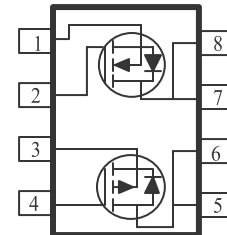
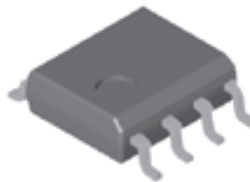


## P & N-Channel 30-V (D-S) MOSFET

These miniature surface mount MOSFETs utilize a high cell density trench process to provide low  $r_{DS(on)}$  and to ensure minimal power loss and heat dissipation. Typical applications are DC-DC converters and power management in portable and battery-powered products such as computers, printers, PCMCIA cards, cellular and cordless telephones.

- Low  $r_{DS(on)}$  provides higher efficiency and extends battery life
- Low thermal impedance copper leadframe SOIC-8 saves board space
- Fast switching speed
- High performance trench technology



### PRODUCT SUMMARY

| $V_{DS}$ (V) | $r_{DS(on)}$ m( $\Omega$ ) | $I_D$ (A) |
|--------------|----------------------------|-----------|
| 30           | 82 @ $V_{GS} = 2.5V$       | 4.2       |
|              | 58 @ $V_{GS} = 4.5V$       | 5.0       |
| -26.5        | 172 @ $V_{GS} = -2.5V$     | -2.9      |
|              | 112 @ $V_{GS} = -4.5V$     | -3.6      |

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)

| Parameter                                                 |                    | Symbol         | N-Channel  | P-Channel | Units      |
|-----------------------------------------------------------|--------------------|----------------|------------|-----------|------------|
| Drain-Source Voltage                                      |                    | $V_{DS}$       | 30         | -26.5     | V          |
| Gate-Source Voltage                                       |                    | $V_{GS}$       | $\pm 12$   | $\pm 12$  |            |
| Continuous Drain Current <sup>a</sup>                     | $T_A = 25^\circ C$ | $I_D$          | 5.0        | -3.6      | A          |
|                                                           | $T_A = 70^\circ C$ |                | 4.1        | -6.8      |            |
| Pulsed Drain Current <sup>b</sup>                         |                    | $I_{DM}$       | 20         | -20       |            |
| Continuous Source Current (Diode Conduction) <sup>a</sup> |                    | $I_S$          | 1.3        | -1.3      | A          |
| Power Dissipation <sup>a</sup>                            | $T_A = 25^\circ C$ | $P_D$          | 2.1        | 2.1       | W          |
|                                                           | $T_A = 70^\circ C$ |                | 1.3        | 1.3       |            |
| Operating Junction and Storage Temperature Range          |                    | $T_J, T_{stg}$ | -55 to 150 |           | $^\circ C$ |

### THERMAL RESISTANCE RATINGS

| Parameter                                |                 | Symbol          | Maximum | Units        |
|------------------------------------------|-----------------|-----------------|---------|--------------|
| Maximum Junction-to-Ambient <sup>a</sup> | $t \leq 10$ sec | $R_{\theta JA}$ | 62.5    | $^\circ C/W$ |
|                                          | Steady-State    |                 | 110     | $^\circ C/W$ |

#### Notes

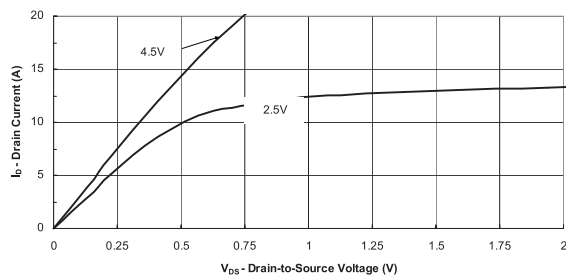
- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

