

**Features**

- Advanced Shield Gate Trench technology
- Super Low Gate Charge
- High-Speed Switching
- 100% EAS Guaranteed
- Green Device Available

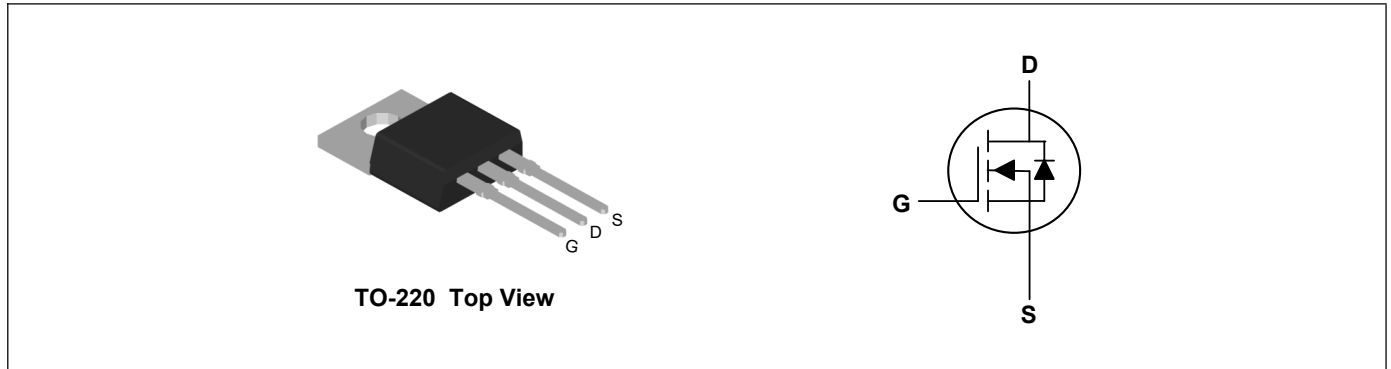
**Applications**

- High Frequency Point-of-Load, Synchronous Buck Converter
- Networking DC-DC Power System
- Load Switch

**Product Summary**



|                                 |     |            |
|---------------------------------|-----|------------|
| $V_{DS}$                        | 150 | V          |
| $I_D$                           | 125 | A          |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ ) | 14  | m $\Omega$ |



**Absolute Maximum Ratings( $T_c=25^\circ C$ , unless otherwise noted)**

| Parameter                                  | Symbol                | Rating     | Units      |
|--|-----------------------|------------|------------|
| Drain-Source Voltage                       | $V_{DS}$              | 150        | V          |
| Gate-Source Voltage                        | $V_{GS}$              | $\pm 20$   | V          |
| Continuous Drain Current <sup>1</sup>      | $I_D@T_c=25^\circ C$  | 125        | A          |
| Continuous Drain Current <sup>1</sup>      | $I_D@T_c=100^\circ C$ | 80         | A          |
| Pulsed Drain Current <sup>2</sup>          | $I_{DM}$              | 500        | A          |
| Single Pulse Avalanche Energy <sup>3</sup> | $E_{AS}$              | 1320       | mJ         |
| Total Power Dissipation                    | $P_D$                 | 420        | W          |
| Storage Temperature Range                  | $T_{STG}$             | -55 to 150 | $^\circ C$ |
| Operating Junction Temperature Range       | $T_J$                 | -55 to 150 | $^\circ C$ |

**Thermal Characteristics**

| Parameter                                     | Symbol          | Typ | Max  | Unit         |
|---|-----------------|-----|------|--------------|
| Thermal Resistance Junction-Case <sup>1</sup> | $R_{\theta JC}$ | --- | 0.29 | $^\circ C/W$ |

