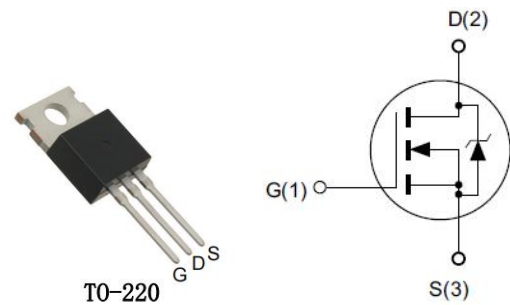


### Features

- ◆ 500V, 18A,  $R_{DS(ON)}(Typ.) = 0.27\Omega @ V_{GS} = 10V$ .
- ◆ Low  $C_{rss}$
- ◆ Fast Switching
- ◆ 100% Avalanche Tested

### Application

- ◆ Adapter
- ◆ DC-AC power converter
- ◆ switching power supply



### Absolute Maximum Ratings $T_c = 25^\circ C$ unless otherwise noted

| Symbol         | Parameter                                      | Limit      | Unit       |
|----------------|------------------------------------------------|------------|------------|
|                |                                                | TO-220     |            |
| $V_{DS}$       | Drain-Source Voltage <sup>a</sup>              | 500        | V          |
| $V_{GS}$       | Gate-Source Voltage                            | $\pm 30$   | V          |
| $I_D$          | Drain Current-Continuous, $T_c = 25^\circ C$   | 18         | A          |
|                | Drain Current-Continuous, $T_c = 100^\circ C$  | 11         | A          |
| $I_{DM}$       | Drain Current-Pulsed <sup>b</sup>              | 72         | A          |
| $P_D$          | Maximum Power Dissipation @ $T_J = 25^\circ C$ | 190        | W          |
| EAS            | Single Pulsed Avalanche Energy <sup>d</sup>    | 845        | mJ         |
| $T_J, T_{STG}$ | Operating and Store Temperature Range          | -55 to 150 | $^\circ C$ |

### Thermal Characteristics

| Symbol          | Parameter                               | Value | Unit         |
|-----------------|-----------------------------------------|-------|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction-Case Max.  | 0.66  | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient Max | 62.5  | $^\circ C/W$ |

### Electrical Characteristics $T_J = 25^\circ C$ unless otherwise noted

#### Off Characteristics

| Symbol     | Parameter                         | Test Condition                  | Min. | Typ. | Max.      | Unit    |
|------------|-----------------------------------|---------------------------------|------|------|-----------|---------|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage    | $V_{GS} = 0V, I_D = 250\mu A$   | 500  | -    | -         | V       |
| $I_{DSS}$  | Zero Gate Voltage Drain Current   | $V_{DS} = 500V, V_{GS} = 0V$    | -    | -    | 1         | $\mu A$ |
| $I_{GSS}$  | Forward Gate Body Leakage Current | $V_{DS} = 0V, V_{GS} = \pm 30V$ | -    | -    | $\pm 100$ | nA      |

### ■ On Characteristics

| Symbol       | Parameter                                      | Test Condition                    | Min. | Typ. | Max. | Unit     |
|--------------|------------------------------------------------|-----------------------------------|------|------|------|----------|
| $V_{GS(th)}$ | Gate Threshold Voltage                         | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.0  | -    | 4.0  | V        |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance <sup>c</sup> | $V_{GS} = 10V, I_D = 9A$          | -    | 0.27 | 0.35 | $\Omega$ |

### ■ Dynamic Characteristics

| Symbol    | Parameter                    | Test Condition                                    | Min. | Typ. | Max. | Unit |
|-----------|------------------------------|---------------------------------------------------|------|------|------|------|
| $C_{iss}$ | Input Capacitance            | $V_{DS} = 25V,$<br>$V_{GS} = 0V,$<br>$f = 1.0MHz$ | -    | 2618 | -    | pF   |
| $C_{oss}$ | Output Capacitance           |                                                   | -    | 221  | -    | pF   |
| $C_{rss}$ | Reverse Transfer Capacitance |                                                   | -    | 5.96 | -    | pF   |