| SPECIFICATIONS (T <sub>A</sub> = 25°C UNLESS OTHERWISE NOTED) |                     |                                                                                                                                                                                                                    |        |      |      |      |      |
|---------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|------|------|------|
| Parameter                                                     | Symbol              | Test Conditions                                                                                                                                                                                                    | Limits |      |      |      | Unit |
|                                                               |                     |                                                                                                                                                                                                                    | Ch     | Min  | Typ  | Max  |      |
| Static                                                        |                     |                                                                                                                                                                                                                    |        |      |      |      |      |
| Gate-Threshold Voltage                                        | V <sub>GS(th)</sub> | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = 250 uA                                                                                                                                                        | N      | 0.6  |      |      | V    |
|                                                               |                     | V <sub>GS</sub> = V <sub>DS</sub> , I <sub>D</sub> = -250 uA                                                                                                                                                       | P      | -0.6 |      |      |      |
| Gate-Body Leakage                                             | I <sub>GSS</sub>    | V <sub>GS</sub> = -12 V, V <sub>DS</sub> = 0 V                                                                                                                                                                     | P      |      |      | ±100 | nA   |
|                                                               |                     | V <sub>GS</sub> = 12 V, V <sub>DS</sub> = 0 V                                                                                                                                                                      | N      |      |      | ±100 |      |
| Zero Gate Voltage Drain Current                               | I <sub>DSS</sub>    | V <sub>DS</sub> = -24 V, V <sub>GS</sub> = 0 V                                                                                                                                                                     | P      |      |      | -1   | uA   |
|                                                               |                     | V <sub>DS</sub> = 24 V, V <sub>GS</sub> = 0 V                                                                                                                                                                      | N      |      |      | 1    |      |
| On-State Drain Current <sup>A</sup>                           | I <sub>D(on)</sub>  | V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 4.5 V                                                                                                                                                                     | N      | 20   |      |      | A    |
|                                                               |                     | V <sub>DS</sub> = -5 V, V <sub>GS</sub> = -4.5 V                                                                                                                                                                   | P      | -20  |      |      |      |
| Drain-Source On-Resistance <sup>A</sup>                       | r <sub>DS(on)</sub> | V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 5.0 A                                                                                                                                                                    | N      |      |      | 58   | mΩ   |
|                                                               |                     | V <sub>GS</sub> = 2.5 V, I <sub>D</sub> = 4.2 A                                                                                                                                                                    |        |      |      | 82   |      |
|                                                               |                     | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -3.6 A                                                                                                                                                                  | P      |      |      | 112  |      |
|                                                               |                     | V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -2.9 A                                                                                                                                                                  |        |      |      | 172  |      |
| Forward Tranconductance <sup>A</sup>                          | g <sub>fs</sub>     | V <sub>DS</sub> = 15 V, I <sub>D</sub> = 5.0 A                                                                                                                                                                     | N      |      | 25   |      | S    |
|                                                               |                     | V <sub>DS</sub> = -15 V, I <sub>D</sub> = -3.6 A                                                                                                                                                                   | P      |      | 10   |      |      |
| Dynamic                                                       |                     |                                                                                                                                                                                                                    |        |      |      |      |      |
| Total Gate Charge                                             | Q <sub>g</sub>      | N-Channel<br>V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =5.0A<br>P-Channel<br>V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.6A                                                | N      |      | 6.3  |      | nC   |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 10   |      |      |
| Gate-Source Charge                                            | Q <sub>gs</sub>     |                                                                                                                                                                                                                    | N      |      | 0.9  |      |      |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 2.2  |      |      |
| Gate-Drain Charge                                             | Q <sub>gd</sub>     |                                                                                                                                                                                                                    | N      |      | 1.9  |      |      |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 1.7  |      |      |
| Switching                                                     |                     |                                                                                                                                                                                                                    |        |      |      |      |      |
| Turn-On Delay Time                                            | t <sub>d(on)</sub>  | N-Chaneel<br>V <sub>DD</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =1A ,<br>R <sub>GEN</sub> =6Ω,<br>P-Channel<br>V <sub>DD</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-1A<br>R <sub>GEN</sub> =6Ω | N      |      | 7.4  |      | nS   |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 7.6  |      |      |
| Rise Time                                                     | t <sub>r</sub>      |                                                                                                                                                                                                                    | N      |      | 4    |      |      |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 6.8  |      |      |
| Turn-Off Delay Time                                           | t <sub>d(off)</sub> |                                                                                                                                                                                                                    | N      |      | 22.2 |      |      |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 33.6 |      |      |
| Fall-Time                                                     | t <sub>f</sub>      |                                                                                                                                                                                                                    | N      |      | 3.6  |      |      |
|                                                               |                     |                                                                                                                                                                                                                    | P      |      | 23.2 |      |      |

