

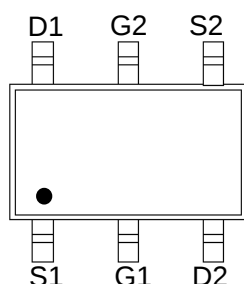
## -20V/-0.66A Dual P-Channel MOSFET

### Features

- Lead Free Product is Acquired
- Surface Mount Package
- P-Channel Switch with Low  $R_{DS(on)}$
- Operated at Low Logic Level Gate Drive

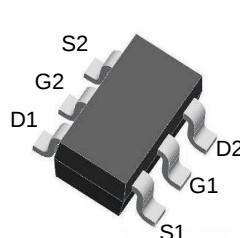
### Application

- Load/Power Switching
- Interfacing, Logic Switching
- Battery Management for Ultra Small Portable Electronics

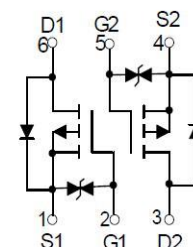


### Product Summary

| $V_{DS}$ | $R_{DS(on)}$ MAX | $I_D$ MAX |
|----------|------------------|-----------|
| -20V     | 520mΩ@4.5V       | -0.66A    |
|          | 700mΩ@2.5V       |           |



SOT-363 top view



Schematic diagram



### Absolute Maximum Ratings ( $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Symbol | Parameter | Rating | Unit |
|--------|-----------|--------|------|
|--------|-----------|--------|------|

### Common Ratings ( $T_C=25^{\circ}\text{C}$ Unless Otherwise Noted)

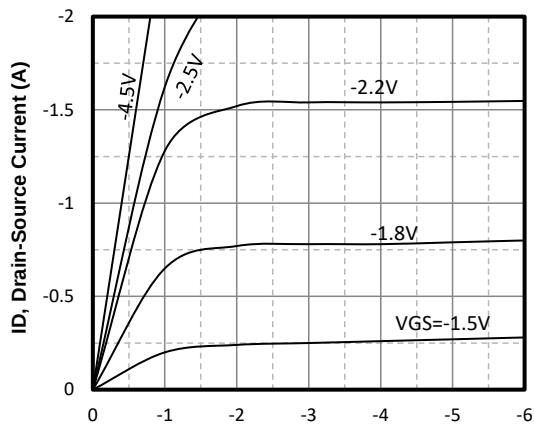
|                  |                                  |         |            |    |
|------------------|----------------------------------|---------|------------|----|
| V <sub>DS</sub>  | Drain-Source Breakdown Voltage   |         | -20        | V  |
| V <sub>GS</sub>  | Gate-Source Voltage              |         | ±10        | V  |
| T <sub>J</sub>   | Maximum Junction Temperature     |         | 150        | °C |
| T <sub>STG</sub> | Storage Temperature Range        |         | -55 to 150 | °C |
| I <sub>S</sub>   | Diode Continuous Forward Current | Tc=25°C | -0.66      | A  |

### Mounted on Large Heat Sink

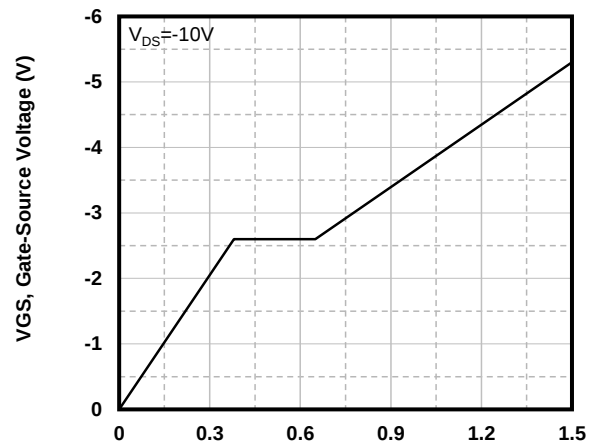
|                 |                                               |                          |       |                      |
|-----------------|-----------------------------------------------|--------------------------|-------|----------------------|
| $I_{DM}$        | Pulse Drain Current Tested                    | $T_C=25^{\circ}\text{C}$ | -2.65 | A                    |
| $I_D$           | Continuous Drain Current@ $V_{GS}=10\text{V}$ | $T_C=25^{\circ}\text{C}$ | -0.66 | A                    |
| $P_D$           | Maximum Power Dissipation                     | $T_C=25^{\circ}\text{C}$ | 0.15  | W                    |
| $R_{\theta JA}$ | Thermal Resistance Junction-to-Ambient        |                          | 833   | $^{\circ}\text{C/W}$ |

