

### Features

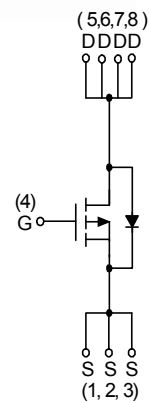
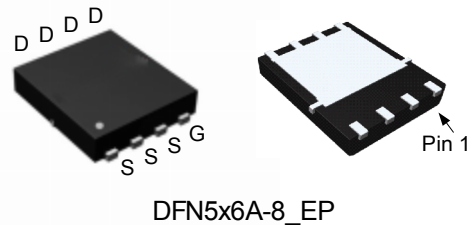
- -100V/-40A,  
 $R_{DS(ON)} = 78m\Omega(\text{typ.}) @ V_{GS} = -10V$
- 100% UIS +  $R_g$  Tested
- Reliable and Rugged
- Lead Free and Green Devices Available

(RoHS Compliant)

### Applications

- Power Management for Industrial DC / DC Converters.

### Pin Description



P-Channel MOSFET

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol                        | Parameter                              |                       | Rating            | Unit |
|-------------------------------|----------------------------------------|-----------------------|-------------------|------|
| Common Ratings                |                                        |                       |                   |      |
| V <sub>DSS</sub>              | Drain-Source Voltage                   |                       | -100              | V    |
| V <sub>GSS</sub>              | Gate-Source Voltage                    |                       | ±20               |      |
| T <sub>J</sub>                | Maximum Junction Temperature           |                       | 150               | °C   |
| T <sub>STG</sub>              | Storage Temperature Range              |                       | -55 to 150        |      |
| I <sub>S</sub>                | Diode Continuous Forward Current       | T <sub>C</sub> =25°C  | -40               | A    |
| I <sub>D</sub>                | Continuous Drain Current               | T <sub>C</sub> =25°C  | -40               |      |
|                               |                                        | T <sub>C</sub> =100°C | -16               |      |
| I <sub>DM</sub>               | Pulsed Drain Current                   | T <sub>C</sub> =25°C  | -136 <sup>a</sup> |      |
| P <sub>D</sub>                | Maximum Power Dissipation              | T <sub>C</sub> =25°C  | 96                | W    |
|                               |                                        | T <sub>C</sub> =100°C | 38                |      |
| R <sub>θJC</sub>              | Thermal Resistance-Junction to Case    | Steady State          | 1.3               | °C/W |
| I <sub>D</sub>                | Continuous Drain Current               | T <sub>A</sub> =25°C  | -5                | A    |
|                               |                                        | T <sub>A</sub> =70°C  | -4                |      |
| P <sub>D</sub>                | Maximum Power Dissipation              | T <sub>A</sub> =25°C  | 2.08              | W    |
|                               |                                        | T <sub>A</sub> =70°C  | 1.33              |      |
| R <sub>θJA</sub> <sup>b</sup> | Thermal Resistance-Junction to Ambient | Steady State          | 60                | °C/W |
| I <sub>AS</sub> <sup>c</sup>  | Avalanche Current, Single pulse        | L=0.5mH               | -27               | A    |
| E <sub>AS</sub> <sup>c</sup>  | Avalanche Energy, Single pulse         | L=0.5mH               | 182               | mJ   |

Note a : Pulse width is limited by max. junction temperature.

Note b : Surface Mounted on 1in<sup>2</sup> pad area.

Note c : UIS tested and pulse width are limited by maximum junction temperature 150 $^\circ\text{C}$ (initial temperature  $T_J = 25^\circ\text{C}$ ).

