 32    |
| R <sub>g</sub>   | Gate resistance              | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz  |     |     | 0.3 | Ω     |

**SWITCHING PARAMETERS**

| Symbol               | Parameter                          | Conditions  | Min | Typ  | Max | Units |
|----------------------|------------------------------------|---|-----|------|-----|-------|
| Q <sub>g</sub> (10V) | Total Gate Charge                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =3A                          |     | 2.9  |     | nC    |
| Q <sub>g</sub> 4.5V) | Total Gate Charge                  |   |     | 1.45 |     |       |
| Q <sub>gs</sub>      | Gate Source Charge                 |   |     | 0.42 |     |       |
| Q <sub>gd</sub>      | Gate Drain Charge                  |   |     | 0.6  |     |       |
| t <sub>D(on)</sub>   | Turn-On DelayTime                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =0.75Ω, R <sub>GEN</sub> =3Ω |     | 7    |     | ns    |
| t <sub>r</sub>       | Turn-On Rise Time                  |   |     | 5.6  |     |       |
| t <sub>D(off)</sub>  | Turn-Off DelayTime                 |   |     | 19.6 |     |       |
| t <sub>f</sub>       | Turn-Off Fall Time                 |   |     | 6.3  |     |       |
| t <sub>rr</sub>      | Body Diode Reverse Recovery Time   | I <sub>F</sub> =-8A, dI/dt=500A/μs  |     | 14   |     | ns    |
| Q <sub>rr</sub>      | Body Diode Reverse Recovery Charge | I <sub>F</sub> =18A, dI/dt=500A/μs  |     | 3.8  |     | nC    |