### ■ On Characteristics

| Symbol       | Parameter           | Test Condition                                                | Min. | Typ. | Max. | Unit |
|--------------|---------------------|---------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$  | Turn-On Delay Time  | $V_{DD} = 250V, I_D = 18A,$<br>$R_G = 10\Omega, V_{GS} = 10V$ | -    | 28   | -    | ns   |
| $t_r$        | Turn-On Rise Time   |                                                               | -    | 47   | -    | ns   |
| $t_{d(off)}$ | Turn-Off Delay Time |                                                               | -    | 57   | -    | ns   |
| $t_f$        | Turn-Off Fall Time  |                                                               | -    | 40   | -    | ns   |
| $Q_g$        | Total Gate Charge   | $V_{DS} = 400V, I_D = 18A,$<br>$V_{GS} = 10V$                 | -    | 45.7 | -    | nC   |
| $Q_{gs}$     | Gate-Source Charge  |                                                               | -    | 12.6 | -    | nC   |
| $Q_{gd}$     | Gate-Drain Charge   |                                                               | -    | 15.7 | -    | nC   |

### ■ Drain-Source Diode Characteristics

| Symbol   | Parameter                                     | Test Condition                                                            | Min. | Typ. | Max. | Unit |
|----------|-----------------------------------------------|---------------------------------------------------------------------------|------|------|------|------|
| $I_S$    | Drain-Source Diode Forward Continuous Current | $V_{GS} = 0V$                                                             | -    | -    | 18   | A    |
| $I_{SM}$ | Maximum Pulsed Current                        | $V_{GS} = 0V$                                                             | -    | -    | 72   | A    |
| $V_{SD}$ | Drain-Source Diode Forward Voltage            | $V_{GS} = 0V, I_S = 18A$                                                  | -    | -    | 1.5  | V    |
| $t_{rr}$ | Reverse Recovery Time                         | $I_S = 16A, T_j = 25^\circ C$<br>$dI_F/dt = 100A/\mu s,$<br>$V_{GS} = 0V$ | -    | 450  | -    | ns   |
| $Q_{rr}$ | Reverse Recovery Charge                       |                                                                           | -    | 4765 | -    | nC   |

Notes:

- $T_J = +25^\circ C$  to  $+150^\circ C$
- Repetitive rating; pulse width limited by maximum junction temperature.
- Pulse width  $\leq 300\mu s$ ; duty cycle  $\leq 2\%$
- $L = 10mH, V_{DD} = 50V, I_{AS} = 13A, R_G = 25\Omega$  Starting  $T_J = 25^\circ C$

