

## N-Channel 20V(D-S) MOSFET

| Product summary                       |      |            |
|---------------------------------------|------|------------|
| $V_{DS}$                              | 20   | V          |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) Typ. | 250  | m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=2.5V$ ) Typ. | 300  | m $\Omega$ |
| $I_D$ ( $T_A=25^{\circ}C$ )           | 0.95 | A          |

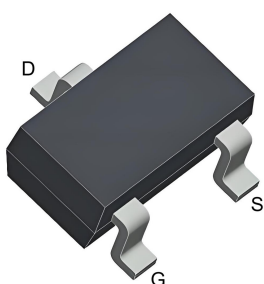
### Features

- Operated at Low Logic Level Gate Drive
- Low  $R_{DS(on)}$
- RoHS Compliant

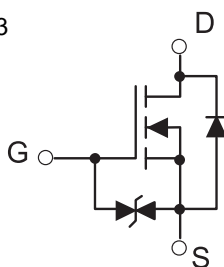
### Applications

- Load Switching
- Logic Level Shift

### Pin Configuration



SOT-323



### Packing Information

| Device   | Package | Reel Size | Quantity(Min. Package) |
|----------|---------|-----------|------------------------|
| ECDF1012 | SOT-323 | 7"        | 3000pcs                |

### Absolute Maximum Ratings (at $T_A=25^{\circ}C$ Unless Otherwise Noted)

| Symbol                           | Parameter   |                      | Rating      | Units |
|----------------------------------|---|----------------------|-------------|-------|
| V <sub>DS</sub>                  | Drain-Source Voltage  |                      | 20          | V     |
| V <sub>GS</sub>                  | Gate-Source Voltage   |                      | ±10         | V     |
| I <sub>D</sub>                   | Continuous Drain Current at V <sub>GS</sub> =10V <sup>A</sup> | T <sub>A</sub> =25°C | 0.95        | A     |
|                                  |   | T <sub>A</sub> =70°C | 0.65        | A     |
| I <sub>DM</sub>                  | Pulse Drain Current Tested <sup>B</sup>                       |                      | 3           | A     |
| P <sub>D</sub>                   | Power Dissipation <sup>A</sup>                                | T <sub>A</sub> =25°C | 0.36        | W     |
| T <sub>J</sub> ,T <sub>STG</sub> | Junciton and Storage Temperature Range                        |                      | -55 to +150 | °C    |

### Thermal Characteristics

| Symbol          | Parameter                                  | Typical | Units         |
|-----------------|--|---------|---------------|
| $R_{\theta JA}$ | Thermal Resistance-Junction to ambient $A$ | 347     | $^{\circ}C/W$ |