**Electrical Characteristics ( $T_J=25^{\circ}\text{C}$ , unless otherwise noted)**

| Parameter                         | Symbol       | Conditions                                     | Min | Typ  | Max       | Unit       |
|-----------------------------------|--------------|--|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage    | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                      | 150 | ---  | ---       | V          |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}=10V, I_D=30A$                          | --- | 11   | 14        | m $\Omega$ |
| Gate Threshold Voltage            | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$                  | 2.5 | ---  | 4.5       | V          |
| Drain-Source Leakage Current      | $I_{DSS}$    | $V_{DS}=150V, V_{GS}=0V$                       | --- | ---  | 1         | $\mu A$    |
| Gate-Source Leakage Current       | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$                    | --- | ---  | $\pm 100$ | nA         |
| Forward Transconductance          | $g_{fs}$     | $V_{DS}=5V, I_D=30A$                           | --- | 52   | ---       | S          |
| Total Gate Charge                 | $Q_g$        | $V_{DS}=75V, V_{GS}=10V, I_D=30A$              | --- | 68   | ---       | nC         |
| Gate-Source Charge                | $Q_{gs}$     |  | --- | 23   | ---       |            |
| Gate-Drain Charge                 | $Q_{gd}$     |  | --- | 24   | ---       |            |
| Turn-On Delay Time                | $T_{d(on)}$  | $V_{DD}=75V, V_{GS}=10V, R_G=3\Omega, I_D=30A$ | --- | 18   | ---       | ns         |
| Rise Time                         | $T_r$        |  | --- | 89   | ---       |            |
| Turn-Off Delay Time               | $T_{d(off)}$ |  | --- | 34   | ---       |            |
| Fall Time                         | $T_f$        |  | --- | 70   | ---       |            |
| Input Capacitance                 | $C_{iss}$    | $V_{DS}=75V, V_{GS}=0V, f=1\text{MHz}$         | --- | 3500 | ---       | pF         |
| Output Capacitance                | $C_{oss}$    |  | --- | 310  | ---       |            |
| Reverse Transfer Capacitance      | $C_{rss}$    |  | --- | 85   | ---       |            |

**Drain-Source Diode Characteristics**

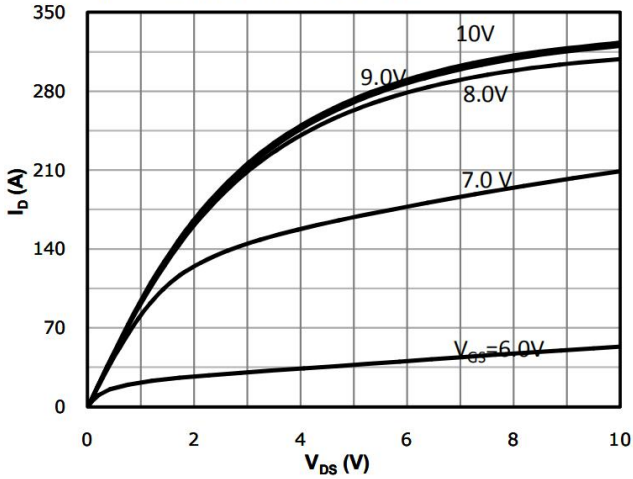
| Parameter                          | Symbol   | Conditions                                   | Min | Typ | Max | Unit |
|------------------------------------|----------|--|-----|-----|-----|------|
| Diode Forward Voltage <sup>2</sup> | $V_{SD}$ | $V_{GS}=0V, I_S=30A, T_J=25^{\circ}\text{C}$ | --- | --- | 1.3 | V    |
| Reverse Recovery Time              | $t_{rr}$ | $I_F=30A$                                    | --- | 70  | --- | nS   |
| Reverse Recovery Charge            | $Q_{rr}$ | $di/dt=100A/\mu s, T_J=25^{\circ}\text{C}$   | --- | 230 | --- | nC   |