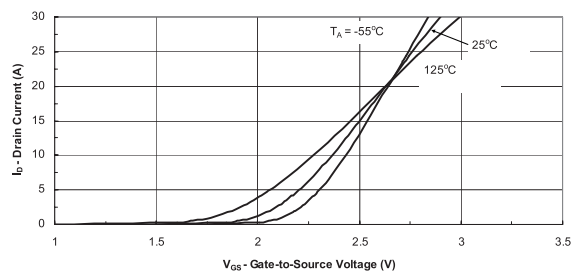
## Notes

- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

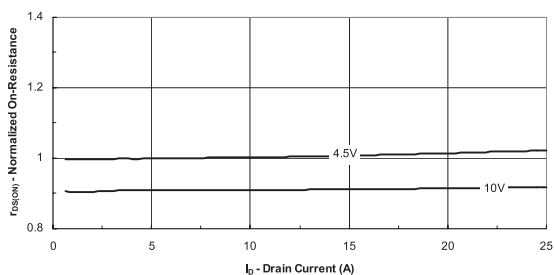
## Typical Electrical Characteristics (N-Channel)



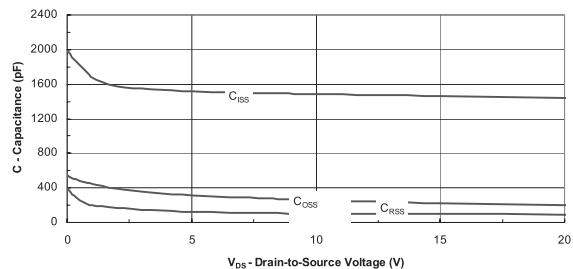
Output Characteristics



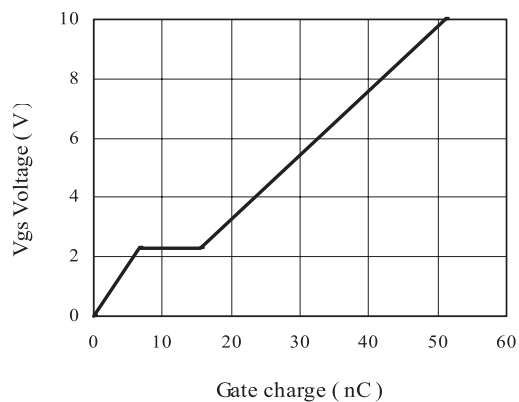
Transfer Characteristics



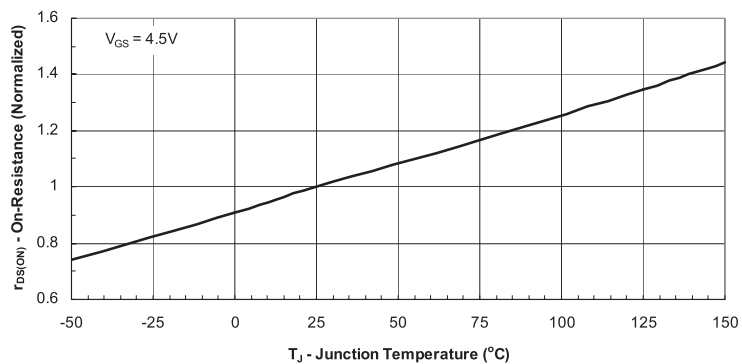
On-Resistance vs. Drain Current



Capacitance

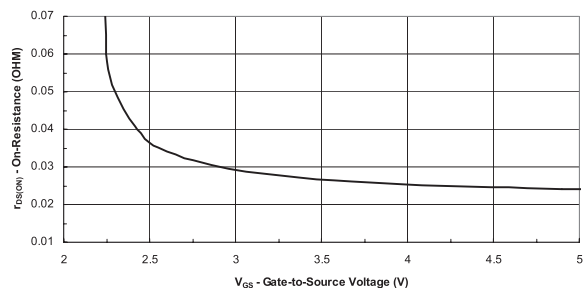
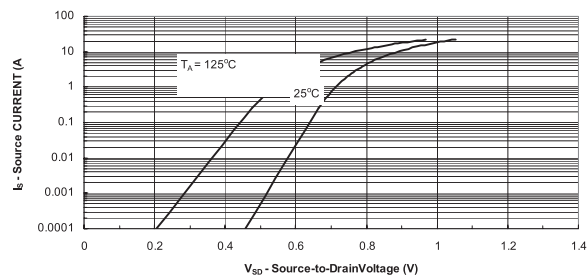