# Electrical Characteristics (at $T_J = 25^{\circ}\text{C}$ Unless Otherwise Noted)

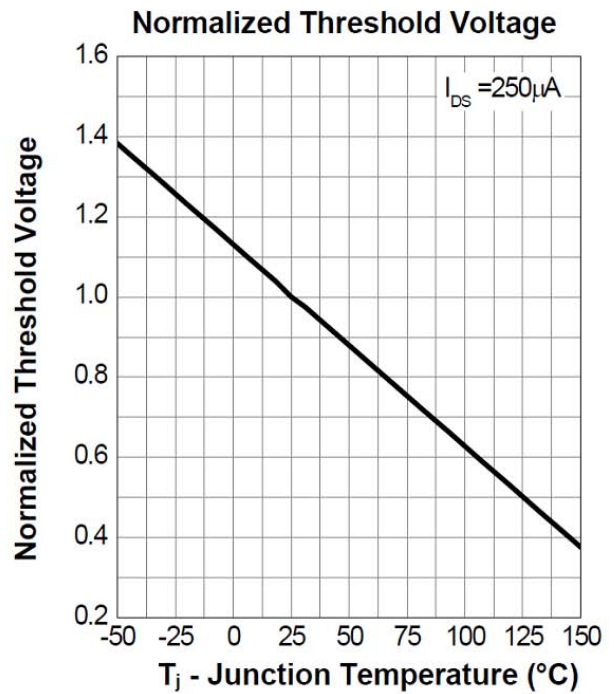
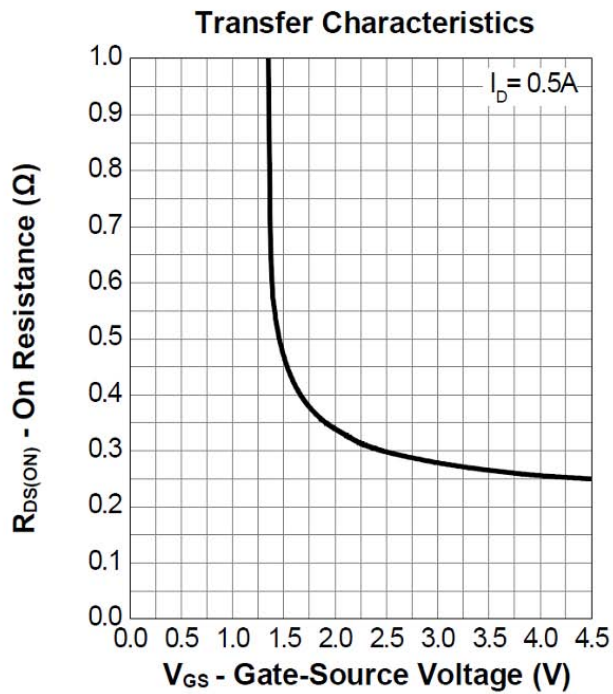
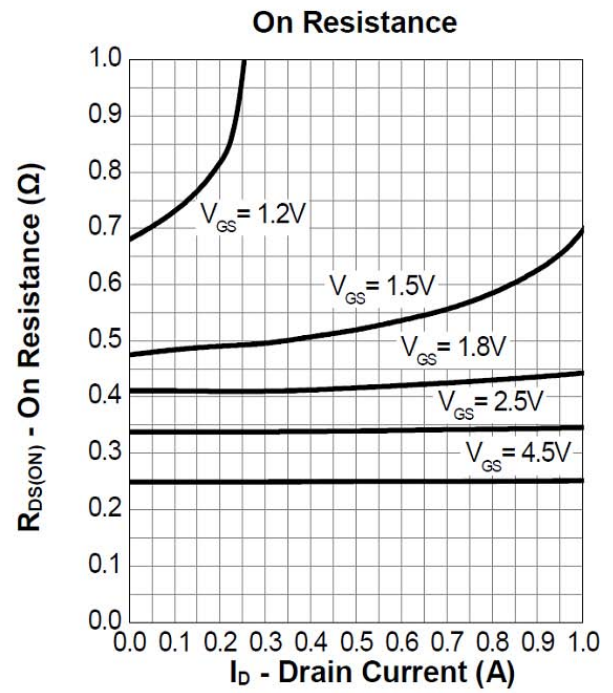
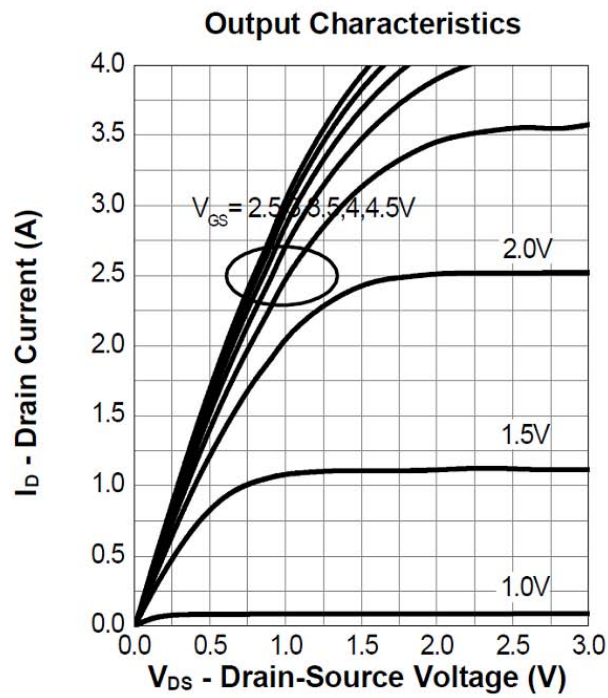
| Symbol                                 | Parameter                                     | Condition  | Min. | Typ. | Max.     | Units      |
|--|---|--|------|------|----------|------------|
| <b>Static Parameters</b>               |   |  |      |      |          |            |
| $BV_{DSS}$                             | Drain-Source Breakdown Voltage                | $V_{GS}=0V, I_D=250\mu A$  | 20   | --   | --       | V          |
| $I_{DSS}$                              | Zero Gate Voltage Drain Current               | $V_{DS}=16V, V_{GS}=0V$  | --   | --   | 1        | $\mu A$    |
| $I_{GSS}$                              | Gate-Body Leakage Current                     | $V_{DS}=0V, V_{GS}=\pm 10V$  | --   | --   | $\pm 30$ | $\mu A$    |
| $V_{GS(th)}$                           | Gate Threshold Voltage                        | $V_{DS}=V_{GS}, I_D=250\mu A$  | 0.4  | 0.7  | 1.0      | V          |
| $R_{DS(on)}$                           | Drain-Source On-State Resistance <sup>B</sup> | $V_{GS}=4.5V, I_D=0.5A$  | --   | 250  | 380      | m $\Omega$ |
|  |   | $V_{GS}=2.5V, I_D=0.2A$  | --   | 300  | 440      | m $\Omega$ |
|  |   | $V_{GS}=1.8V, I_D=0.1A$  | --   | 370  | 530      | m $\Omega$ |
| $V_{SD}$                               | Forward Voltage                               | $I_{SD}=0.5A, V_{GS}=0V$   | --   | --   | 1.2      | V          |