**Note:**

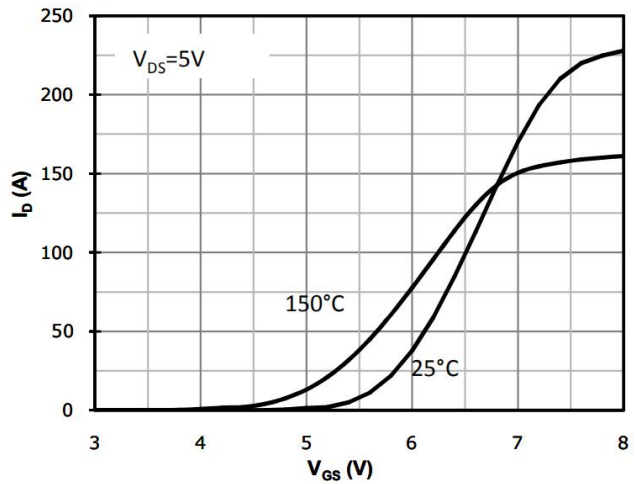
- 1.The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is  $V_{DD}=50V, L=0.5\text{mH}$

**Typical Characteristics**

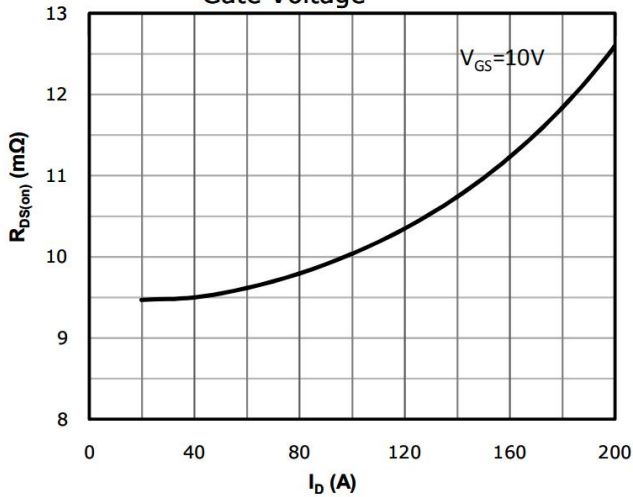
**Fig 1: Output Characteristics**



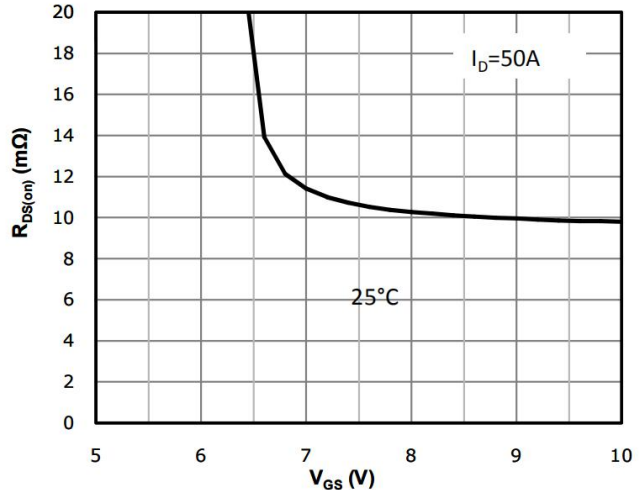
**Fig 2: Transfer Characteristics**



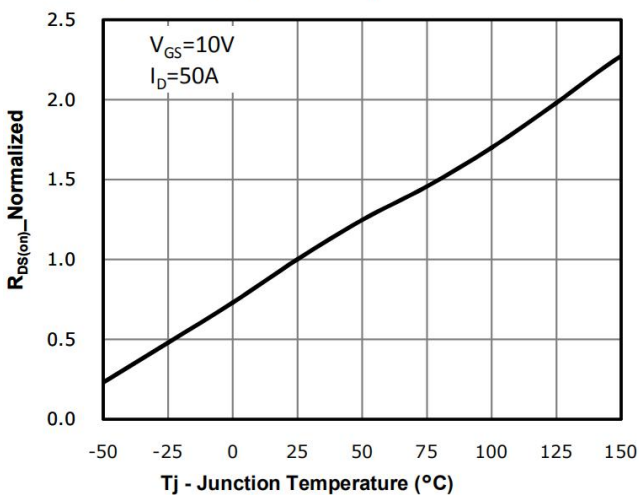
**Fig 3: Rds(on) vs Drain Current and Gate Voltage**