## Electrical Characteristics (T<sub>A</sub> = 25°C Unless Otherwise Noted)

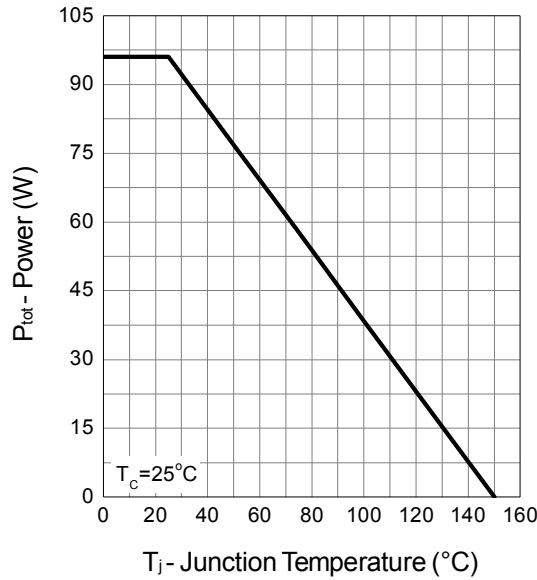
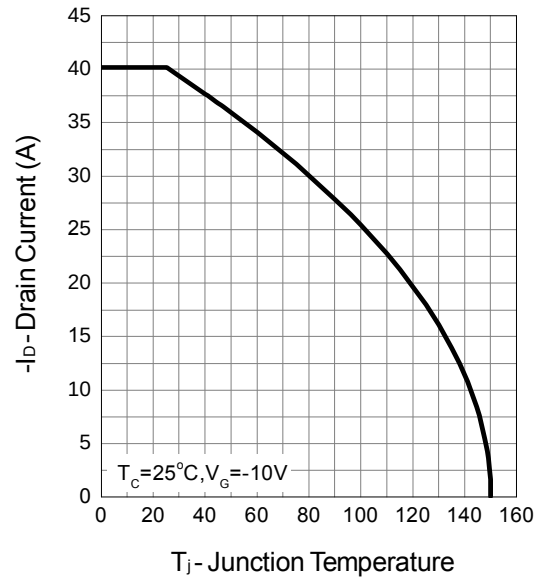
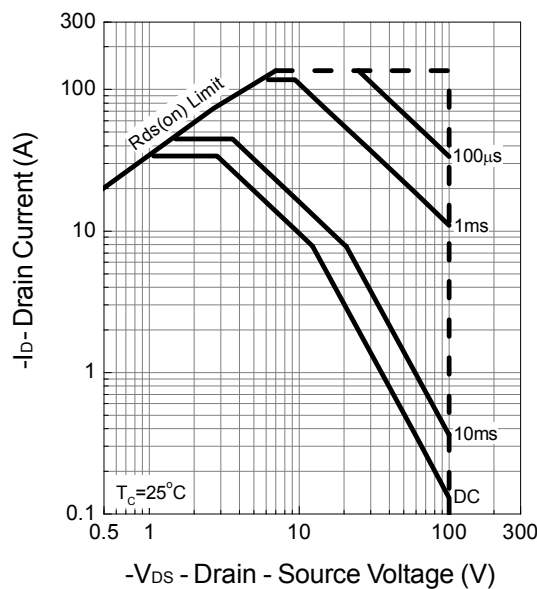
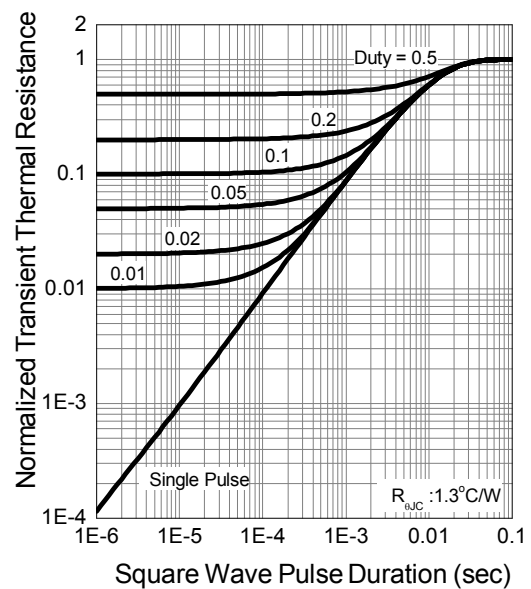
| Symbol                                   | Parameter                        | Test Conditions                                                                                                    | Min. | Typ. | Max. | Unit |
|------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                   |                                  |                                                                                                                    |      |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA                                                                       | -100 | -    | -    | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-80V, V <sub>GS</sub> =0V                                                                         | -    | -    | -1   | μA   |
|                                          |                                  | T <sub>J</sub> =85°C                                                                                               | -    | -    | -30  |      |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA                                                         | -1.2 | -1.7 | -2.5 | V    |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V                                                                         | -    | -    | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>d</sup>         | Drain-Source On-state Resistance | V <sub>GS</sub> =-10V, I <sub>DS</sub> =-18A                                                                       | -    | 78   | 95   | mΩ   |
| Diode Characteristics                    |                                  |                                                                                                                    |      |      |      |      |
| V <sub>SD</sub> <sup>d</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =-18A, V <sub>GS</sub> =0V                                                                         | -    | -0.8 | -1.1 | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =-18A, dI <sub>SD</sub> /dt=100A/μs                                                                | -    | 46   | -    | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                                    | -    | 103  | -    | nC   |
| Dynamic Characteristics <sup>e</sup>     |                                  |                                                                                                                    |      |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                                                   | -    | 3.4  | 6.8  | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =-30V,<br>Frequency=1.0MHz                                                 | -    | 2467 | 3207 | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                                                    | -    | 268  | -    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                                                    | -    | 126  | -    |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =-30V, R <sub>L</sub> =30Ω,<br>I <sub>DS</sub> =-1A, V <sub>GEN</sub> =-10V,<br>R <sub>G</sub> =6Ω | -    | 17   | 31   | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                                    | -    | 9    | 17   |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                                    | -    | 83   | 150  |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                                    | -    | 34   | 61   |      |
| Gate Charge Characteristics <sup>e</sup> |                                  |                                                                                                                    |      |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =-50V, V <sub>GS</sub> =-4.5V,<br>I <sub>DS</sub> =-18A                                            | -    | 27   | -    | nC   |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =-50V, V <sub>GS</sub> =-10V,<br>I <sub>DS</sub> =-18A                                             | -    | 56   | 78   |      |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                                    | -    | 9.5  | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                                    | -    | 14.5 | -    |      |