| Electrical Characteristics (TJ=25℃ unless otherwise noted)              |                                  |                                       |       |       |      |      |
|-------------------------------------------------------------------------|----------------------------------|---------------------------------------|-------|-------|------|------|
| Symbol                                                                  | Parameter                        | Condition                             | Min   | Typ   | Max  | Unit |
| Static Electrical Characteristics @ TJ = 25℃ (unless otherwise stated)  |                                  |                                       |       |       |      |      |
| BV <sub>(BR)DSS</sub>                                                   | Drain-Source Breakdown Voltage   | VGS=0V, ID=-250μA                     | -20   | --    | --   | V    |
| I <sub>DSS</sub>                                                        | Zero Gate Voltage Drain Current  | VDS=-20V, VGS=0V                      | --    | --    | -1   | uA   |
| I <sub>GSS</sub>                                                        | Gate-Body Leakage Current        | VGS=±10V, VDS=0V                      | --    | --    | ±10  | uA   |
| V <sub>GS(th)</sub>                                                     | Gate Threshold Voltage           | VDS=VGS, ID=-250μA                    | -0.35 | -0.65 | -1.1 | V    |
| R <sub>DS(on)</sub>                                                     | Drain-Source On-State Resistance | VGS=-4.5V, ID=-1.0A                   | --    | 380   | 520  | mΩ   |
|                                                                         |                                  | VGS=-2.5V, ID=-0.8A                   | --    | 520   | 700  |      |
|                                                                         |                                  | VGS=-1.8V, ID=-0.5A                   | --    | 750   | --   |      |
| Dynamic Electrical Characteristics @ TJ = 25℃ (unless otherwise stated) |                                  |                                       |       |       |      |      |
| C <sub>ISS</sub>                                                        | Input Capacitance                | VDS=-10V, VGS=0V, f=1MHz              | --    | 115   | --   | pF   |
| C <sub>OSS</sub>                                                        | Output Capacitance               |                                       | --    | 15    | --   | pF   |
| C <sub>RSS</sub>                                                        | Reverse Transfer Capacitance     |                                       | --    | 8.8   | --   | pF   |
| Switching Characteristics                                               |                                  |                                       |       |       |      |      |
| Q <sub>g</sub>                                                          | Total Gate Charge                | VDD=-10V, ID=-0.5A, VGS=-4.5V         | --    | 1.25  | --   | nC   |
| Q <sub>gs</sub>                                                         | Gate Source Charge               |                                       | --    | 0.35  | --   | nC   |
| Q <sub>gd</sub>                                                         | Gate Drain Charge                |                                       | --    | 0.29  | --   | nC   |
| t <sub>d(on)</sub>                                                      | Turn-on Delay Time               | VDS=-10V, ID=-0.2A, VGS=-4.5V, RG=10Ω | --    | 9     | --   | nS   |
| t <sub>r</sub>                                                          | Turn-on Rise Time                |                                       | --    | 5.5   | --   | nS   |
| t <sub>d(off)</sub>                                                     | Turn-Off Delay Time              |                                       | --    | 30.8  | --   | nS   |
| t <sub>f</sub>                                                          | Turn-Off Fall Time               |                                       | --    | 20    | --   | nS   |
| Source- Drain Diode Characteristics                                     |                                  |                                       |       |       |      |      |
| V <sub>SD</sub>                                                         | Forward on voltage               | Tj=25℃, Is=-0.66A,                    | --    | --    | -1.2 | V    |