DC ELECTRICAL AND THERMAL CHARACTERISTICS

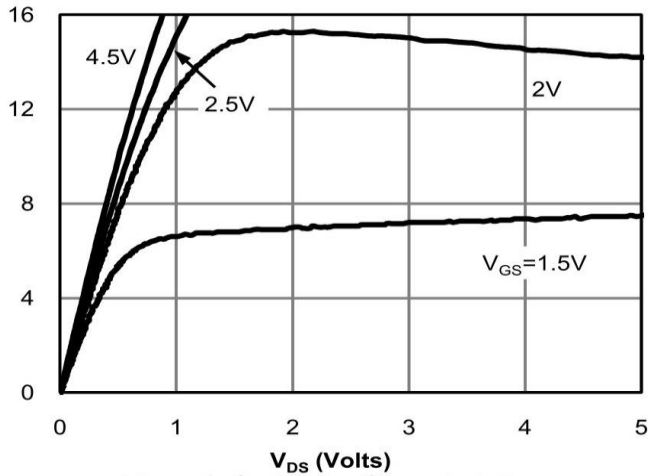


Figure 1: On-Region Characteristics

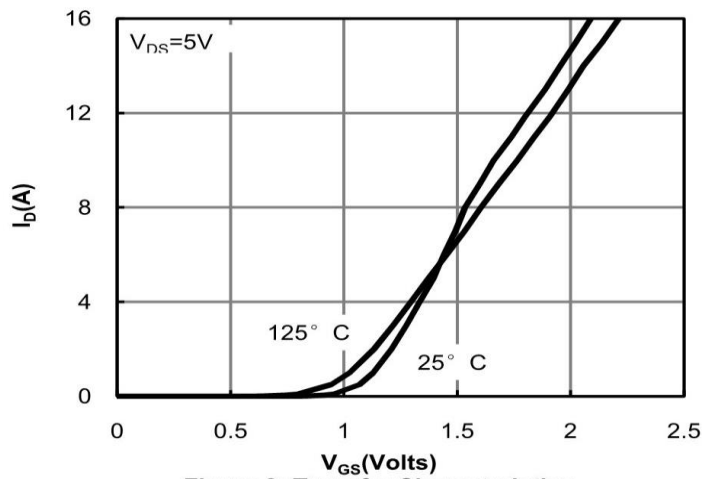


Figure 2: Transfer Characteristics

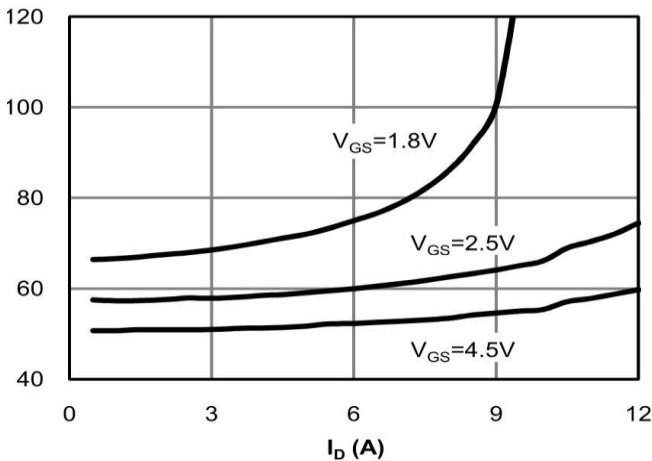


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

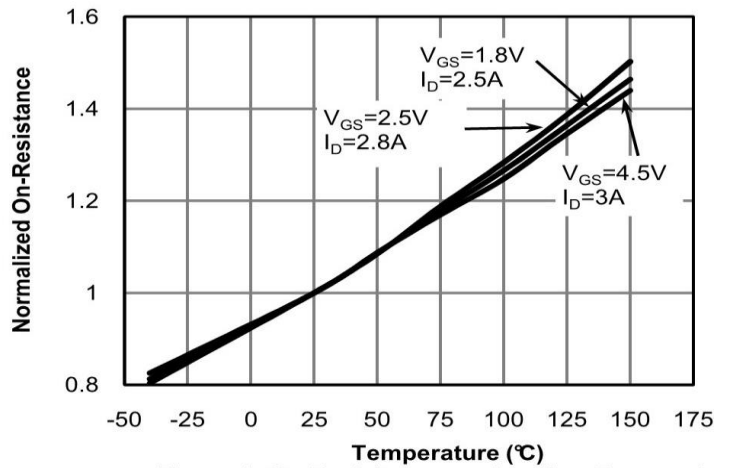
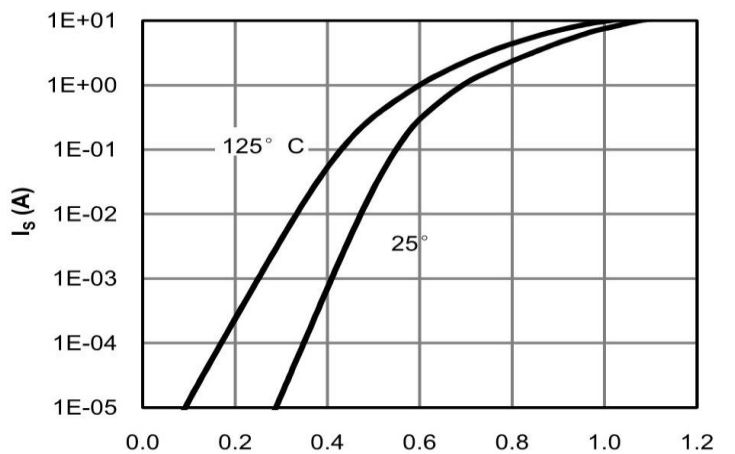
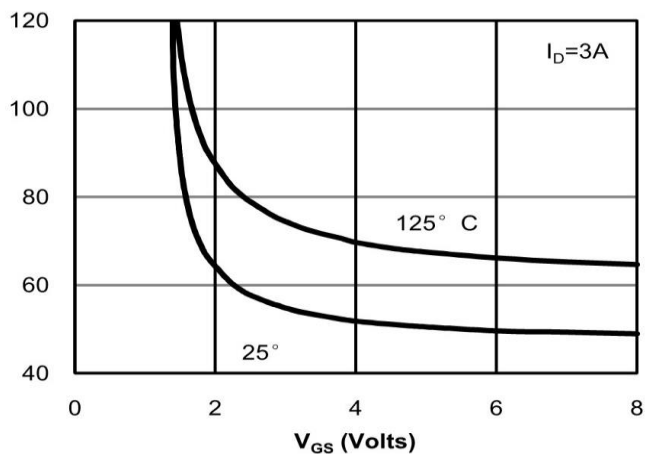