Note d : Pulse test ; pulse width≤300μs, duty cycle≤2%.

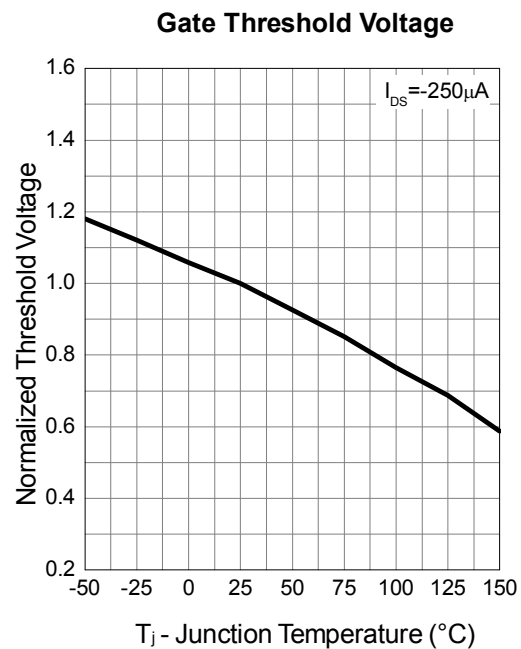
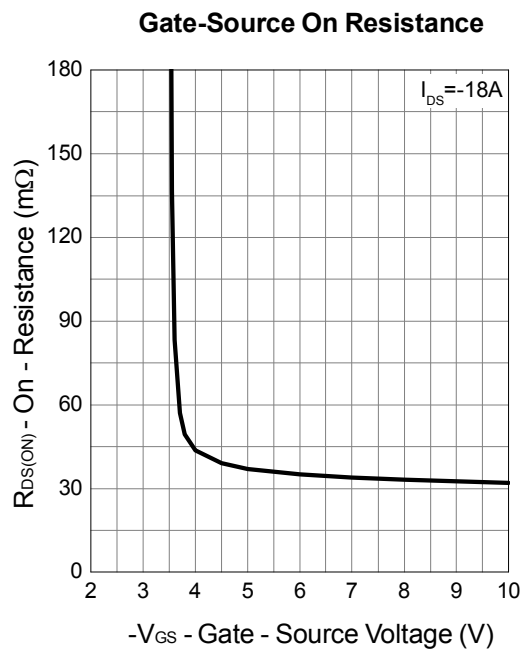
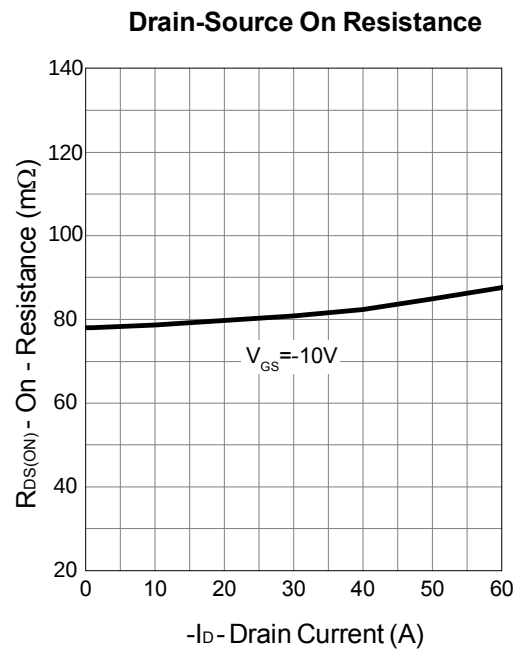
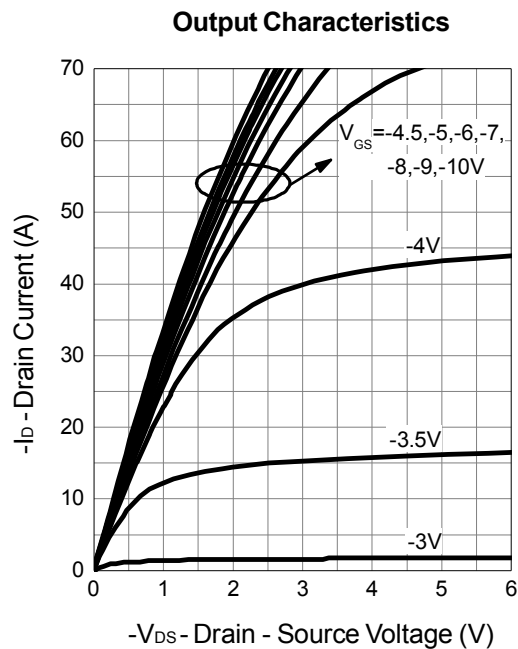
Note e : Guaranteed by design, not subject to production testing.

