

### Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)MAX}$ | $I_D$ |
|---------------|-----------------|-------|
| 150V          | 65mΩ@10V        | 20A   |

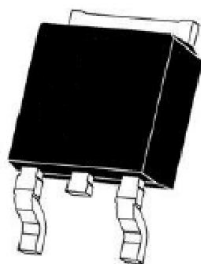
### Feature

- High density cell design for ultra low  $R_{DS(on)}$
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation

### Application

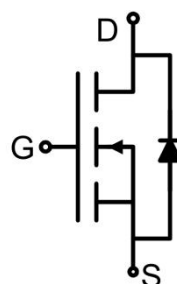
- LED backlighting
- Hard switched and high frequency circuits
- Uninterruptible power supply

### Package



TO-252AB

### Circuit diagram



### Marking



### Absolute maximum ratings (Ta=25°C unless otherwise noted)

| Parameter                            | Symbol          | Value      | Unit          |
|--------------------------------------|-----------------|------------|---------------|
| Drain-Source Voltage                 | $V_{DS}$        | 150        | V             |
| Gate-Source Voltage                  | $V_{GS}$        | $\pm 20$   | V             |
| Continuous Drain Current             | $I_D$           | 20         | A             |
| Pulsed Drain Current                 | $I_{DM}$        | 80         | A             |
| Power Dissipation                    | $P_D$           | 68         | W             |
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 2.2        | $^{\circ}C/W$ |
| Single pulse avalanche energy        | $E_{AS}$        | 65         | mJ            |
| Junction Temperature                 | $T_J$           | 150        | $^{\circ}C$   |
| Storage Temperature                  | $T_{STG}$       | -55 ~ +150 | $^{\circ}C$   |

### Electrical characteristics (Ta=25 °C, unless otherwise noted)

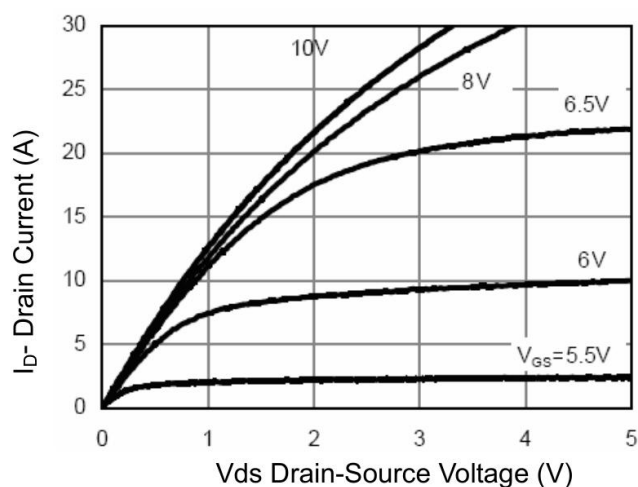
| Parameter                                | Symbol        | Test Condition                                                        | Min. | Typ. | Max.      | Unit       |
|------------------------------------------|---------------|-----------------------------------------------------------------------|------|------|-----------|------------|
| Static Characteristics                   |               |                                                                       |      |      |           |            |
| Drain-source breakdown voltage           | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$                                         | 150  |      |           | V          |
| Zero gate voltage drain current          | $I_{DSS}$     | $V_{DS} = 150V, V_{GS} = 0V$                                          |      |      | 1         | $\mu A$    |
| Gate-body leakage current                | $I_{GSS}$     | $V_{GS} = \pm 20V, V_{DS} = 0V$                                       |      |      | $\pm 100$ | nA         |
| Gate threshold voltage                   | $V_{GS(th)}$  | $V_{DS} = V_{GS}, I_D = 250\mu A$                                     | 2.5  | 3.3  | 4.5       | V          |
| Drain-source on-resistance <sup>1)</sup> | $R_{DS(on)}$  | $V_{GS} = 10V, I_D = 10A$                                             |      | 59   | 65        | m $\Omega$ |
| Forward transconductance <sup>1)</sup>   | $g_{FS}$      | $V_{DS} = 5V, I_D = 10A$                                              | 15   |      |           | S          |
| Dynamic characteristics <sup>2)</sup>    |               |                                                                       |      |      |           |            |
| Input Capacitance                        | $C_{iss}$     | $V_{DS} = 75V, V_{GS} = 0V, f = 1MHz$                                 |      | 600  |           | pF         |
| Output Capacitance                       | $C_{oss}$     |                                                                       |      | 75   |           |            |
| Reverse Transfer Capacitance             | $C_{rss}$     |                                                                       |      | 11   |           |            |
| Total Gate Charge                        | $Q_g$         | $V_{DS} = 75V, V_{GS} = 10V, I_D = 10A$                               |      | 12   |           | nC         |
| Gate-Source Charge                       | $Q_{gs}$      |                                                                       |      | 5.7  |           |            |
| Gate-Drain Charge                        | $Q_{gd}$      |                                                                       |      | 2.7  |           |            |
| Turn-on delay time                       | $t_{d(on)}$   | $V_{DD} = 75V, V_{GS} = 10V,$<br>$R_L = 7.5\Omega, R_{GEN} = 3\Omega$ |      | 9.5  |           | nS         |
| Turn-on rise time                        | $t_r$         |                                                                       |      | 5.5  |           |            |
| Turn-off delay time                      | $t_{d(off)}$  |                                                                       |      | 12.5 |           |            |
| Turn-off fall time                       | $t_f$         |                                                                       |      | 3    |           |            |
| Source-Drain Diode characteristics       |               |                                                                       |      |      |           |            |
| Diode Forward Current <sup>1)</sup>      | $I_S$         |                                                                       |      |      | 20        | A          |
| Diode Forward voltage                    | $V_{DS}$      | $V_{GS} = 0V, I_S = 10A$                                              |      |      | 1.2       | V          |
| Reverse Recovery Time                    | $t_{rr}$      | $T_J = 25^{\circ}C, I_F = 20A$<br>$di/dt = 100A/\mu s$ <sup>1)</sup>  |      | 29   |           | nS         |
| Reverse Recovery Charge                  | $Q_{rr}$      |                                                                       |      | 130  |           | nC         |

