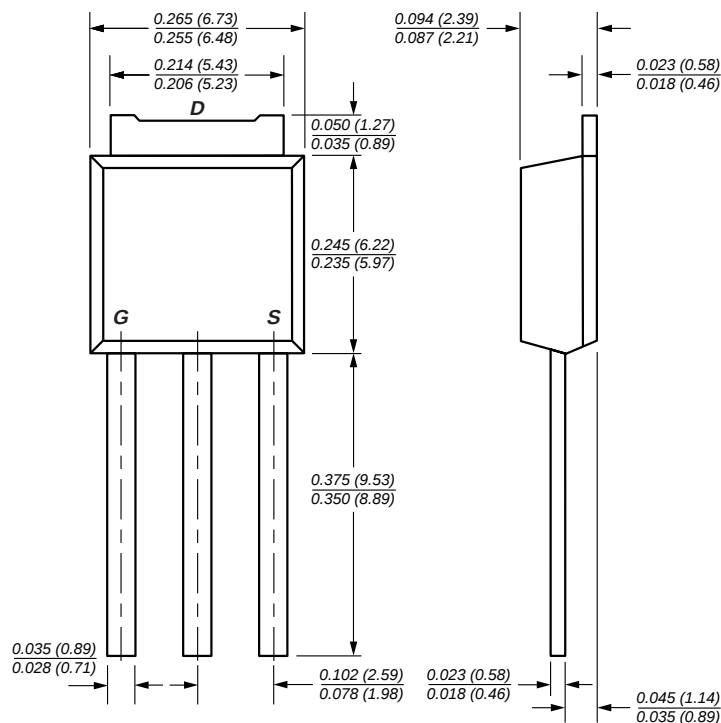
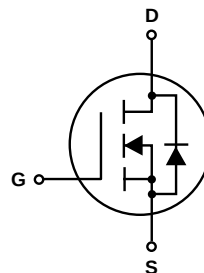


## N-Channel Enhancement-Mode MOSFET

 $V_{DS}$  30V  
 $R_{DS(ON)}$  15m $\Omega$   
 $I_D$  43A

TO-251 (IPAK)

TRENCH  
GENFET™

## Features

- Advanced Trench Process Technology
- High Density Cell Design for Ultra Low On-Resistance
- Specially Designed for Low Voltage DC/DC Converters and motor drives
- Fast Switching for High Efficiency

## Mechanical Data

**Case:** JEDEC TO-251 molded plastic body**Terminals:** Solder plated, solderable per MIL-STD-750, Method 2026**High temperature soldering guaranteed:**  
250°C/10 seconds at terminals**Weight:** 0.011oz., 0.4gMaximum Ratings and Thermal Characteristics ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

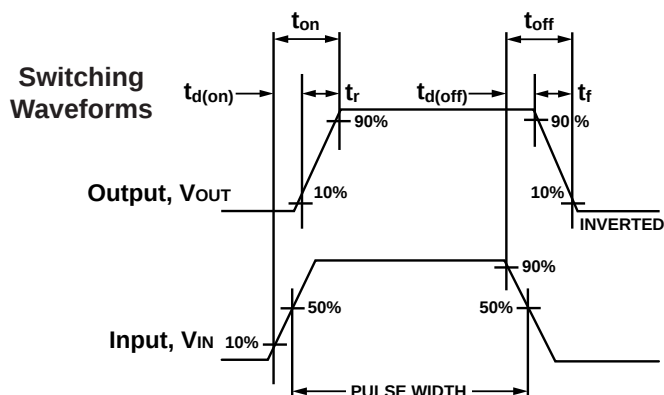
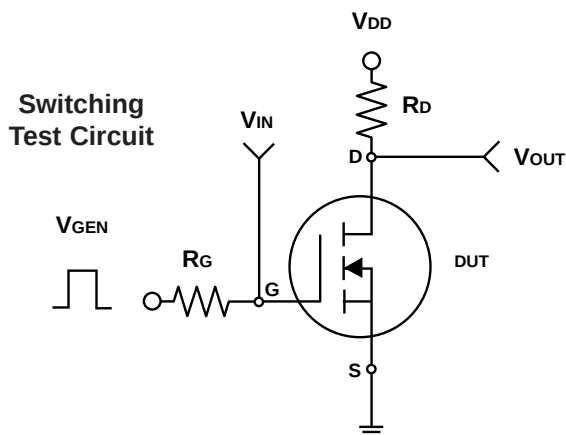
| Parameter                                             | Symbol                                                | Limit      | Unit               |
|-------------------------------------------------------|-------------------------------------------------------|------------|--------------------|
| Drain-Source Voltage                                  | $V_{DS}$                                              | 30         | V                  |
| Gate-Source Voltage                                   | $V_{GS}$                                              | $\pm 20$   |                    |
| Continuous Drain Current <sup>(1)</sup>               | $I_D$                                                 | 43         | A                  |
| Pulsed Drain Current                                  | $I_{DM}$                                              | 80         |                    |
| Maximum Power Dissipation                             | $T_C = 25^\circ\text{C}$<br>$T_C = 100^\circ\text{C}$ | 44.5       | W                  |
|                                                       |                                                       | 17.8       |                    |
| Operating Junction and Storage Temperature Range      | $T_J, T_{stg}$                                        | -55 to 150 | $^\circ\text{C}$   |
| Junction-to-Case Thermal Resistance                   | $R_{\theta JC}$                                       | 2.8        | $^\circ\text{C/W}$ |
| Junction-to-Ambient Thermal Resistance <sup>(2)</sup> | $R_{\theta JA}$                                       | 125        |                    |