| <b>Dynamic Parameters <sup>C</sup></b> |   |  |      |      |          |            |
| $C_{iss}$                              | Input Capacitance                             | $V_{GS}=0V, V_{DS}=10V$<br>$f=1MHz$                                  | --   | 67   | --       | pF         |
| $C_{oss}$                              | Output Capacitance                            |  | --   | 18   | --       | pF         |
| $C_{rss}$                              | Reverse Transfer Capacitance                  |  | --   | 6    | --       | pF         |
| $Q_g$                                  | Total Gate Charge                             | $V_{DS}=10V, I_D=0.5A$<br>$V_{GS}=4.5V$                              | --   | 1.4  | --       | nC         |
| $Q_{gs}$                               | Gate-Source Charge                            |  | --   | 0.21 | --       | nC         |
| $Q_{gd}$                               | Gate-Drain Charge                             |  | --   | 0.21 | --       | nC         |
| $t_{D(on)}$                            | Turn-on Delay Time                            | $V_{DD}=10V$<br>$I_D=0.15A,$<br>$R_{GEN}=10\Omega,$<br>$V_{GS}=4.5V$ | --   | 2.8  | --       | nS         |
| $t_r$                                  | Turn-on Rise Time                             |  | --   | 20   | --       | nS         |
| $t_{D(off)}$                           | Turn-off Delay Time                           |  | --   | 23   | --       | nS         |
| $t_f$                                  | Turn-off Fall Time                            |  | --   | 24   | --       | nS         |