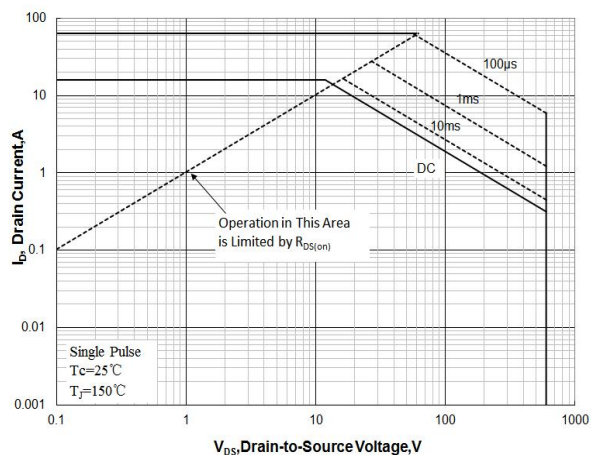


Figure 1. Maximum Safe Operating Area

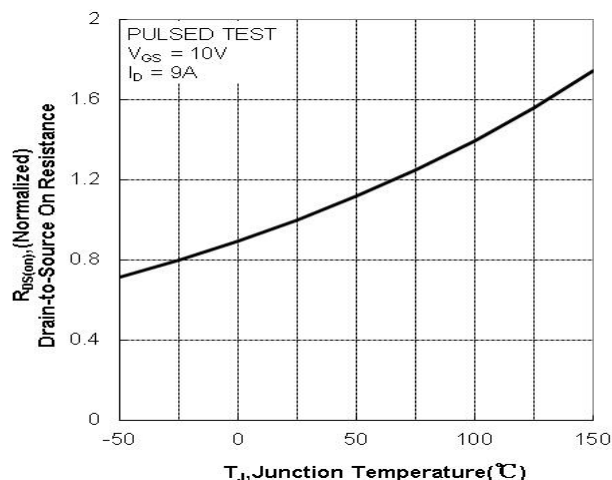


Figure 2. Normalized On-Resistance Variation with Temperature

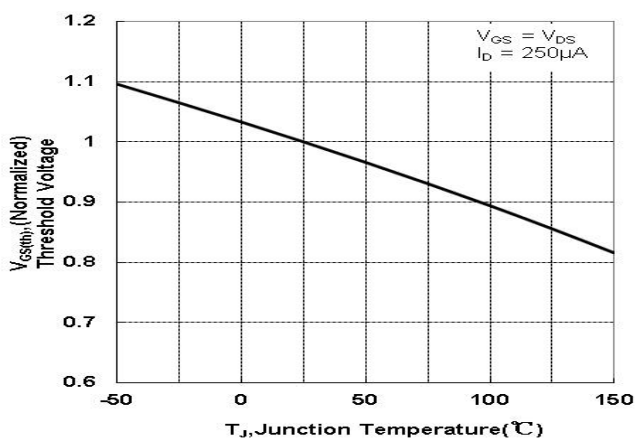


Figure 3. Gate Threshold Variation with Temperature

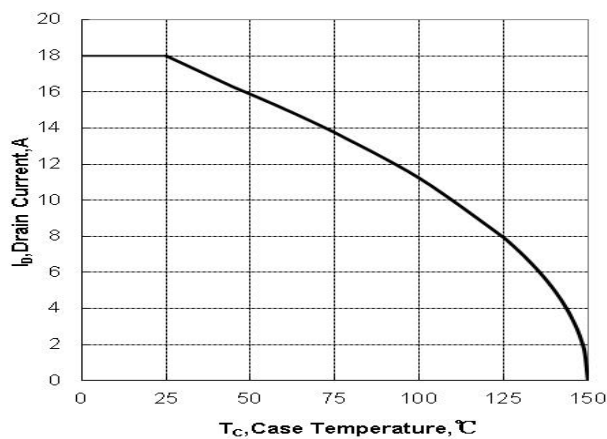


Figure 4. Maximum Drain Current with Case Temperature

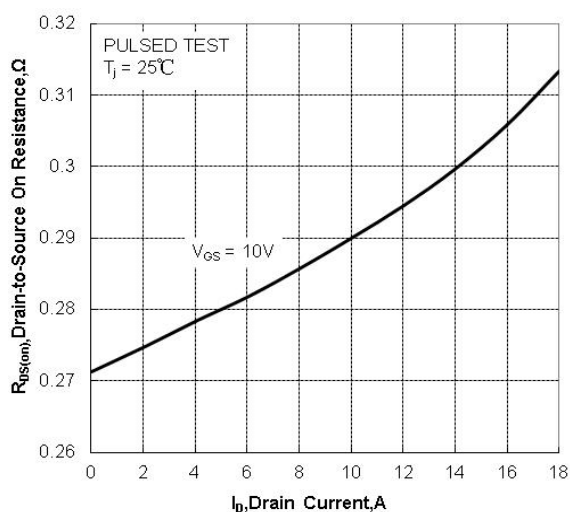


Figure 8. Typical Drain to Source ON Resistance vs Drain Current

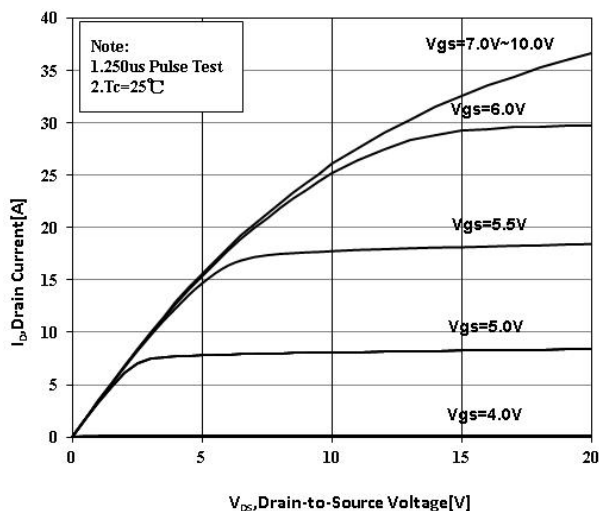


Figure 6. On-State Characteristics