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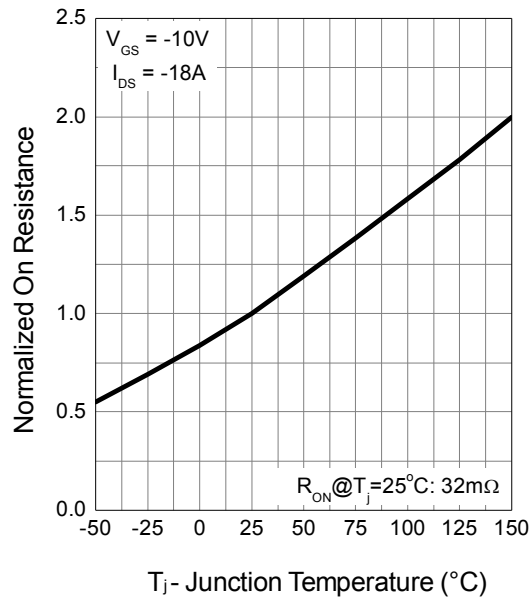
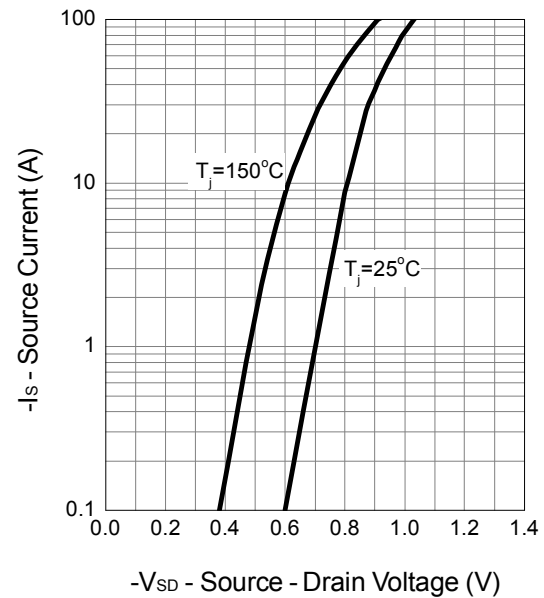
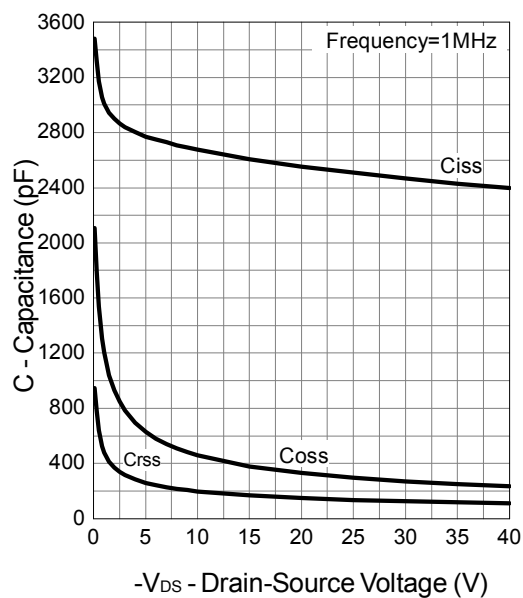
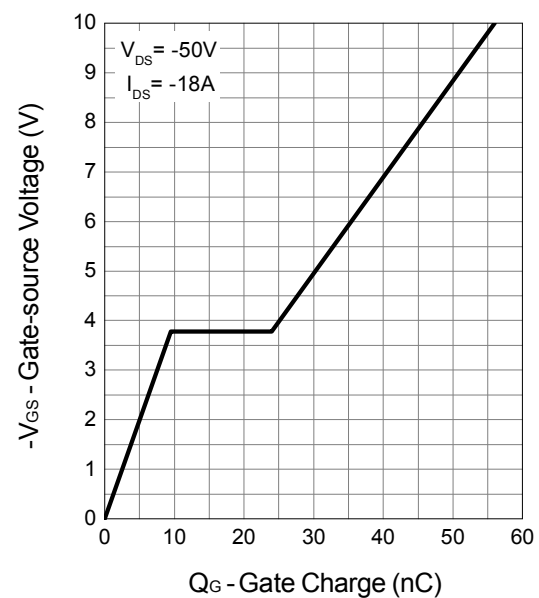
## Typical Operating Characteristics