**Fig 4: Rds(on) vs Gate Voltage**



**Fig 5: Rds(on) vs. Temperature**



**Fig 6: Capacitance Characteristics**

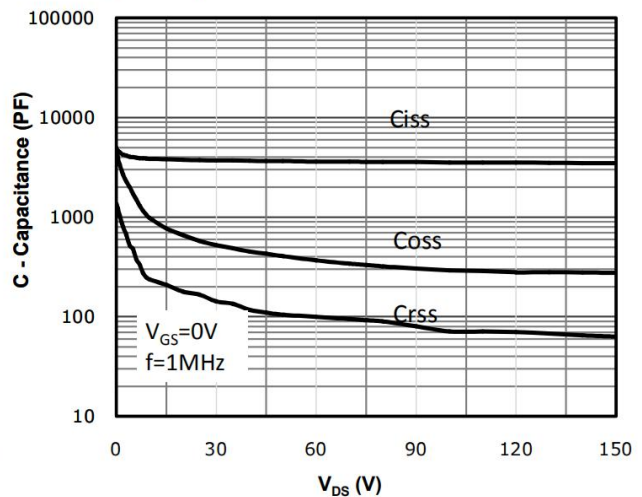


Fig 7: Gate Charge Characteristics

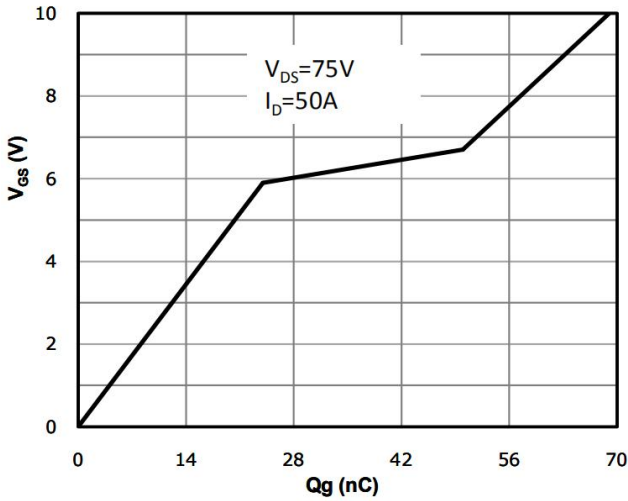


Fig 8: Body-diode Forward Characteristics

