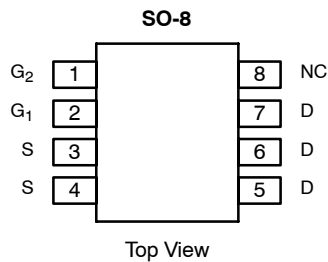




## N-Channel 30:1 Ratio Dual-Gate 30-V (D-S) MOSFET

### PRODUCT SUMMARY

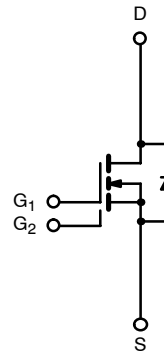
|        | $V_{DS}$ (V) | $r_{DS(on)}$ ( $\Omega$ ) | $I_D$ (A) |
|--------|--------------|---------------------------|-----------|
| Gate 1 | 30           | 0.022 @ $V_{GS} = 10$ V   | 7.7       |
|        |              | 0.03 @ $V_{GS} = 4.5$ V   | 6.4       |
| Gate 2 |              | 0.25 @ $V_{GS} = 10$ V    | 2.0       |
|        |              | 0.40 @ $V_{GS} = 4.5$ V   | 1.5       |



Ordering Information: Si4806DY  
Si4806DY-T1 (with Tape and Reel)

### FEATURES

- TrenchFET® Power MOSFET
- 100%  $R_g$  Tested



N-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| Parameter                                                      |                       | Symbol                            | Gate 1     | Gate 2 | Unit |
|----------------------------------------------------------------|-----------------------|-----------------------------------|------------|--------|------|
| Drain-Source Voltage                                           |                       | V <sub>DS</sub>                   | 30         |        | V    |
| Gate-Source Voltage                                            |                       | V <sub>GS</sub>                   | ± 20       |        |      |
| Continuous Drain Current (T <sub>J</sub> = 150°C) <sup>a</sup> | T <sub>A</sub> = 25°C | I <sub>D</sub>                    | 7.7        | 6.4    | A    |
|                                                                | T <sub>A</sub> = 70°C |                                   | 4.4        | 6.0    |      |
| Pulsed Drain Current                                           |                       | I <sub>DM</sub>                   | 40         | 4.0    |      |
| Continuous Source Current (Diode Conduction) <sup>a</sup>      |                       | I <sub>S</sub>                    | 2          |        |      |
| Maximum Power Dissipation <sup>a</sup>                         | T <sub>A</sub> = 25°C | P <sub>D</sub>                    | 2.3        |        | W    |
|                                                                | T <sub>A</sub> = 70°C |                                   | 1.0        |        |      |
| Operating Junction and Storage Temperature Range               |                       | T <sub>J</sub> , T <sub>stg</sub> | -55 to 150 |        | °C   |

### THERMAL RESISTANCE RATINGS

| Parameter                                | Symbol     | Limit | Unit               |
|------------------------------------------|------------|-------|--------------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $R_{thJA}$ | 55    | $^\circ\text{C/W}$ |

