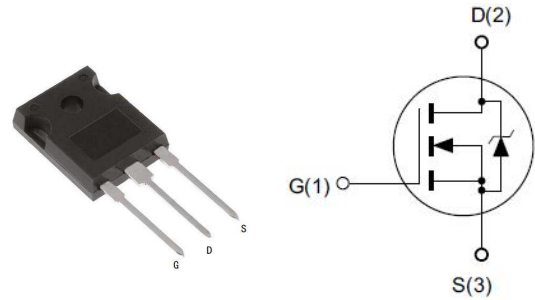


### Features

- ◆ 500V, 29A,  $R_{DS(ON)}(Typ.) = 113m\Omega @ V_{GS} = 10V$
- ◆ Advanced Super Junction Technology
- ◆ Easy To Control Gate Switching
- ◆ 100% Avalanche Tested



### Application

- ◆ PC power and PD Adaptor
- ◆ LCD & PDP TV and LED lighting
- ◆ Single-ended flyback or two-transistor forward topologies

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

| Symbol         | Parameter                                            | Rating          | Unit             |
|----------------|------------------------------------------------------|-----------------|------------------|
| $V_{DS}$       | Drain-Source Voltage <sup>a</sup>                    | 500             | V                |
| $V_{GS}$       | Gate-Source Voltage                                  | $\pm 30$        |                  |
| $I_D$          | Drain Current-Continuous, $T_c = 25^\circ\text{C}$   | 29              | A                |
| $I_{DM}$       | Drain Current-Pulsed <sup>b</sup>                    | 87              |                  |
| $P_D$          | Maximum Power Dissipation @ $T_J = 25^\circ\text{C}$ | 156             | W                |
| $dv/dt$        | Peak Diode Recovery $dv/dt$ <sup>c</sup>             | 50              | V/ns             |
| $E_{AS}$       | Single Pulsed Avalanche Energy <sup>d</sup>          | 500             | mJ               |
| $T_J, T_{STG}$ | Operating and Store Temperature Range                | 150, -55 to 150 | $^\circ\text{C}$ |

### Thermal Characteristics

| Symbol          | Parameter                               | Value | Unit               |
|-----------------|-----------------------------------------|-------|--------------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case    | 0.8   | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 62    |                    |

### Electrical Characteristics $T_J = 25^\circ\text{C}$ 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 | $V_{DS} = 0V, V_{GS} = 30V$   | -    | -    | 100  | nA      |

### ■ On Characteristics

| Symbol       | Parameter                         | Test Condition                    | Min. | Typ. | Max. | Unit       |
|--------------|-----------------------------------|-----------------------------------|------|------|------|------------|
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.5  | -    | 3.5  | V          |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance | $V_{GS} = 10V, I_D = 14.5A$       | -    | 113  | 130  | m $\Omega$ |

### ■ Dynamic Characteristics

| Symbol    | Parameter                    | Test Condition                                     | Min. | Typ. | Max. | Unit     |
|-----------|------------------------------|----------------------------------------------------|------|------|------|----------|
| $R_G$     | Gate Resistance              | $f = 1.0MHz$                                       | -    | 24.2 | -    | $\Omega$ |
| $C_{iss}$ | Input Capacitance            | $V_{DS} = 100V,$<br>$V_{GS} = 0V,$<br>$f = 1.0MHz$ | -    | 1446 | -    | pF       |
| $C_{oss}$ | Output Capacitance           |                                                    | -    | 79   | -    |          |
| $C_{rss}$ | Reverse Transfer Capacitance |                                                    | -    | 1.31 | -    |          |