**Note:** (1) Maximum DC current limited by the package(2) 1-in<sup>2</sup> 2oz. Cu PCB mounted

## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise noted)

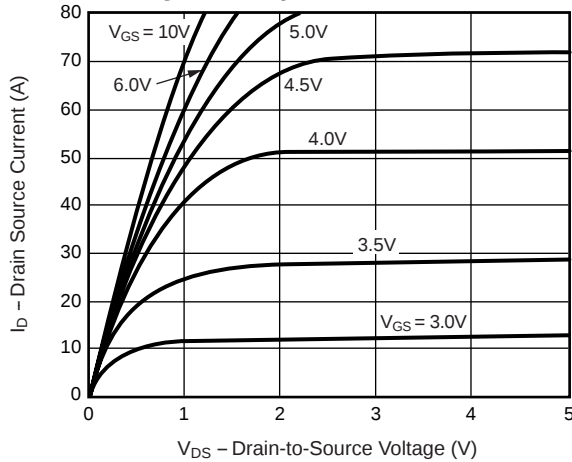
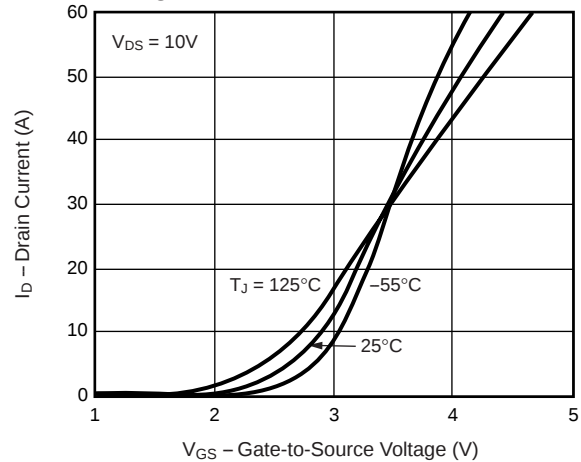
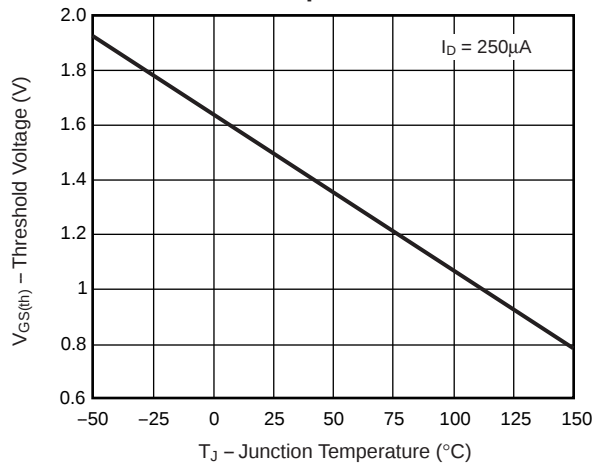
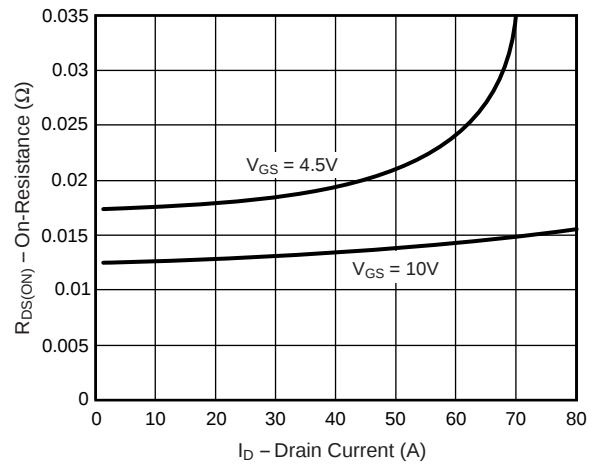
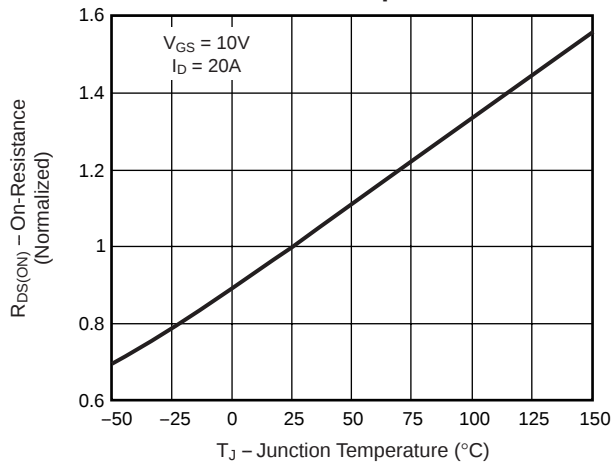
| Parameter                                       | Symbol              | Test Condition                                                                                                    | Min | Typ  | Max  | Unit |
|-------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------|-----|------|------|------|
| Static                                          |                     |                                                                                                                   |     |      |      |      |
| Drain-Source Breakdown Voltage                  | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                                      | 30  | –    | –    | V    |
| Gate Threshold Voltage                          | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                                        | 1.0 | –    | 3.0  | V    |
| Gate-Body Leakage                               | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                      | –   | –    | ±100 | nA   |
| Zero Gate Voltage Drain Current                 | I <sub>DSS</sub>    | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                                                       | –   | –    | 1    | μA   |
| On-State Drain Current <sup>(1)</sup>           | I <sub>D(on)</sub>  | V <sub>DS</sub> ≥ 5V, V <sub>GS</sub> = 10V                                                                       | 40  | –    | –    | A    |
| Drain-Source On-State Resistance <sup>(2)</sup> | R <sub>DS(on)</sub> | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A                                                                       | –   | 12.5 | 15   | mΩ   |
|                                                 |                     | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 17A                                                                      | –   | 17.5 | 21   |      |
| Forward Transconductance <sup>(1)</sup>         | g <sub>fs</sub>     | V <sub>DS</sub> = 15V, I <sub>D</sub> = 20A                                                                       | –   | 35   | –    | S    |
| Dynamic                                         |                     |                                                                                                                   |     |      |      |      |
| Total Gate Charge                               | Q <sub>g</sub>      | V <sub>DS</sub> =15V, V <sub>GS</sub> =5.0V, I <sub>D</sub> =20A                                                  | –   | 16   | 22   | nC   |