Gate Charge

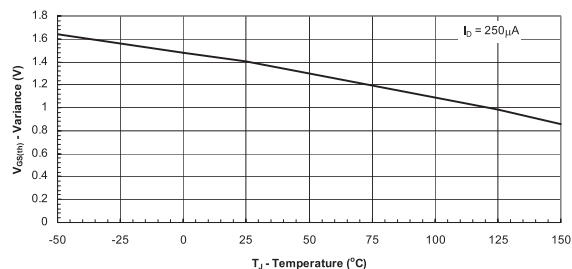


On-Resistance vs. Junction Temperature

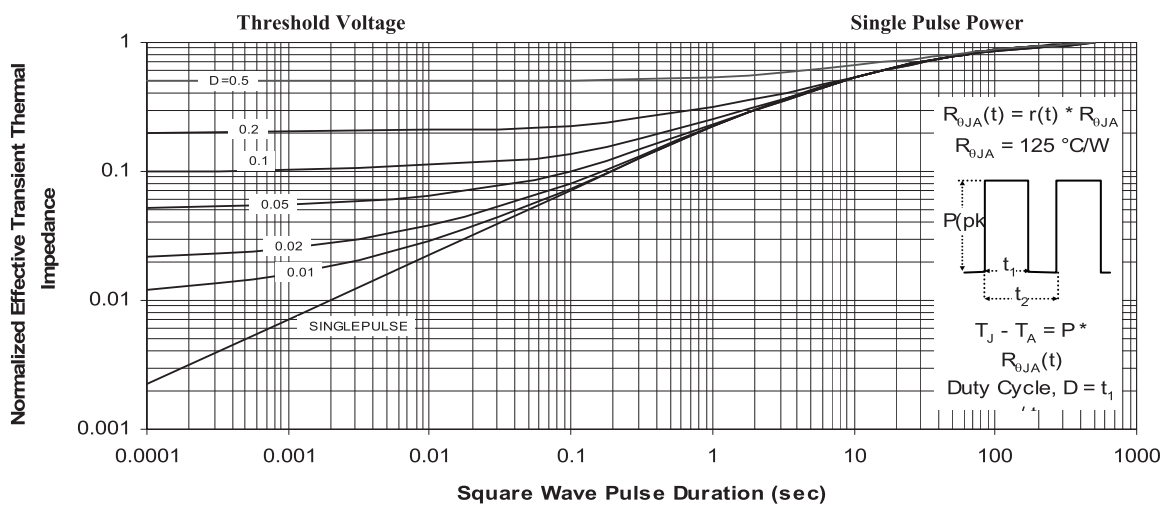
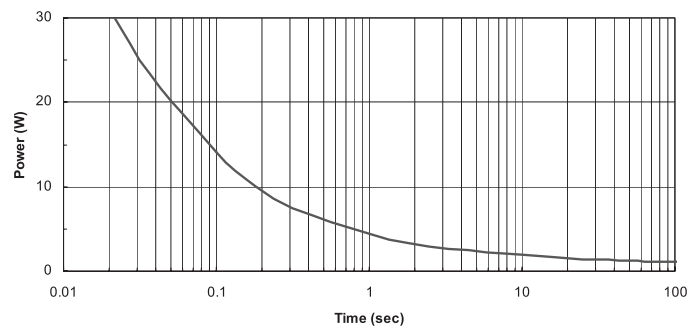
## Typical Electrical Characteristics (N-Channel)