A. The data tested by surface mounted on a 1 inch x 1 inch FR-4 board with 20Z copper.

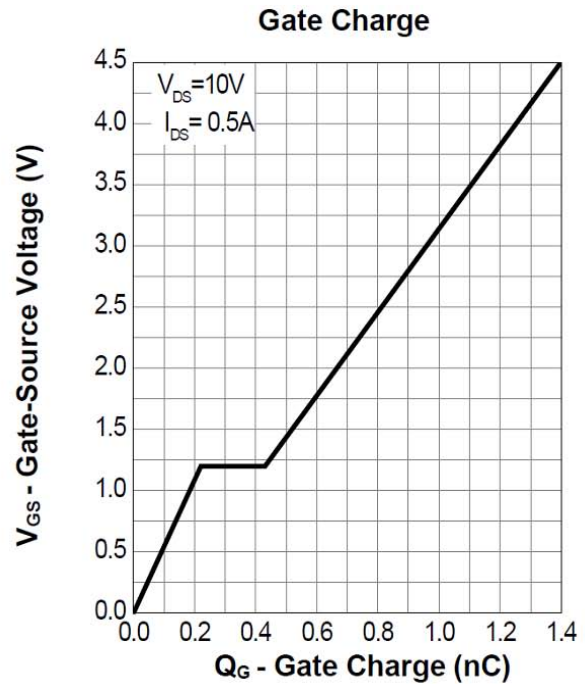
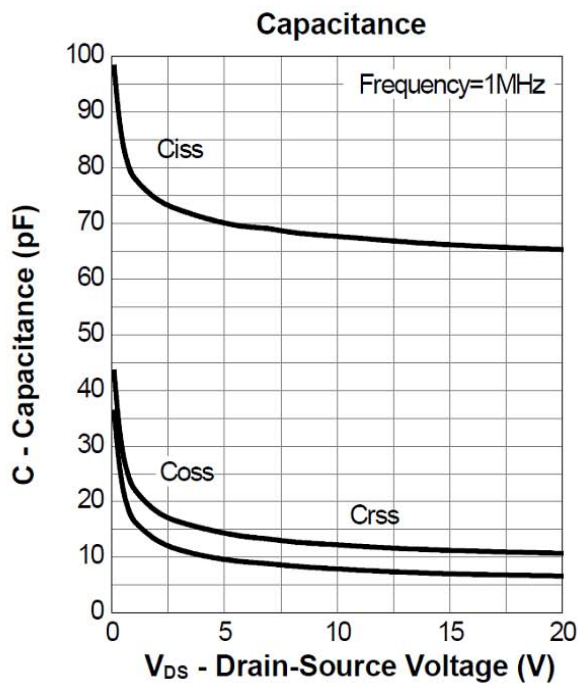
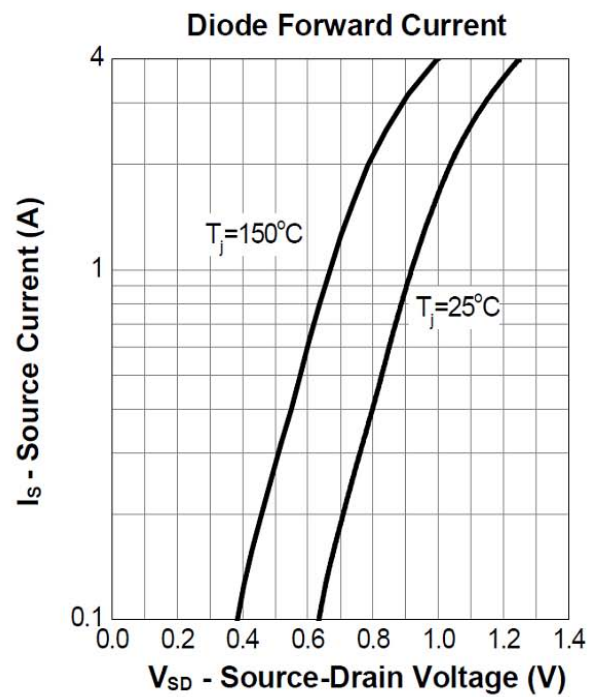
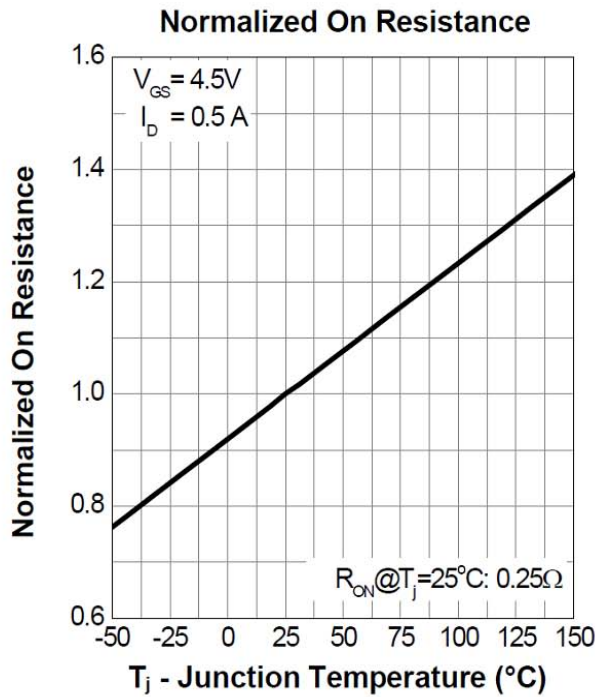
B. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty cycle  $\leq 2\%$ .