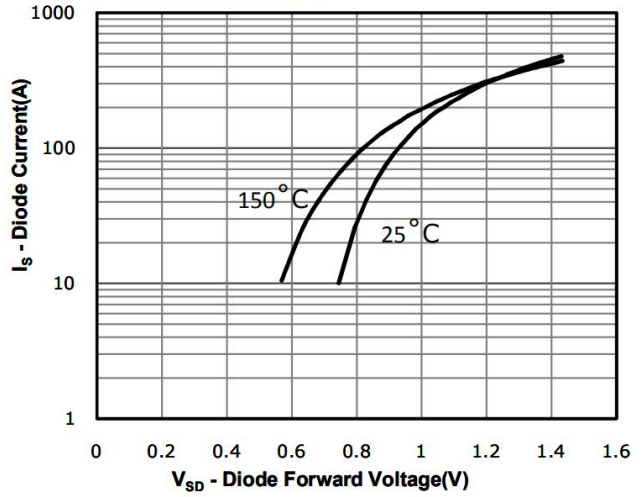


Fig 9: Power Dissipation

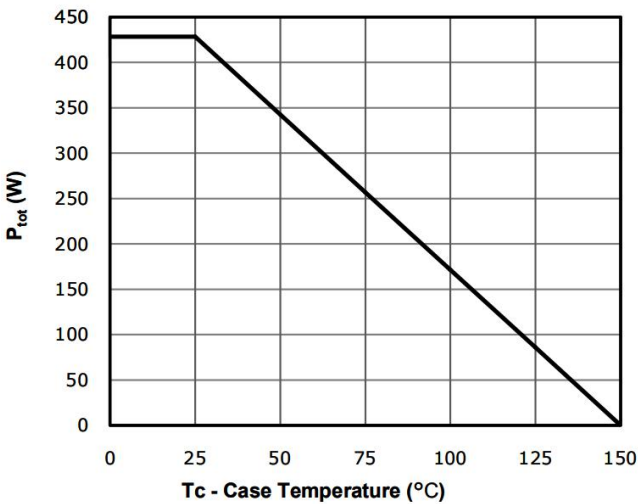


Fig 10: Drain Current Derating

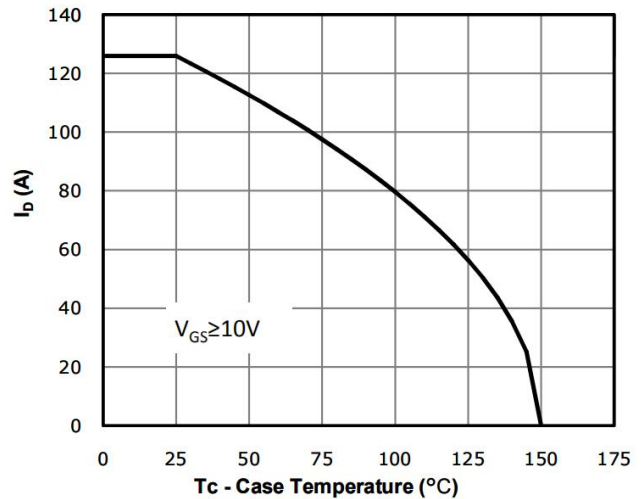
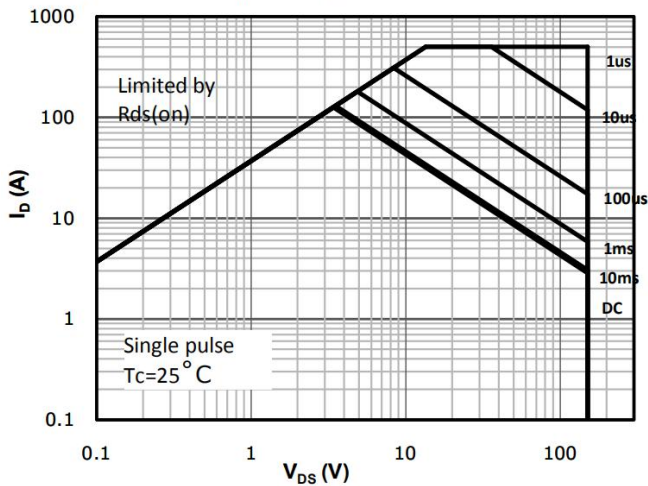
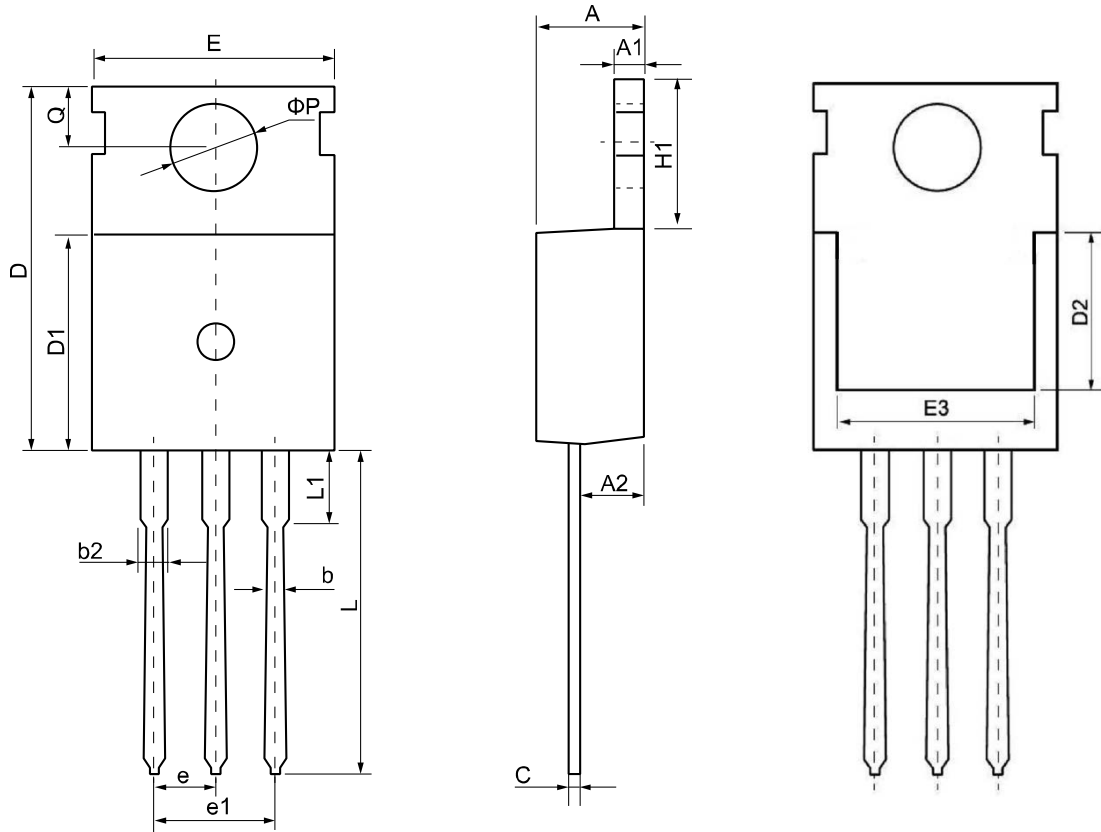