### ■ On Characteristics

| Symbol       | Parameter           | Test Condition                                                            | Min. | Typ. | Max. | Unit |
|--------------|---------------------|---------------------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$  | Turn-On Delay Time  | $V_{DD} = 400V,$<br>$V_{GS} = 13V,$<br>$I_D = 7.7A,$<br>$R_G = 3.4\Omega$ | -    | 20   | -    | ns   |
| $t_r$        | Turn-On Rise Time   |                                                                           | -    | 13   | -    |      |
| $t_{d(off)}$ | Turn-Off Delay Time |                                                                           | -    | 144  | -    |      |
| $t_f$        | Turn-Off Fall Time  |                                                                           | -    | 25   | -    |      |
| $Q_g$        | Total Gate Charge   | $V_{DD} = 400V,$<br>$V_{GS} = 0 \text{ to } 10V,$<br>$I_D = 7.7A$         | -    | 32.9 | -    | nC   |
| $Q_{gs}$     | Gate-Source Charge  |                                                                           | -    | 6.5  | -    |      |
| $Q_{gd}$     | Gate-Drain Charge   |                                                                           | -    | 11.4 | -    |      |

### ■ Drain-Source Diode Characteristics

| Symbol    | Parameter                          | Test Condition                                     | Min. | Typ. | Max. | Unit    |
|-----------|------------------------------------|----------------------------------------------------|------|------|------|---------|
| $V_{SD}$  | Drain-Source Diode Forward Voltage | $V_{GS} = 0V, I_F = 1A$                            | -    | 0.7  | -    | V       |
| $T_{rr}$  | Body Diode Reverse Recovery Time   | $V_R = 400V, I_F = 7.7A$<br>$dl_F/dt = 100A/\mu s$ | -    | 205  | -    | ns      |
| $Q_{rr}$  | Body Diode Reverse Recovery Charge | $V_R = 400V, I_F = 7.7A$<br>$dl_F/dt = 100A/\mu s$ | -    | 2.0  | -    | $\mu C$ |
| $I_{rrm}$ | Peak reverse recovery current      | $V_R = 400V, I_F = 7.7A$<br>$dl_F/dt = 100A/\mu s$ | -    | 20.3 | -    | A       |

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  $\leq 2\%$ .
- $L = 10mH, V_{DD} = 100V, I_{AS} = 10A, R_G = 25\Omega$  Starting  $T_J = 25^\circ C$ .