Figure 4: On-Resistance vs. Junction Temperature



MECHANICAL ELECTRICAL AND THERMAL CHARACTERISTICS

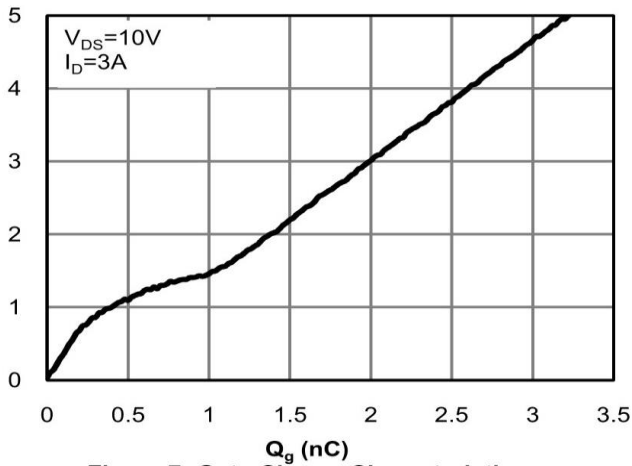


Figure 7: Gate-Charge Characteristics

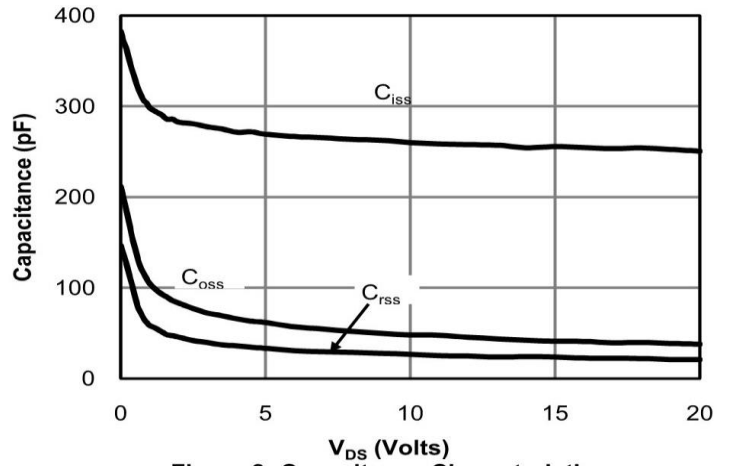


Figure 8: Capacitance Characteristics

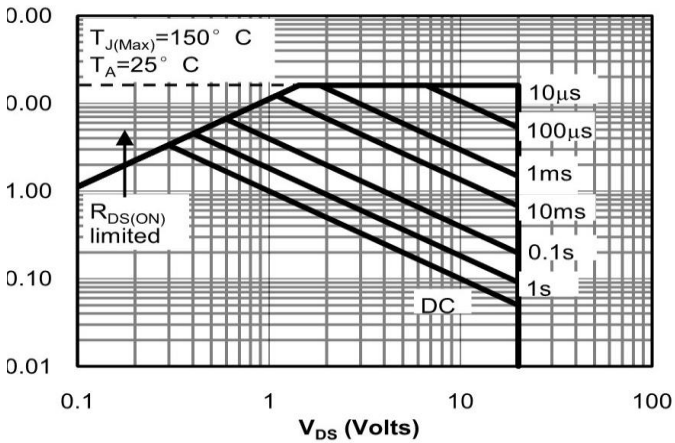


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

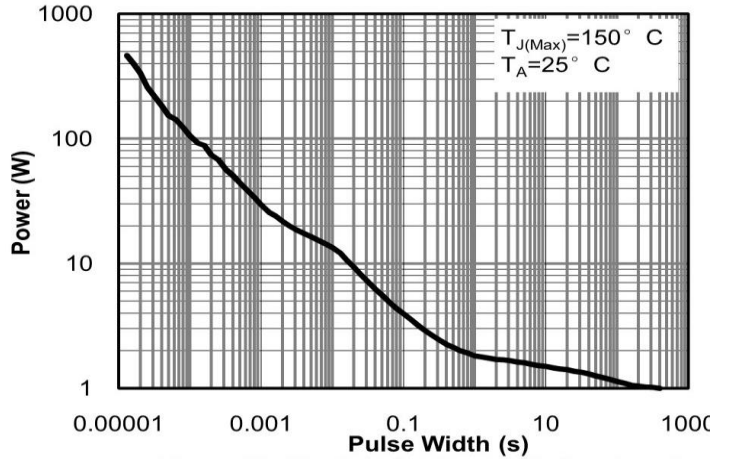


Figure 10: Single Pulse Power Rating Junction to-Ambient (Note E)