Fig 11: Safe Operating Area



**TO-220 Package Outline Dimensions**



| Symbol    | Dimensions (unit:mm) |       |       | Symbol    | Dimensions (unit:mm) |       |       |
|-----------|----------------------|-------|-------|-----------|----------------------|-------|-------|
|           | Min                  | Typ   | Max   |           | Min                  | Typ   | Max   |
| <b>A</b>  | 4.30                 | 4.55  | 4.75  | <b>E</b>  | 9.65                 | 10.00 | 10.25 |
| <b>A1</b> | 1.15                 | 1.30  | 1.45  | <b>E3</b> | 7.00                 | --    | --    |
| <b>A2</b> | 2.20                 | 2.40  | 2.60  | <b>e</b>  | 2.54 BSC             |       |       |
| <b>b</b>  | 0.70                 | 0.80  | 0.95  | <b>e1</b> | 5.08 BSC             |       |       |
| <b>b2</b> | 1.17                 | 1.27  | 1.47  | <b>H1</b> | 6.30                 | 6.50  | 6.80  |
| <b>c</b>  | 0.40                 | 0.50  | 0.65  | <b>L</b>  | 12.70                | 13.50 | 14.10 |
| <b>D</b>  | 15.30                | 15.60 | 15.90 | <b>L1</b> | --                   | 3.20  | 3.95  |
| <b>D1</b> | 8.90                 | 9.10  | 9.35  | <b>φP</b> | 3.40                 | 3.60  | 3.80  |
| <b>D2</b> | 5.50                 | --    | --    | <b>Q</b>  | 2.60                 | 2.80  | 3.00  |