**Power Dissipation**

**Drain Current**

**Safe Operation Area**

**Thermal Transient Impedance**


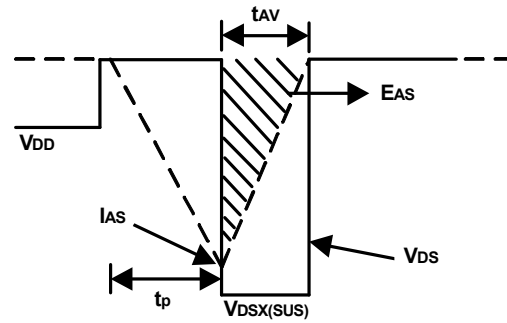
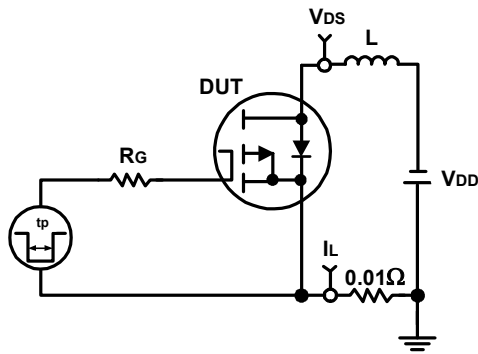
## Typical Operating Characteristics (Cont.)



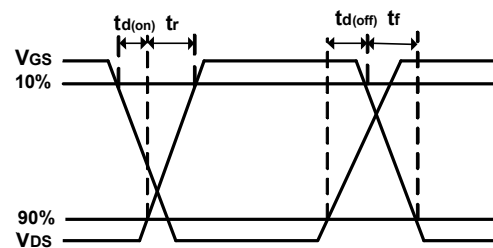
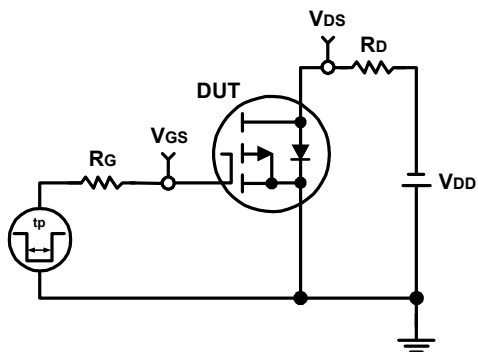
## Typical Operating Characteristics (Cont.)