#### Notes

a. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

**SPECIFICATIONS (T<sub>J</sub> = 25 °C UNLESS OTHERWISE NOTED)**

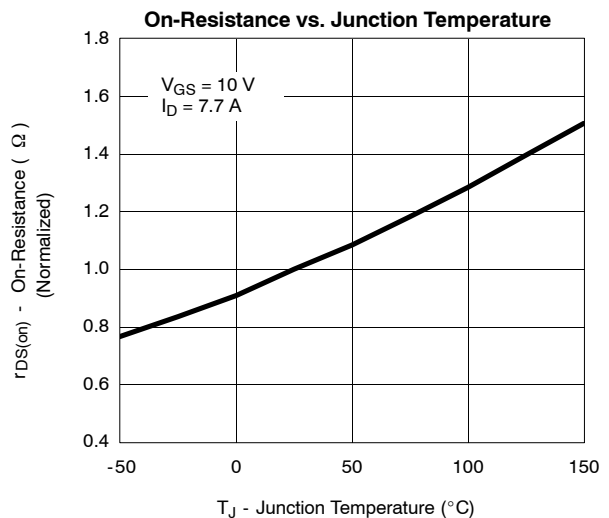
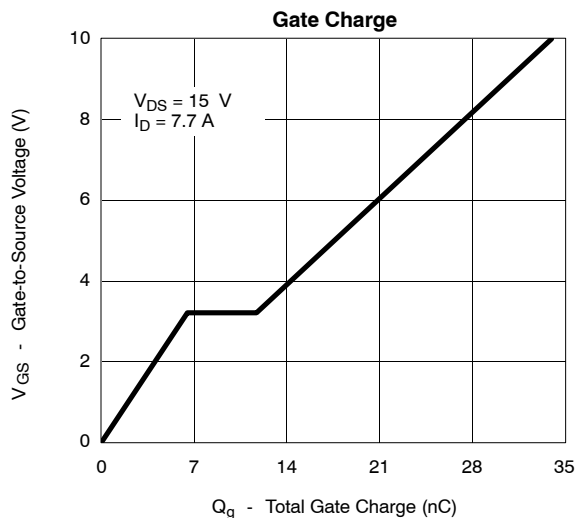
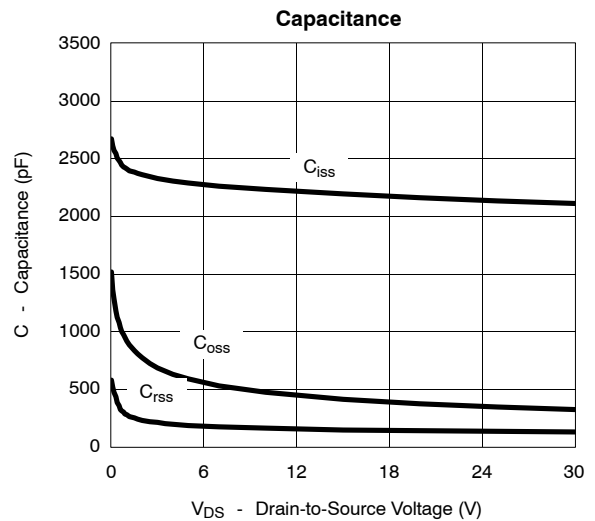
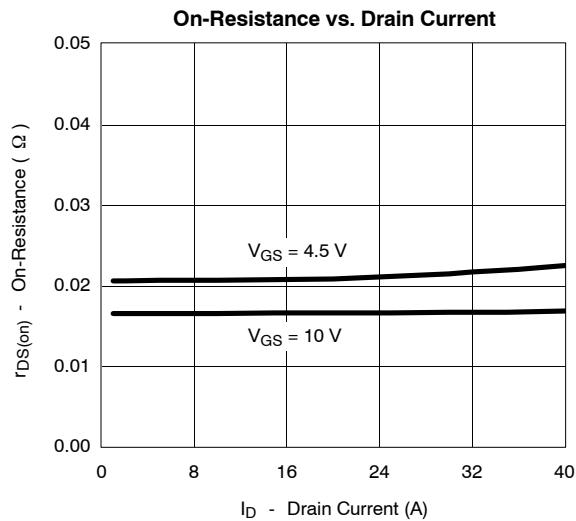
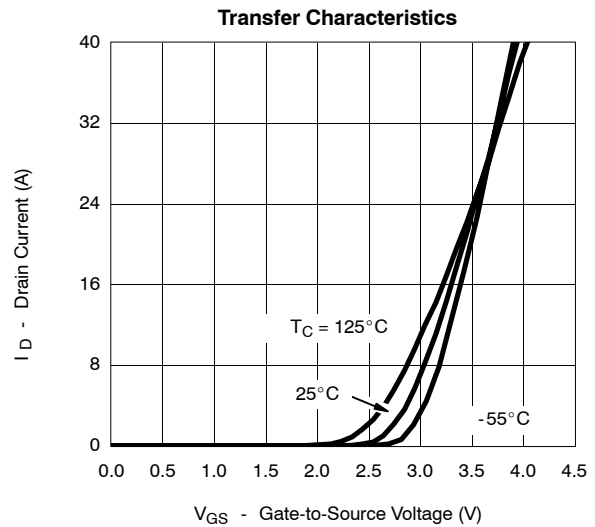
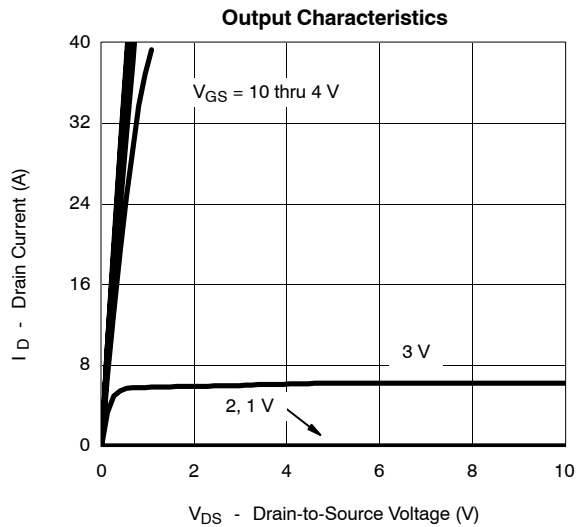
| Parameter                                     | Symbol               | Test Condition                                                                                                                                                                                                  | Min    | Typ   | Max   | Unit |    |
|-----------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------|-------|------|----|
| Static                                        |                      |                                                                                                                                                                                                                 |        |       |       |      |    |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub>  | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250 μA                                                                                                                                                     | 1      |       |       | V    |    |
| Gate-Body Leakage                             | I <sub>GSS</sub>     | V <sub>DS</sub> = 0 V, V <sub>GS</sub> = ±20 V                                                                                                                                                                  |        |       | ± 100 | nA   |    |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>     | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V                                                                                                                                                                   |        |       | 1     | μA   |    |
|                                               |                      | V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0 V, T <sub>J</sub> = 55°C                                                                                                                                            |        |       | 5     |      |    |
| On-State Drain Current <sup>a</sup>           | I <sub>D(on)</sub>   | (G <sub>1</sub> = G <sub>2</sub> ) V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V                                                                                                                                | 40     |       |       | A    |    |
| Drain-Source On-State Resistance <sup>a</sup> | r <sub>DS1(on)</sub> | (G <sub>1</sub> = G <sub>2</sub> ) V <sub>GS</sub> = 10 V, I <sub>D</sub> = 7.7 A                                                                                                                               |        | 0.017 | 0.022 | Ω    |    |