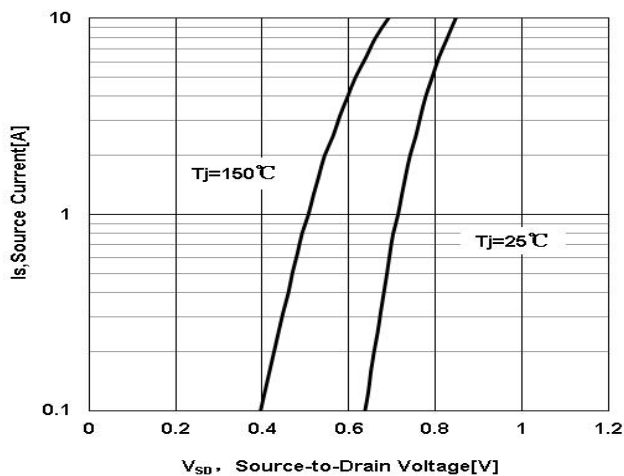


Figure 7. Body Diode Forward Voltage Variation with Source Current

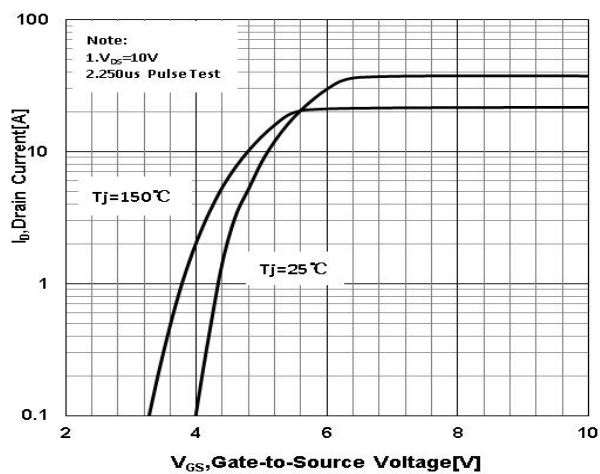


Figure 8. Transfer Characteristics Variation with Source Current

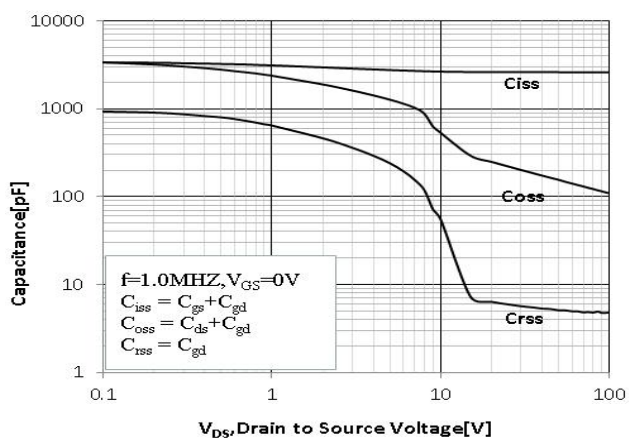


Figure 9. Capacitance Characteristics

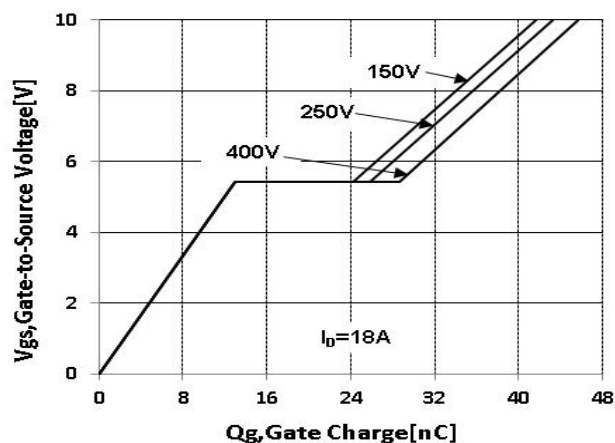


Figure 10. Gate Charge Characteristics

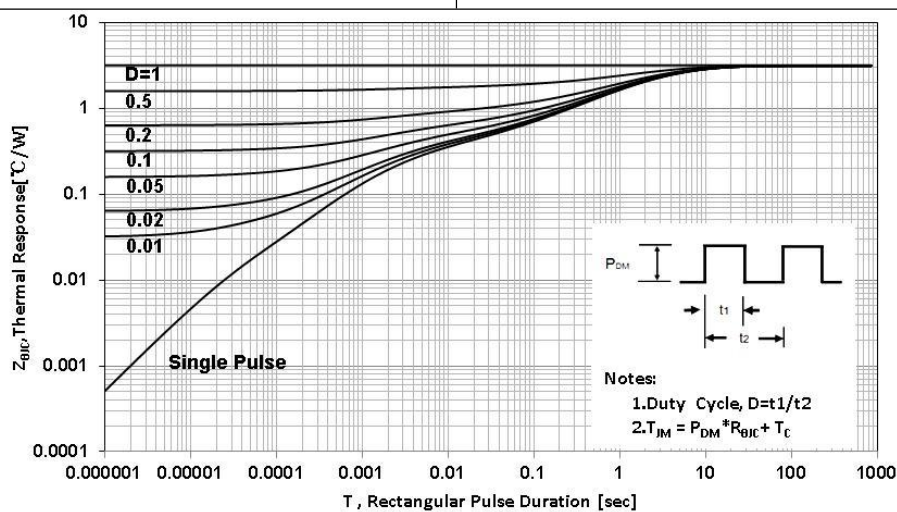


Figure 11. Normalized Effective Transient Thermal Impedance With Pulse Duration

### ■ Package Information