**Drain-Source On Resistance**

**Source-Drain Diode Forward**

**Capacitance**

**Gate Charge**


## Avalanche Test Circuit and Waveforms

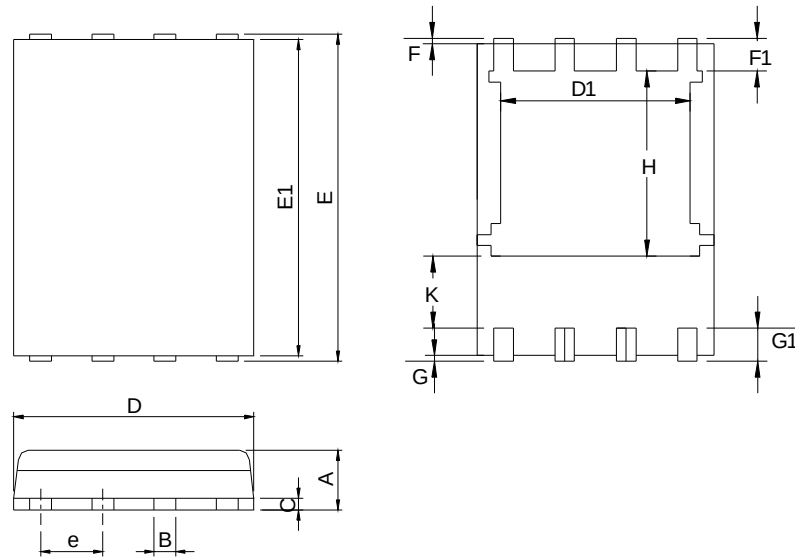


## Switching Time Test Circuit and Waveforms



## Package Information

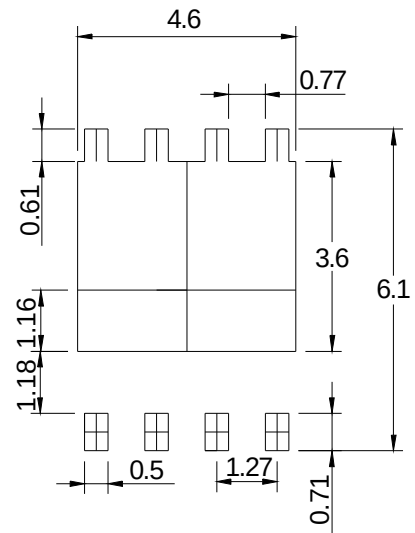
### DFN5x6-8



| DIMENSIONS | DFN5x6-8    |      |           |       |
|------------|-------------|------|-----------|-------|
|            | MILLIMETERS |      | INCHES    |       |
|            | MIN.        | MAX. | MIN.      | MAX.  |
| A          | 0.90        | 1.20 | 0.035     | 0.047 |
| B          | 0.3         | 0.51 | 0.012     | 0.020 |
| C          | 0.19        | 0.25 | 0.007     | 0.010 |
| D          | 4.80        | 5.30 | 0.189     | 0.209 |
| D1         | 4.00        | 4.40 | 0.157     | 0.173 |
| E          | 5.90        | 6.20 | 0.232     | 0.244 |
| E1         | 5.50        | 5.80 | 0.217     | 0.228 |
| e          | 1.27 BSC    |      | 0.050 BSC |       |
| F          | 0.05        | 0.30 | 0.002     | 0.012 |
| F1         | 0.35        | 0.75 | 0.014     | 0.030 |
| G          | 0.05        | 0.30 | 0.002     | 0.012 |
| G1         | 0.35        | 0.75 | 0.014     | 0.030 |
| H          | 3.34        | 3.9  | 0.131     | 0.154 |
| K          | 0.762       | -    | 0.03      | -     |

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.  
Mold flash or protrusions shall not exceed 10 mil.

### RECOMMENDED LAND PATTERN



UNIT: mm