|                                               |                      | (G <sub>1</sub> = G <sub>2</sub> ) V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 6.4 A                                                                                                                              |        | 0.021 | 0.03  |      |    |
|                                               | r <sub>DS2(on)</sub> | V <sub>G1S</sub> = 0 V, V <sub>G2S</sub> = 10 V, I <sub>D</sub> = 2.0 A                                                                                                                                         |        | 0.20  | 0.25  |      |    |
|                                               |                      | V <sub>G1S</sub> = 0 V, V <sub>G2S</sub> = 4.5 V, I <sub>D</sub> = 0.3 A                                                                                                                                        |        | 0.30  | 0.40  |      |    |
| Forward Transconductance <sup>a</sup>         | g <sub>fs</sub>      | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 7.7 A                                                                                                                                                                  |        | 21    |       | S    |    |
| Diode Forward Voltage <sup>a</sup>            | V <sub>SD</sub>      | I <sub>S</sub> = 2 A, V <sub>GS</sub> = 0 V                                                                                                                                                                     |        | 0.72  | 1.1   | V    |    |
| Dynamic <sup>b</sup>                          |                      |                                                                                                                                                                                                                 |        |       |       |      |    |
| Total Gate Charge                             | Q <sub>g</sub>       | Gate 1<br>V <sub>DS</sub> = 15 V, V <sub>GS(1, 2)</sub> = 10 V<br>I <sub>D</sub> = 7.7 A<br><br>Gate 2<br>V <sub>DS</sub> = 15 V, V <sub>GS(1)</sub> = 0 V<br>V <sub>GS(2)</sub> = 10 V, I <sub>D</sub> = 2.0 A | Gate 1 |       | 34    | 60   | nC |
|                                               |                      |                                                                                                                                                                                                                 | Gate 2 |       | 2.2   | 5    |    |
| Gate-Source Charge                            | Q <sub>gs</sub>      |                                                                                                                                                                                                                 | Gate 1 |       | 6.5   |      |    |