### ■ Characteristic Curve

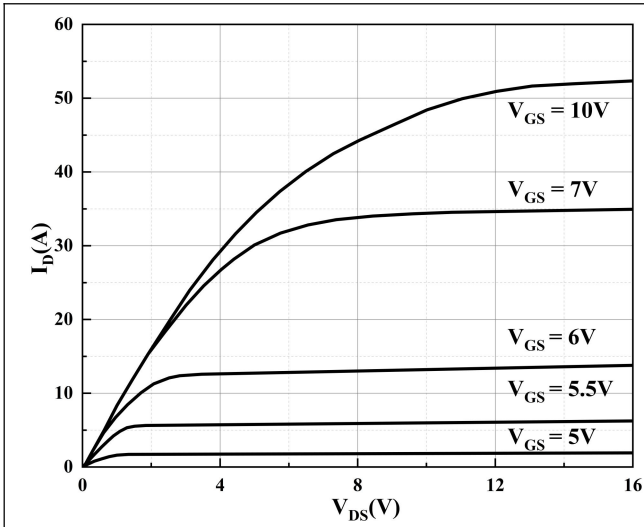


Figure 1. Typical Output Characteristics

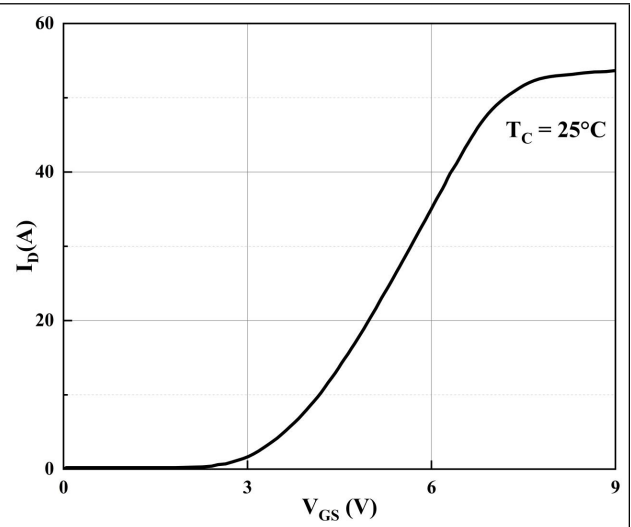


Figure 2. Typical Transfer Characteristics

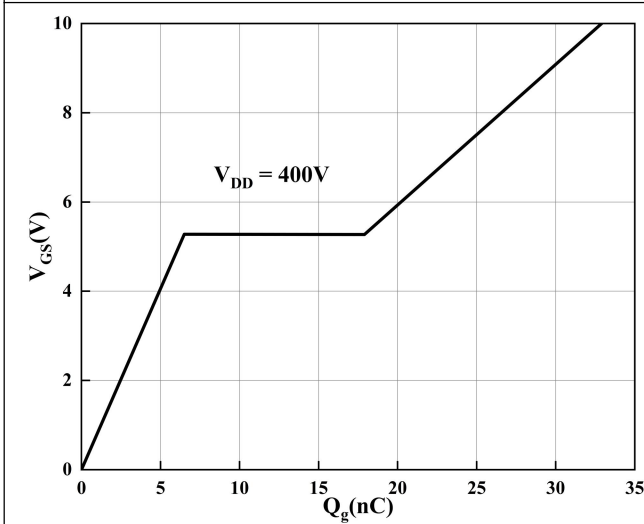


Figure 3. Typical Gate Charge

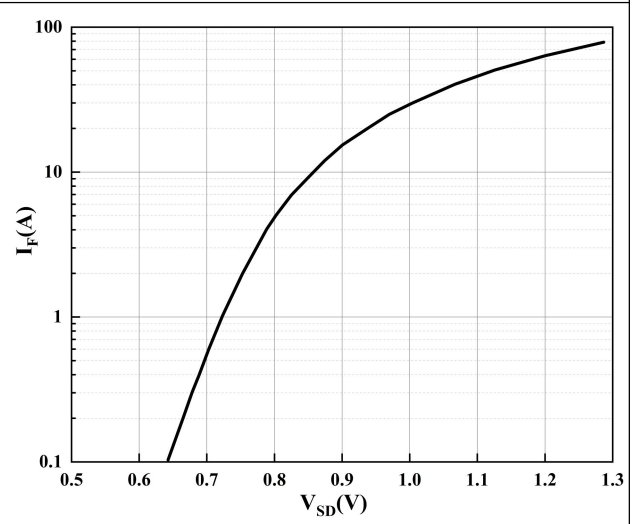


Figure 4. Typical Source-Drain Diode Forward