Notes:

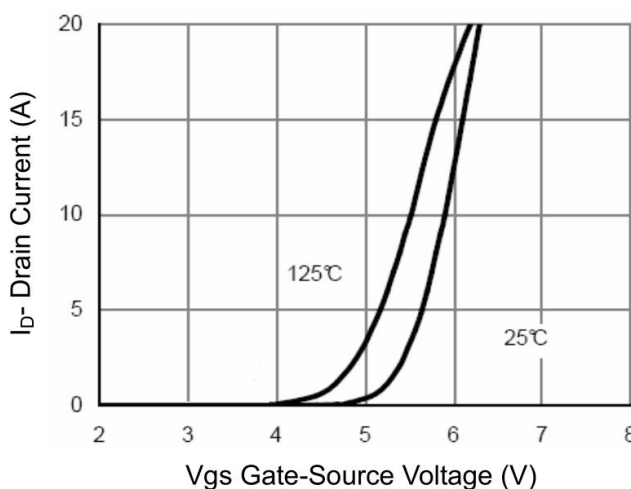
1) Pulse Test: Pulse Width < 300 $\mu s$ , Duty Cycle  $\leq 2\%$ .

2) Guaranteed by design, not subject to production testing.

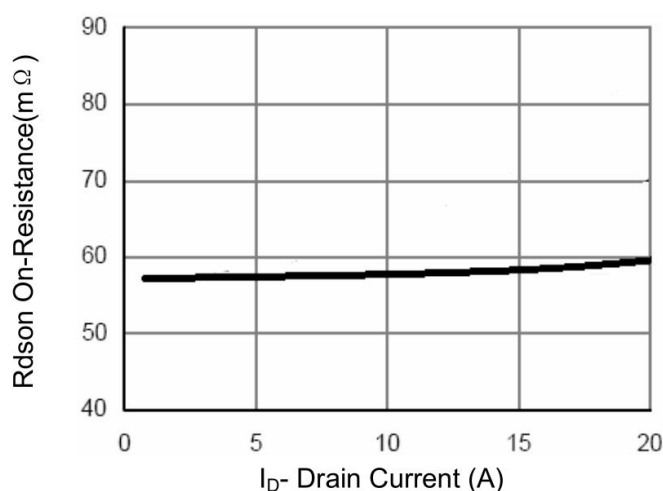
## Typical Characteristics



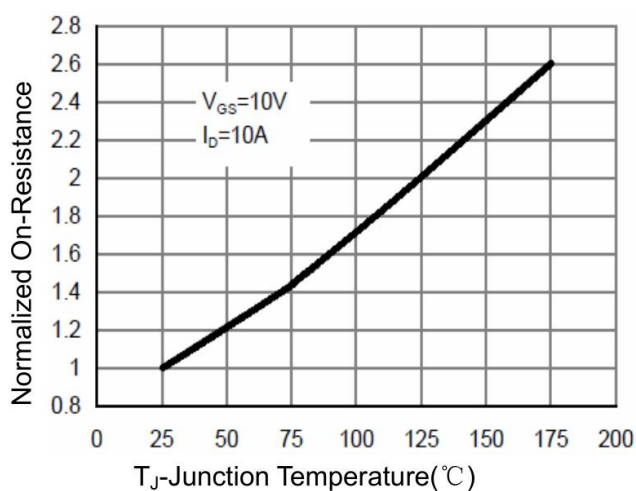
**Figure 1 Output Characteristics**



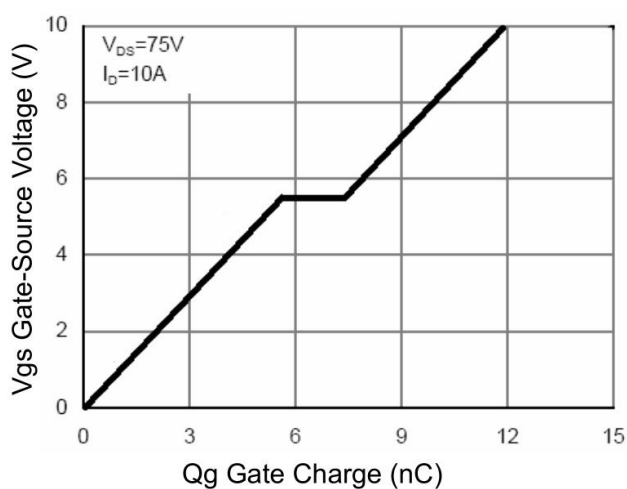
**Figure 2 Transfer Characteristics**



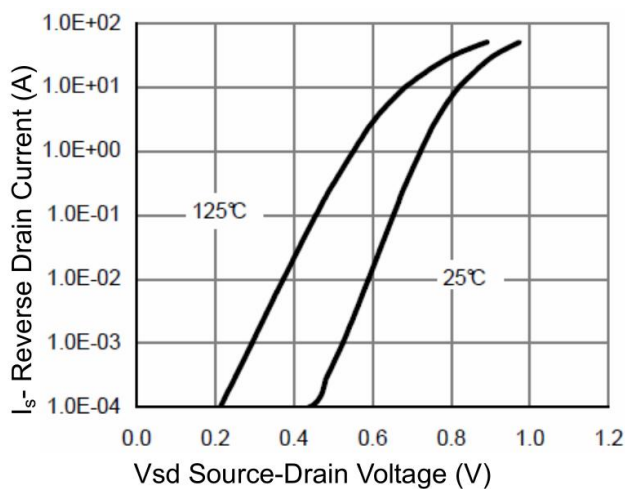
**Figure 3 Rdson- Drain Current**



**Figure 4 Rdson-Junction Temperature**

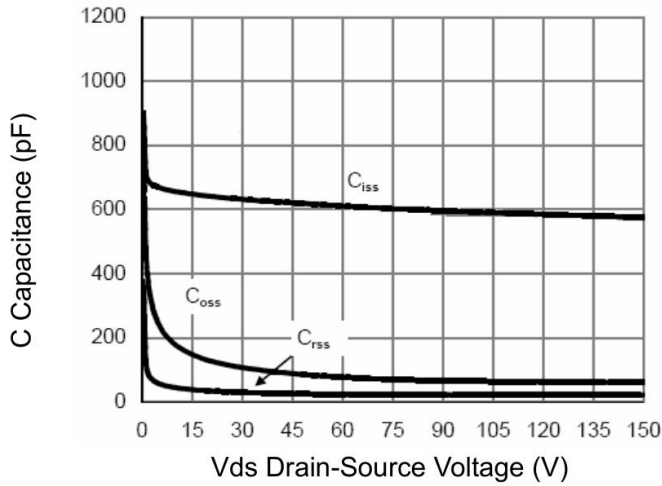


**Figure 5 Gate Charge**

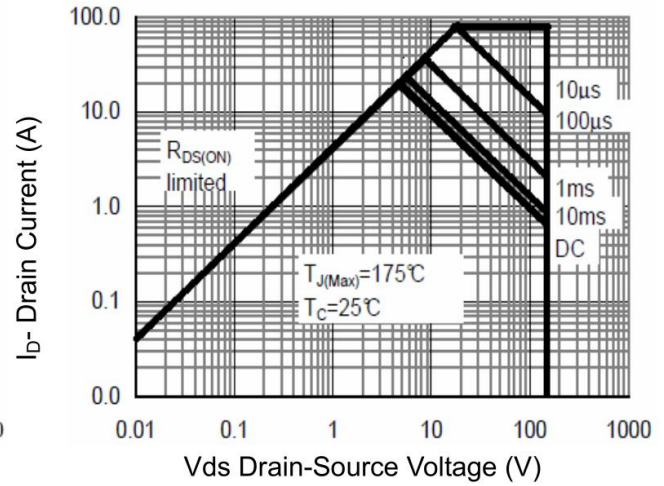