|                                               |                      |                                                                                                                                                                                                                 | Gate 2 |       | 0.5   |      |    |
| Gate-Drain Charge                             | Q <sub>gd</sub>      |                                                                                                                                                                                                                 | Gate 1 |       | 5.2   |      |    |
|                                               |                      |                                                                                                                                                                                                                 | Gate 2 |       | 0.28  |      |    |
| Gate Resistance                               | R <sub>g</sub>       | Gate 1                                                                                                                                                                                                          | 0.4    |       | 2.7   | Ω    |    |
|                                               |                      | Gate 2                                                                                                                                                                                                          | 3      |       | 10    |      |    |
| Turn-On Delay Time                            | t <sub>d(on)</sub>   | V <sub>DD</sub> = 15 V, R <sub>L</sub> = 15 Ω<br>I <sub>D</sub> ≅ 1 A, V <sub>GEN</sub> = 10 V, R <sub>G</sub> = 6 Ω                                                                                            |        | 12    | 15    | ns   |    |
| Rise Time                                     | t <sub>r</sub>       |                                                                                                                                                                                                                 |        | 9     | 20    |      |    |
| Turn-Off Delay Time                           | t <sub>d(off)</sub>  |                                                                                                                                                                                                                 |        | 55    | 80    |      |    |
| Fall Time                                     | t <sub>f</sub>       |                                                                                                                                                                                                                 |        | 15    | 30    |      |    |
| Source-Drain Reverse Recovery Time            | t <sub>rr</sub>      | I <sub>F</sub> = 2 A, di/dt = 100 A/μs                                                                                                                                                                          |        | 40    | 60    |      |    |