C. Guaranteed by design, not subject to production testing.

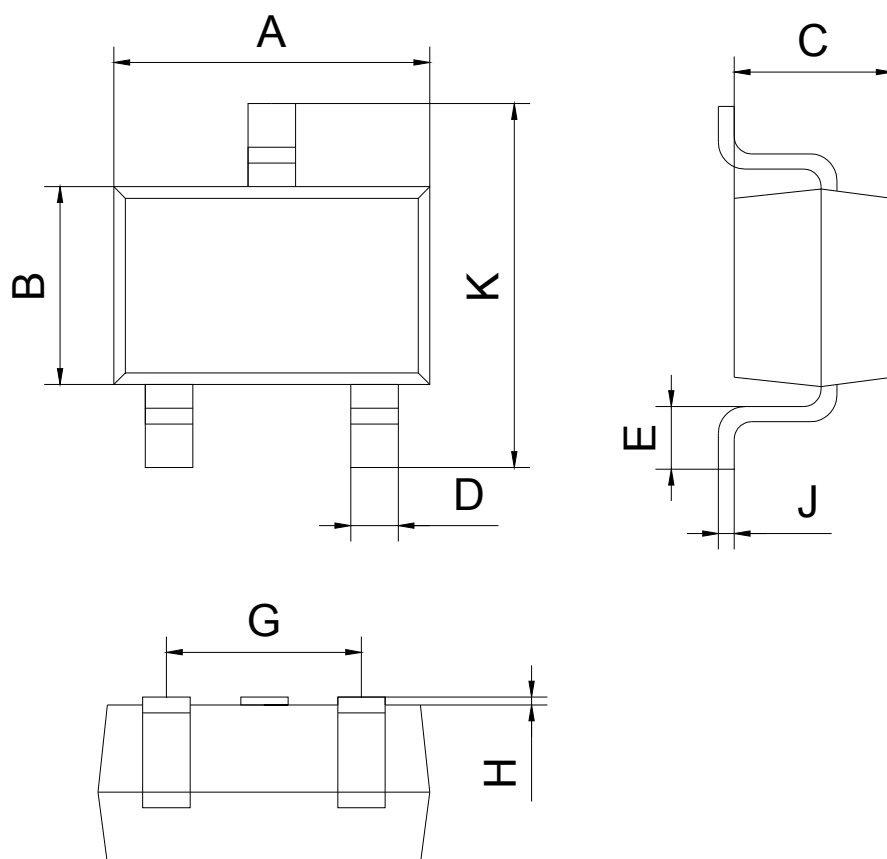
## Typical Characteristics



## Typical Characteristics



# SOT-323 Package Information



| SOT-323 |      |      |
|---------|------|------|
| Dim     | Min  | Max  |
| A       | 2.00 | 2.20 |
| B       | 1.15 | 1.35 |
| C       | 0.90 | 1.10 |
| D       | 0.15 | 0.35 |
| E       | 0.25 | 0.40 |
| G       | 1.20 | 1.40 |
| H       | 0.02 | 0.10 |
| J       | 0.05 | 0.15 |
| K       | 2.20 | 2.40 |