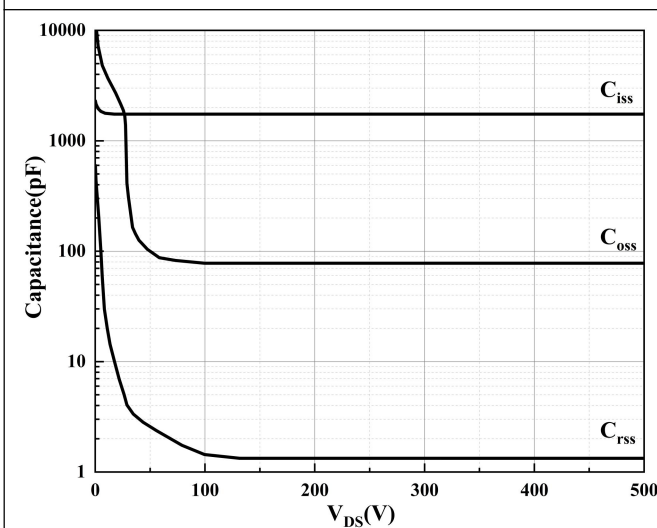


Figure 5. Typical Capacitance

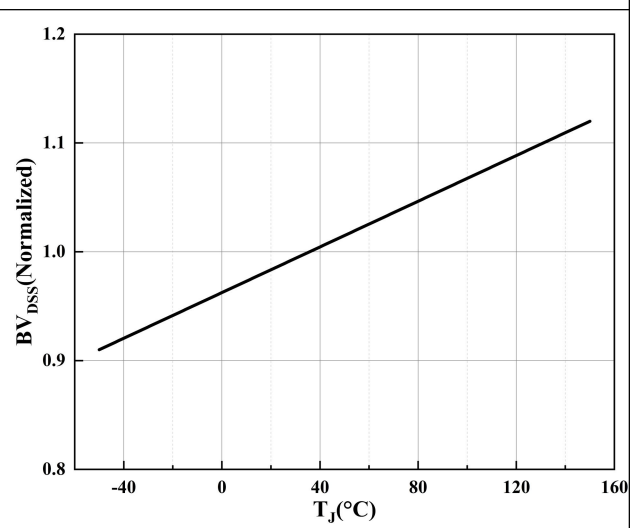


Figure 6. Typical Drain-Source Breakdown Voltage

### ■ Characteristic Curve

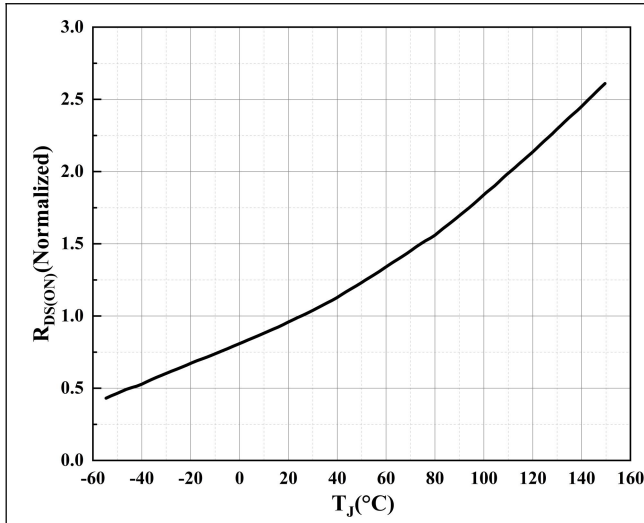


Figure 7. Typical  $R_{DS(ON)}$  vs Junction Temperature

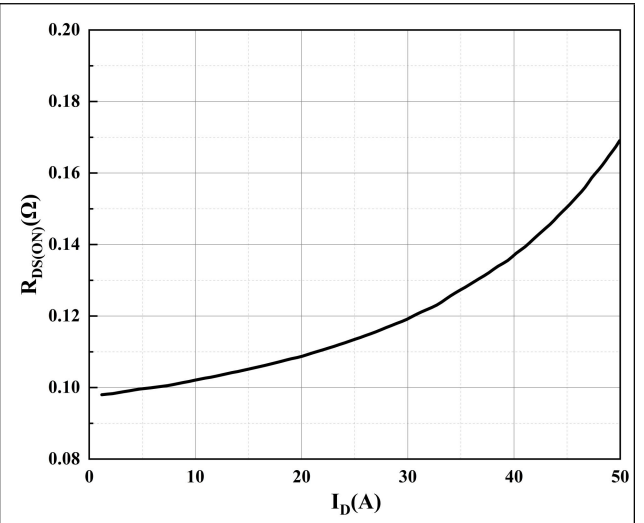


Figure 8. Typical  $R_{DS(ON)}$  vs Drain Current