|                                                 |                     | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 10V<br>I <sub>D</sub> = 20A                                              | –   | 34   | 48   |      |
|                                                 |                     |                                                                                                                   | –   | 5.7  | –    |      |
| Gate-Source Charge                              | Q <sub>gs</sub>     |                                                                                                                   | –   | 4.7  | –    |      |
| Gate-Drain Charge                               | Q <sub>gd</sub>     |                                                                                                                   | –   | 10   | 20   |      |
| Turn-On Delay Time                              | t <sub>d(on)</sub>  | V <sub>DD</sub> = 15V, R <sub>L</sub> = 15Ω<br>I <sub>D</sub> ≅ 1A, V <sub>GEN</sub> = 10V<br>R <sub>G</sub> = 6Ω | –   | 9    | 18   | ns   |
| Rise Time                                       | t <sub>r</sub>      |                                                                                                                   | –   | 47   | 75   |      |
| Turn-Off Delay Time                             | t <sub>d(off)</sub> |                                                                                                                   | –   | 13   | 26   |      |
| Fall Time                                       | t <sub>f</sub>      |                                                                                                                   | –   | 1850 | –    |      |
| Input Capacitance                               | C <sub>iss</sub>    | V <sub>GS</sub> = 0V                                                                                              | –   | 315  | –    | pF   |
| Output Capacitance                              | C <sub>oss</sub>    | V <sub>DS</sub> = 15V                                                                                             | –   | 150  | –    |      |
| Reverse Transfer Capacitance                    | C <sub>rss</sub>    | f = 1.0MHz                                                                                                        | –   |      |      |      |
| Source-Drain Diode                              |                     |                                                                                                                   |     |      |      |      |
| Max Diode Forward Current                       | I <sub>S</sub>      | –                                                                                                                 | –   | –    | 20   | A    |
| Diode Forward Voltage <sup>(1)</sup>            | V <sub>SD</sub>     | I <sub>S</sub> = 20A, V <sub>GS</sub> = 0V                                                                        | –   | 0.91 | 1.3  | V    |