Source-Drain Diode Forward Voltage

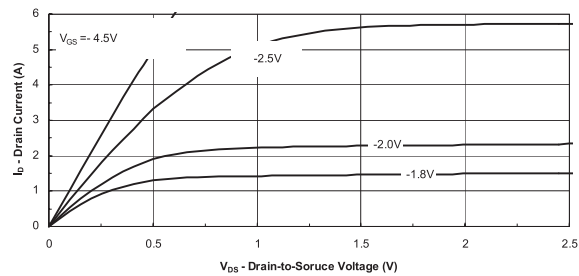


On-Resistance vs. Gate-to Source Voltage

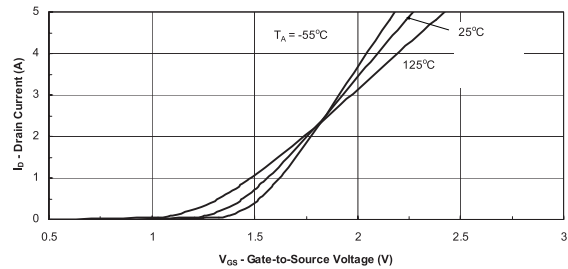


Normalized Thermal Transient Impedance, Junction-to-Ambient

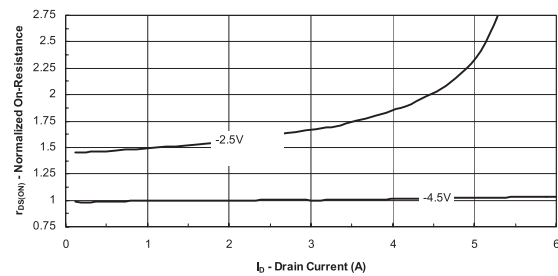
## Typical Electrical Characteristics (P-Channel)



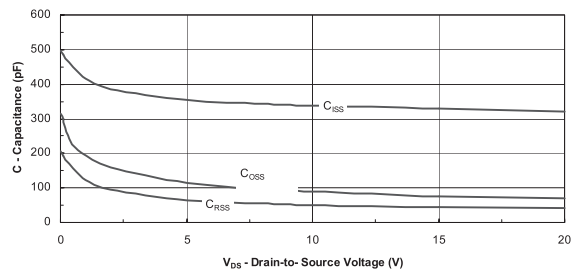
Output Characteristics



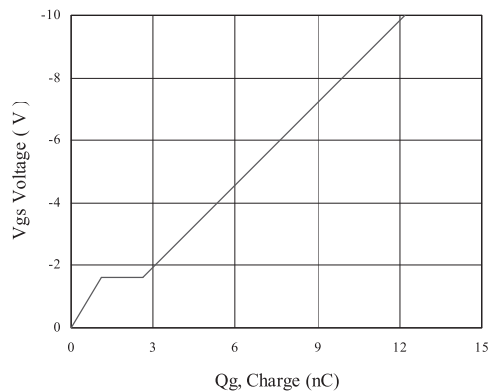
Transfer Characteristics



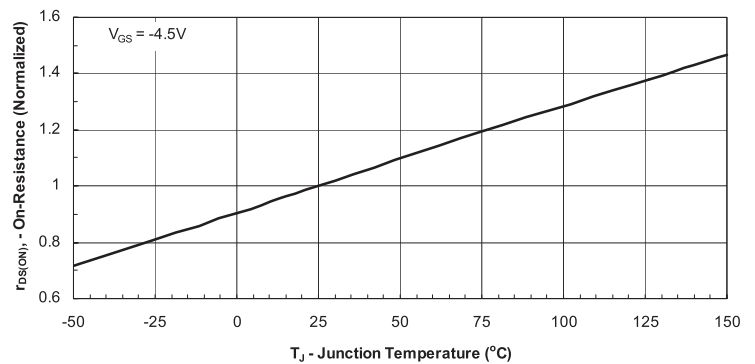
On-Resistance vs. Drain Current



Capacitance

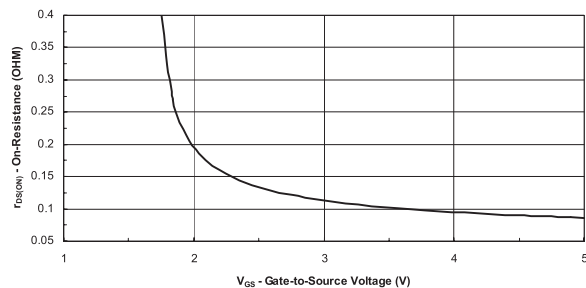
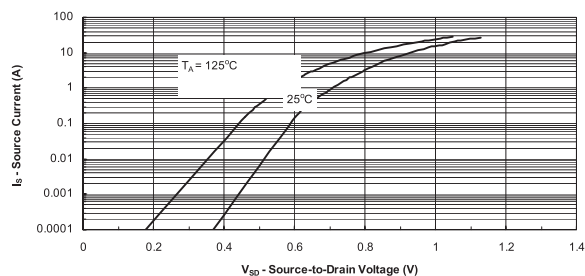