## Notes

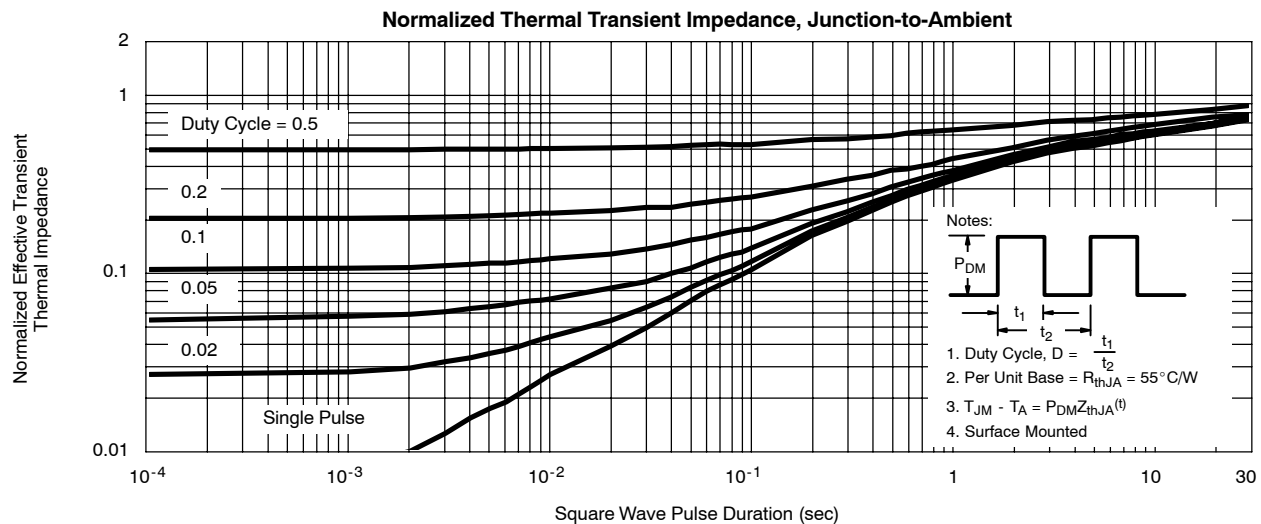
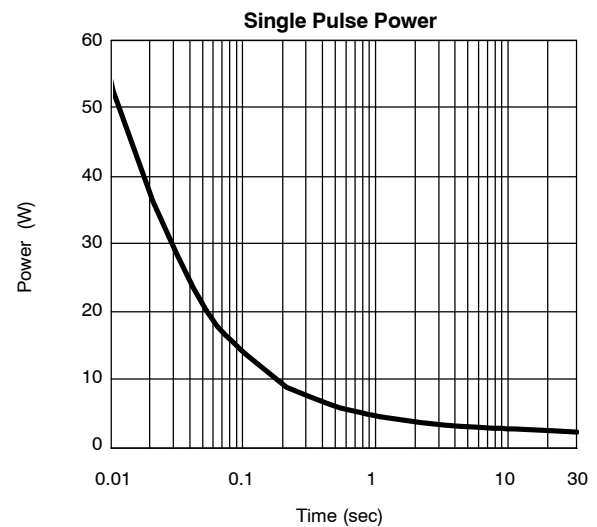
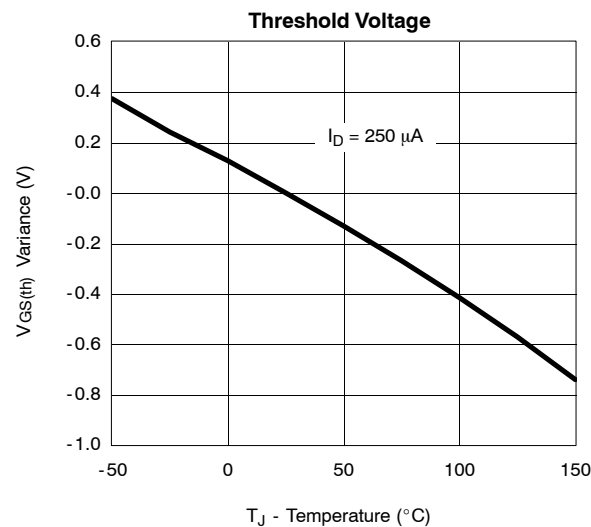
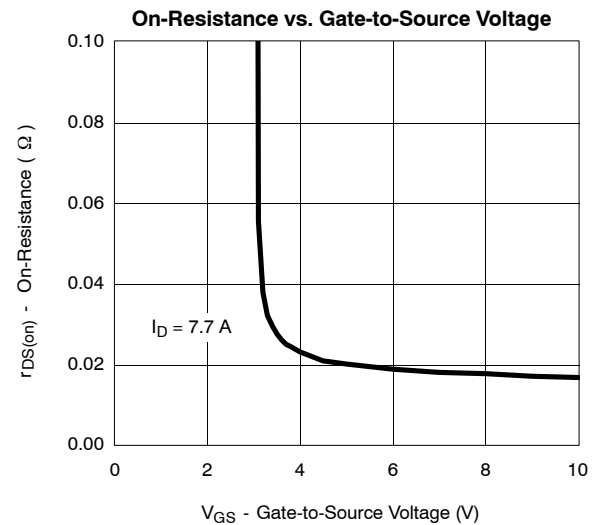
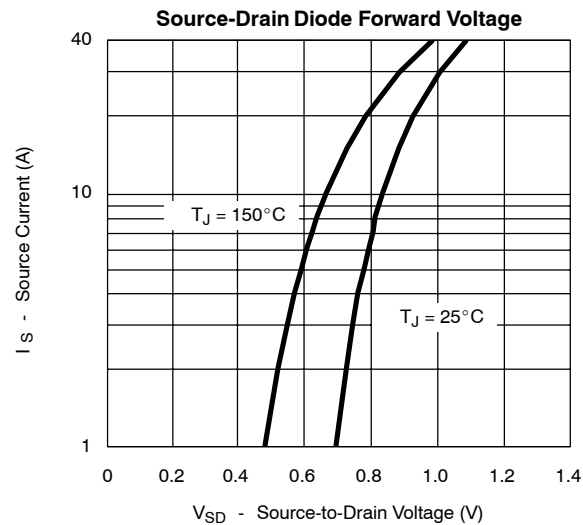
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.  
b. Guaranteed by design, not subject to production testing.