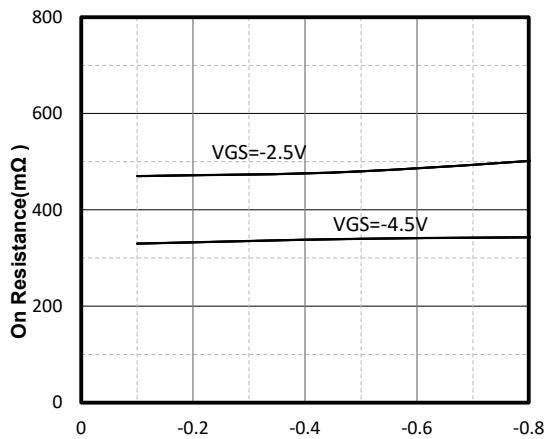
## Typical Operating Characteristics



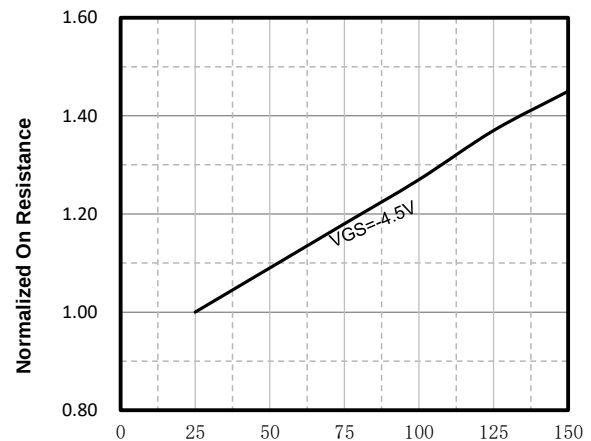
VDS, Drain -Source Voltage (V)  
Fig1. Typical Output Characteristics



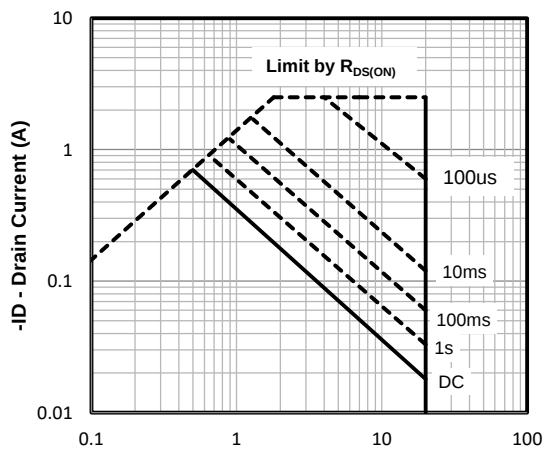
Qg -Total Gate Charge (nC)  
Fig2. Typical Gate Charge Vs. Gate-Source Voltage



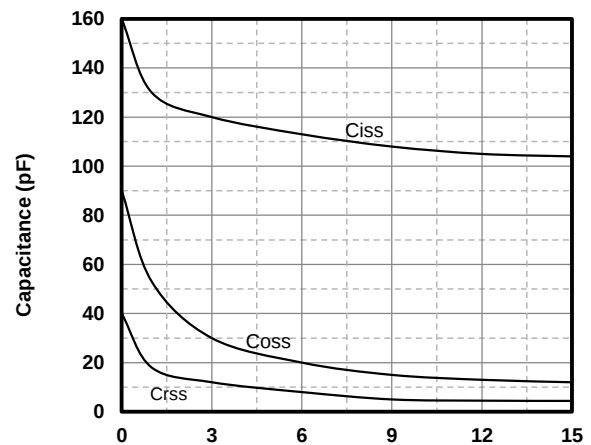
ID, Drain-Source Current (mA)  
Fig3. Drain-Source on Resistance