Gate Charge



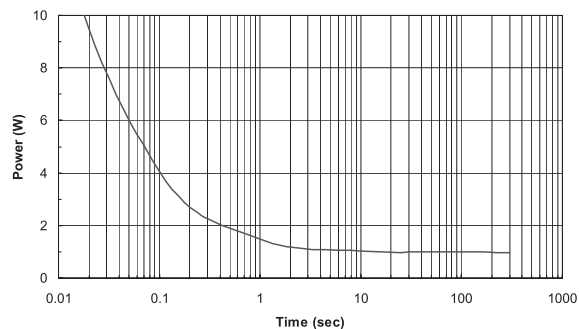
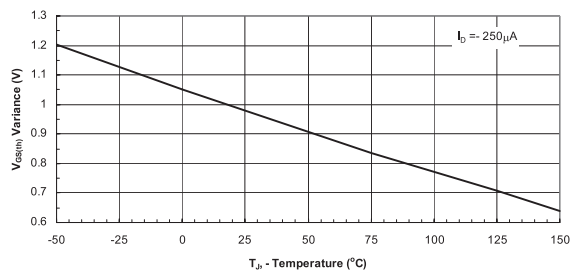
On-Resistance vs. Junction Temperature

## Typical Electrical Characteristics (P-Channel)



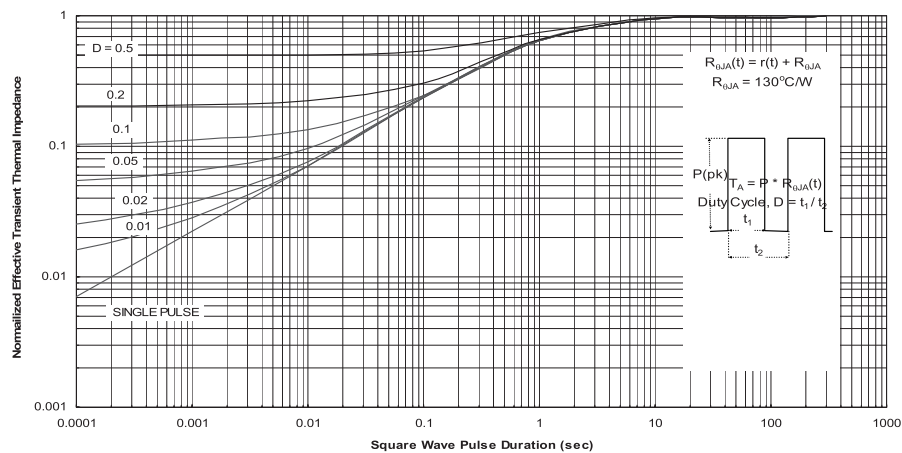
Source-Drain Diode Forward Voltage

On-Resistance vs. Gate-to Source Voltage



Threshold Voltage

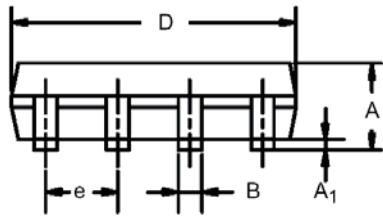
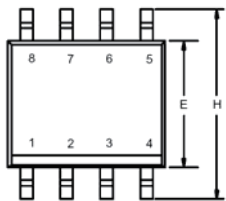
Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

Package Information

SO-8: 8LEAD



| Dim            | MILLIMETERS |      | INCHES    |       |
|----------------|-------------|------|-----------|-------|
|                | Min         | Max  | Min       | Max   |
| A              | 1.35        | 1.75 | 0.053     | 0.069 |
| A <sub>1</sub> | 0.10        | 0.20 | 0.004     | 0.008 |
| B              | 0.35        | 0.51 | 0.014     | 0.020 |
| C              | 0.19        | 0.25 | 0.0075    | 0.010 |
| D              | 4.80        | 5.00 | 0.189     | 0.196 |
| E              | 3.80        | 4.00 | 0.150     | 0.157 |
| e              | 1.27 BSC    |      | 0.050 BSC |       |
| H              | 5.80        | 6.20 | 0.228     | 0.244 |
| h              | 0.25        | 0.50 | 0.010     | 0.020 |
| L              | 0.50        | 0.93 | 0.020     | 0.037 |
| q              | 0°          | 8°   | 0°        | 8°    |