**Note:** (1) Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%



# Ratings and Characteristic Curves

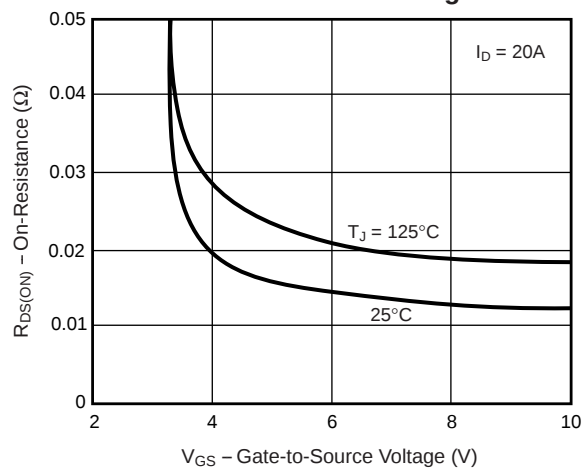
( $T_A = 25^\circ\text{C}$  unless otherwise noted)

**Fig. 1 – Output Characteristics**

**Fig. 2 – Transfer Characteristics**

**Fig. 3 – Threshold Voltage vs. Temperature**

**Fig. 4 – On-Resistance vs. Drain Current**

**Fig. 5 – On-Resistance vs. Junction Temperature**


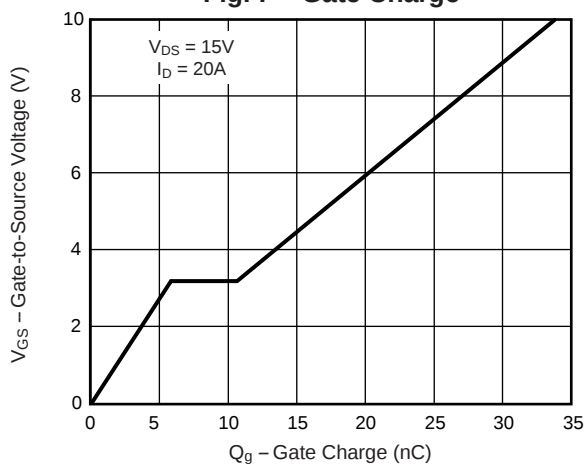
## Ratings and Characteristic Curves

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

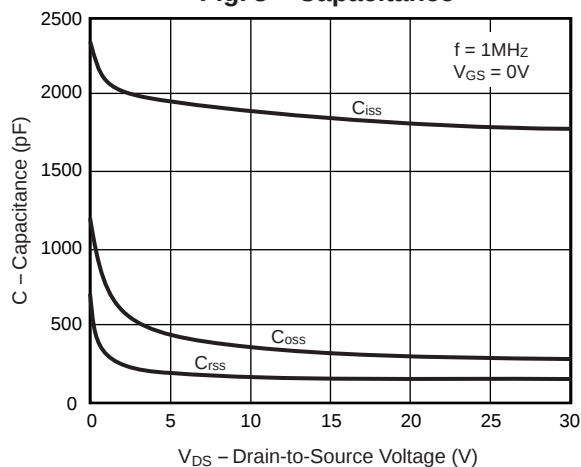
**Fig. 6 – On-Resistance vs. Gate-to-Source Voltage**