**Figure 6 Source- Drain Diode Forward**

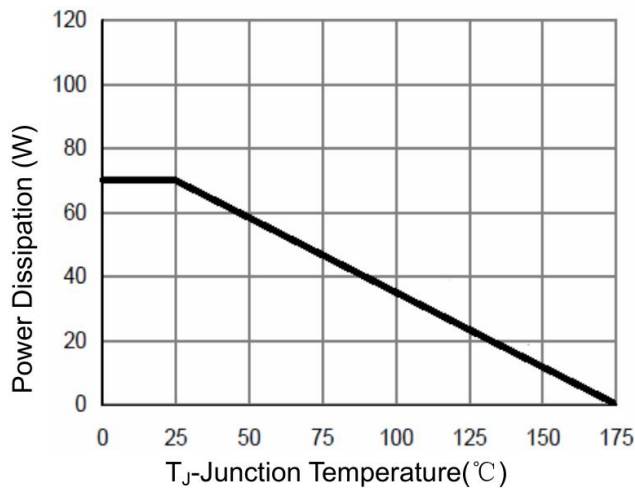
## Typical Characteristics



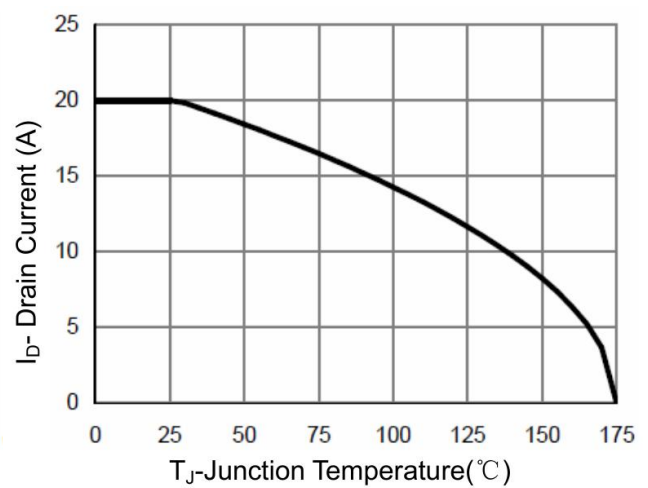
**Figure 7 Capacitance vs Vds**



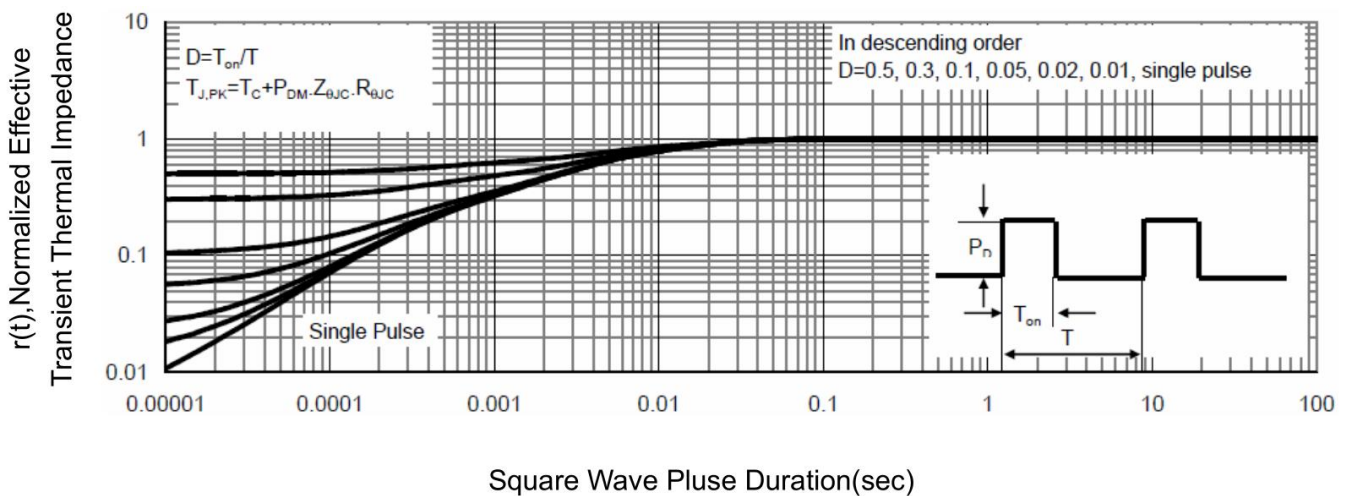
**Figure 8 Safe Operation Area**



**Figure 9 Power De-rating**

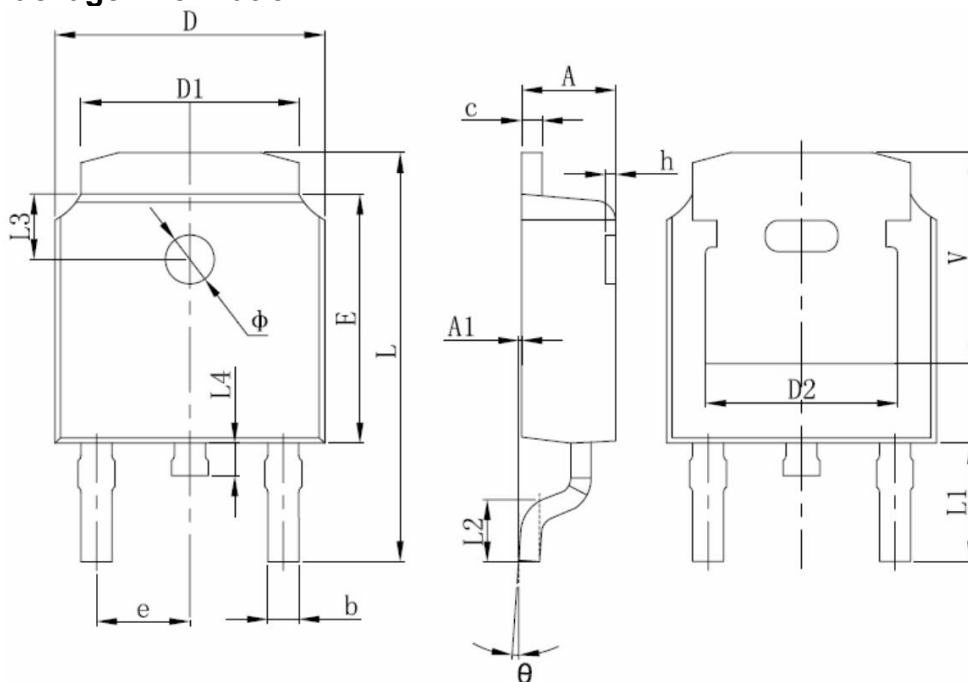


**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

### TO-252AB Package Information



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 2.200                     | 2.400  | 0.087                | 0.094 |
| A1     | 0.000                     | 0.127  | 0.000                | 0.005 |
| b      | 0.635                     | 0.770  | 0.025                | 0.030 |
| c      | 0.460                     | 0.580  | 0.018                | 0.023 |
| D      | 6.500                     | 6.700  | 0.256                | 0.264 |
| D1     | 5.100                     | 5.460  | 0.201                | 0.215 |
| D2     | 4.830 REF.                |        | 0.190 REF.           |       |
| E      | 6.000                     | 6.200  | 0.236                | 0.244 |
| e      | 2.186                     | 2.386  | 0.086                | 0.094 |
| L      | 9.712                     | 10.312 | 0.382                | 0.406 |
| L1     | 2.900 REF.                |        | 0.114 REF.           |       |
| L2     | 1.400                     | 1.700  | 0.055                | 0.067 |
| L3     | 1.600 REF.                |        | 0.063 REF.           |       |
| L4     | 0.600                     | 1.000  | 0.024                | 0.039 |
| Φ      | 1.100                     | 1.300  | 0.043                | 0.051 |
| θ      | 0°                        | 8°     | 0°                   | 8°    |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| V      | 5.250 REF.                |        | 0.207 REF.           |       |