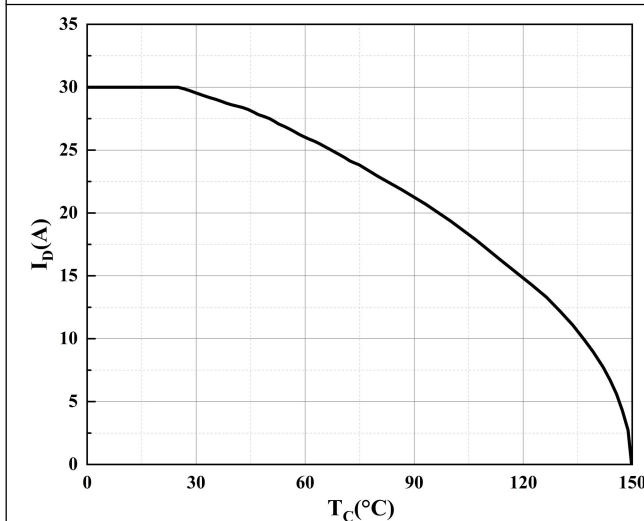


Figure 9. Typical Drain Current De-rating

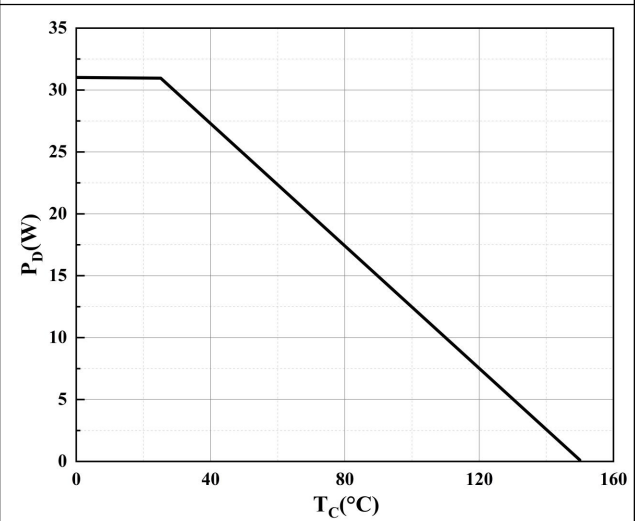


Figure 10. Typical Power Dissipation

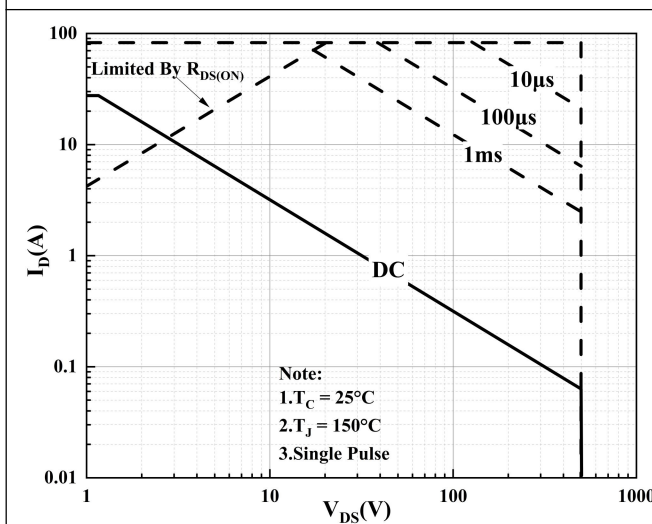


Figure 11. Safe Operating Area

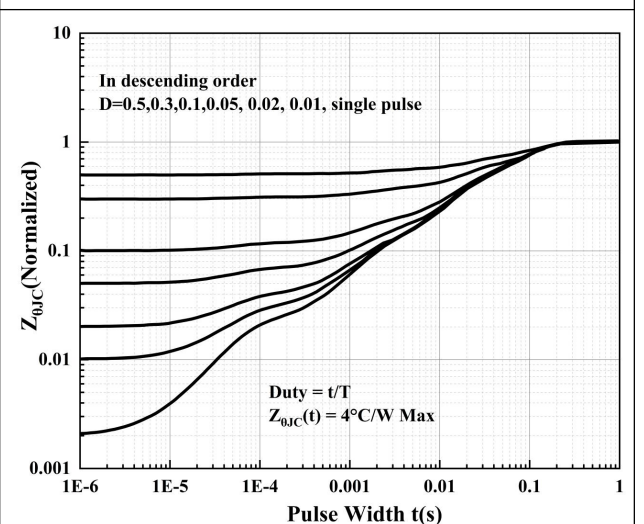


Figure 12. Normalized Transient Impedance

### ■ Package Information