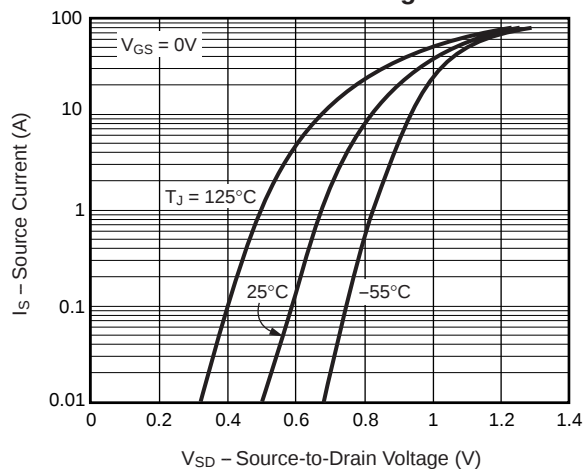
**Fig. 7 – Gate Charge**



**Fig. 8 – Capacitance**

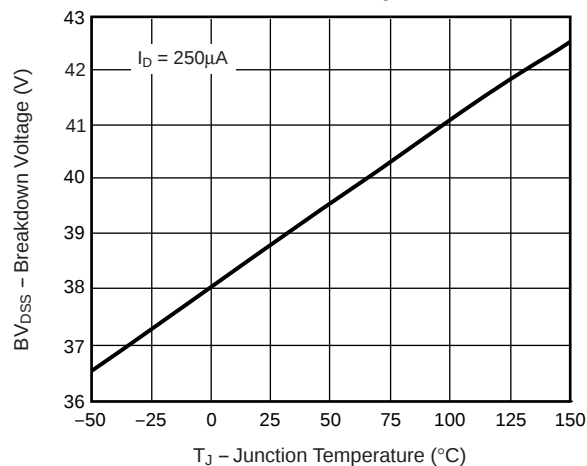


**Fig. 9 – Source-Drain Diode Forward Voltage**

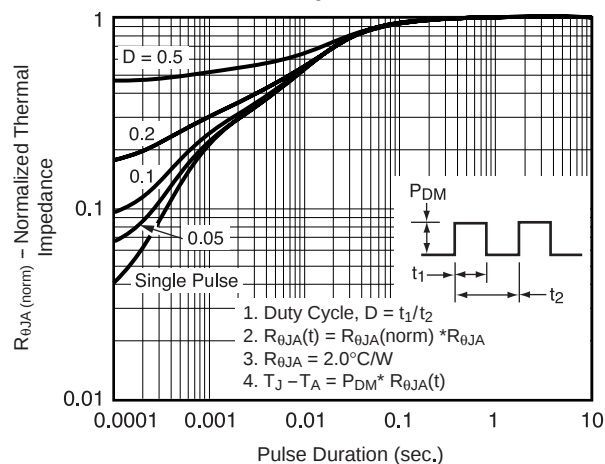


## Ratings and Characteristic Curves ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

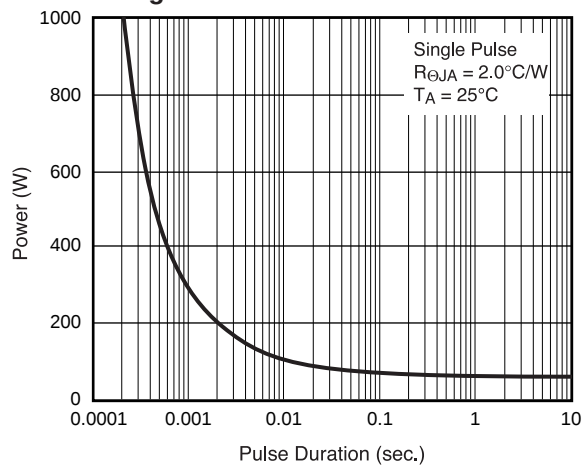
**Fig. 10 – Breakdown Voltage vs. Junction Temperature**



**Fig. 11 – Transient Thermal Impedance**



**Fig. 12 – Power vs. Pulse Duration**



**Fig. 13 – Maximum Safe Operating Area**