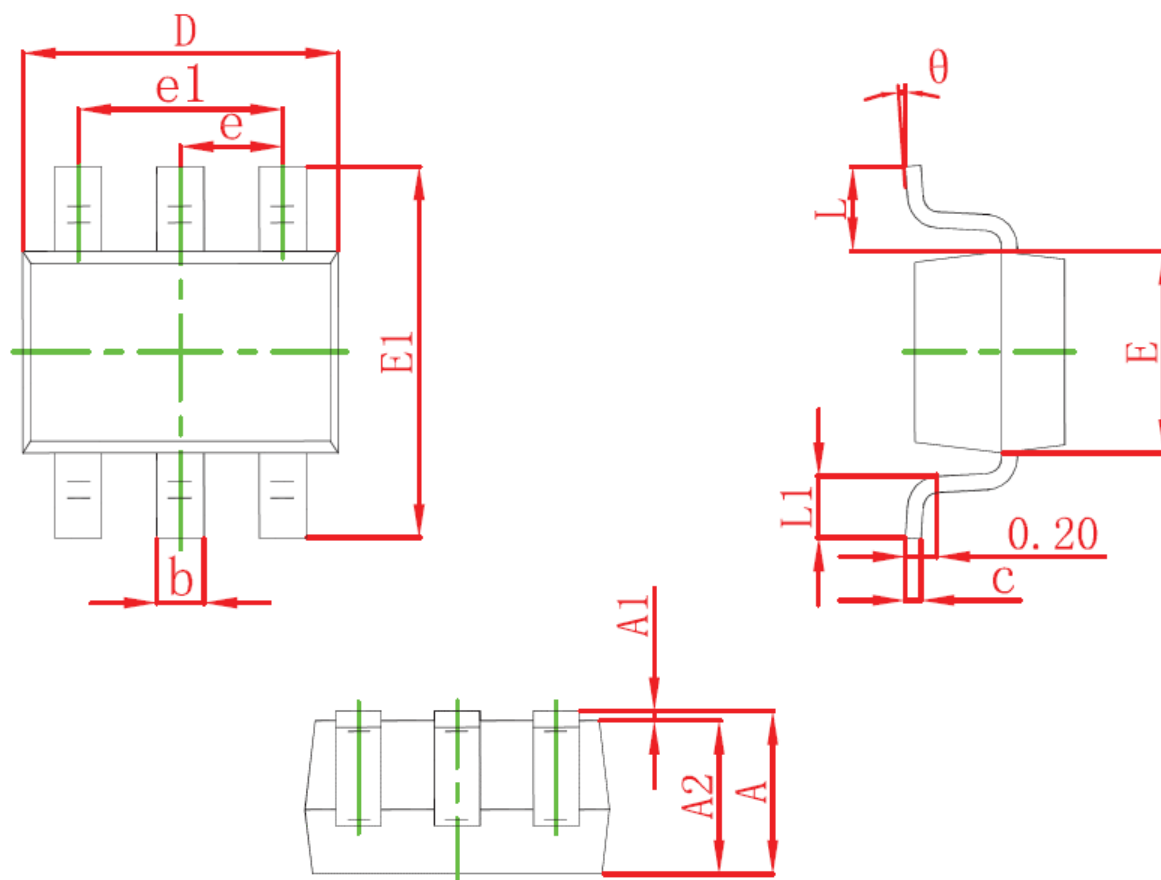
TJ - Junction Temperature (°C)  
Fig4. Normalized On-Resistance Vs. Temperature



-VDS, Drain -Source Voltage (V)  
Fig5. Maximum Safe Operating Area



-VDS, Drain-Source Voltage (V)  
Fig6. Typical Capacitance Vs. Drain-Source Voltage

**SOT-363 Package information**


| Symbol   | Dimensions in Millimeters(mm) |       | Dimensions In Inches |       |
|----------|-------------------------------|-------|----------------------|-------|
|          | Min                           | Max   | Min                  | Max   |
| A        | 0.900                         | 1.100 | 0.035                | 0.043 |
| A1       | 0.000                         | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                         | 1.000 | 0.035                | 0.039 |
| b        | 0.150                         | 0.350 | 0.006                | 0.014 |
| c        | 0.100                         | 0.150 | 0.004                | 0.006 |
| D        | 2.000                         | 2.200 | 0.079                | 0.087 |
| E        | 1.150                         | 1.350 | 0.045                | 0.053 |
| E1       | 2.150                         | 2.400 | 0.085                | 0.094 |
| e        | 0.650TYP                      |       | 0.026TYP             |       |
| e1       | 1.200                         | 1.400 | 0.047                | 0.055 |
| L        | 0.525REF                      |       | 0.021REF             |       |
| L1       | 0.260                         | 0.460 | 0.010                | 0.018 |
| $\theta$ | 0°                            | 8°    | 0°                   | 8°    |