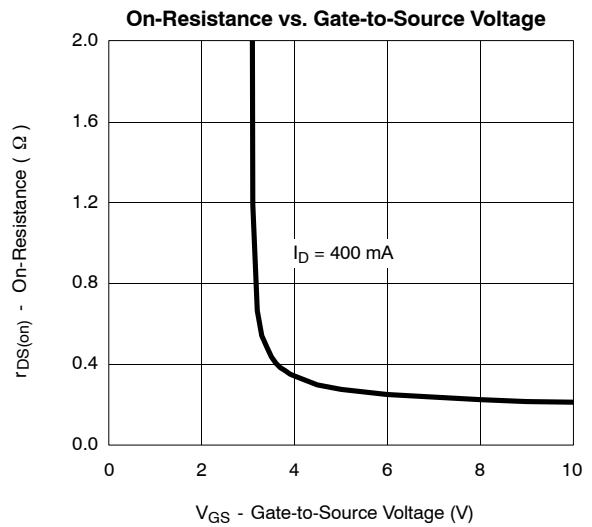
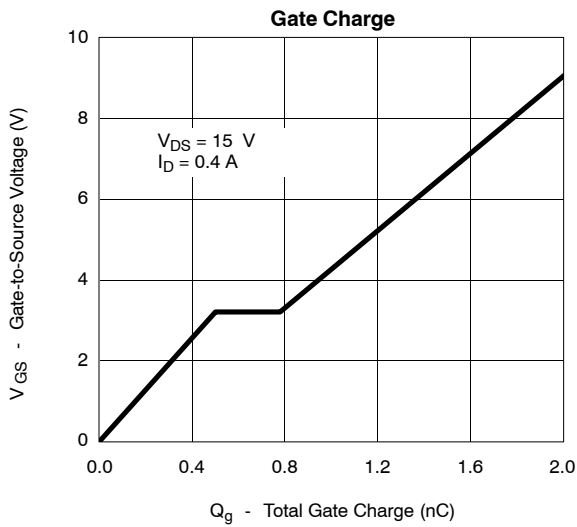
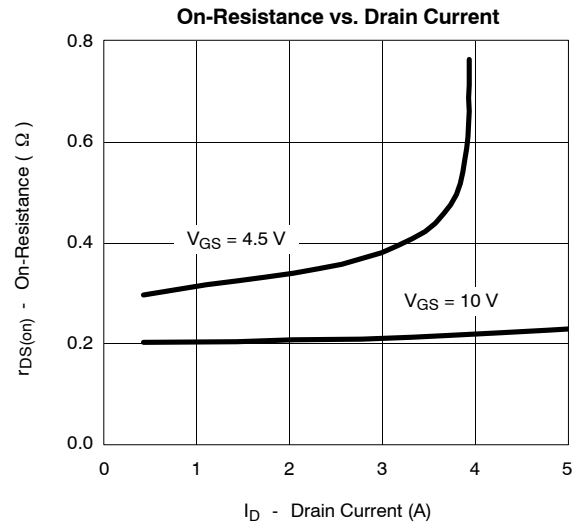
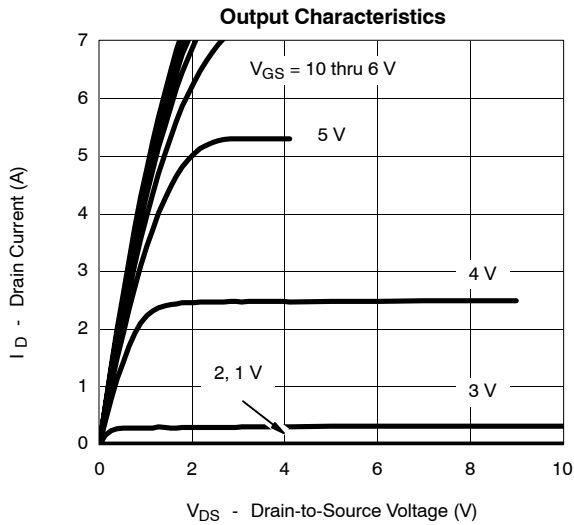
**TYPICAL CHARACTERISTICS ( $V_{G1} = V_{G2}$ , 25°C UNLESS NOTED)**



**TYPICAL CHARACTERISTICS ( $V_{G1} = V_{G2}$ , 25°C UNLESS NOTED)**



**TYPICAL CHARACTERISTICS ( $V_{G1} = 0$  V,  $25^{\circ}\text{C}$  UNLESS NOTED)**





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