

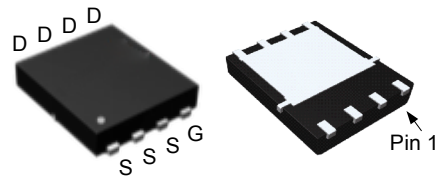
### Features

- 60V/80A,  
 $R_{DS(ON)} = 7m\Omega$  (typ.) @  $V_{GS} = 10V$
- Reliable and Rugged
- Lead Free and Green Devices Available  
 (RoHS Compliant)

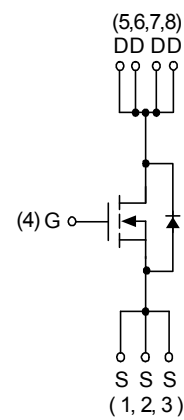
### Applications

- Secondary Side Synchronous Rectification
- DC-DC Converter
- Motor Control
- Load Switching

### Pin Description



DFN5x6-8



N-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                      |                       | 60         | V    |
| V <sub>GSS</sub>              | Gate-Source Voltage                       |                       | ±25        |      |
| 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  | 80         | A    |
| I <sub>D</sub>                | Continuous Drain Current                  | T <sub>C</sub> =25°C  | 80         |      |
|                               |                                           | T <sub>C</sub> =100°C | 48         |      |
| I <sub>DM</sub>               | Pulsed Drain Current                      | T <sub>C</sub> =25°C  | 240        |      |
| P <sub>D</sub>                | Maximum Power Dissipation                 | T <sub>C</sub> =25°C  | 52         | W    |
|                               |                                           | T <sub>C</sub> =100°C | 20.8       |      |
| R <sub>θJC</sub>              | Thermal Resistance-Junction to Case       | Steady State          | 2.4        | °C/W |
| R <sub>θJA</sub> <sup>C</sup> | Thermal Resistance-Junction to Ambient    | t ≤ 10s               | 25         | °C/W |
|                               |                                           | Steady State          | 60         |      |
| I <sub>AS</sub> <sup>b</sup>  | Avalanche Current, Single pulse (L=0.5mH) |                       | 50         | A    |
| E <sub>AS</sub> <sup>b</sup>  | Avalanche Energy, Single pulse (L=0.5mH)  |                       | 625        | mJ   |

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

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

Note c : Surface Mounted on  $1\text{in}^2$  pad area.

## Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

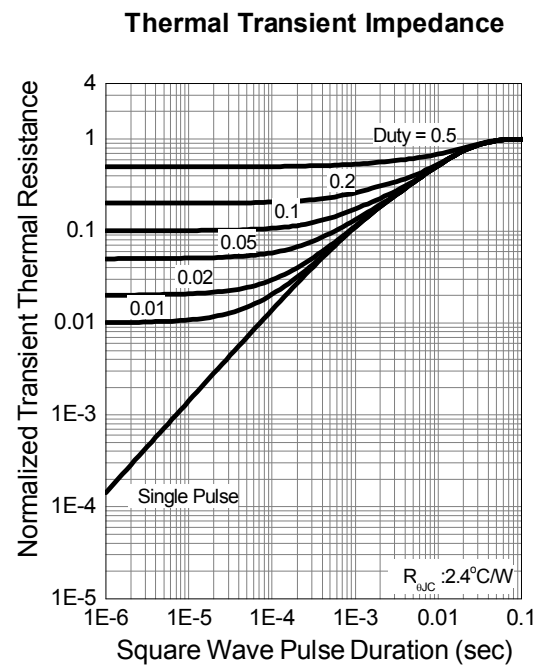
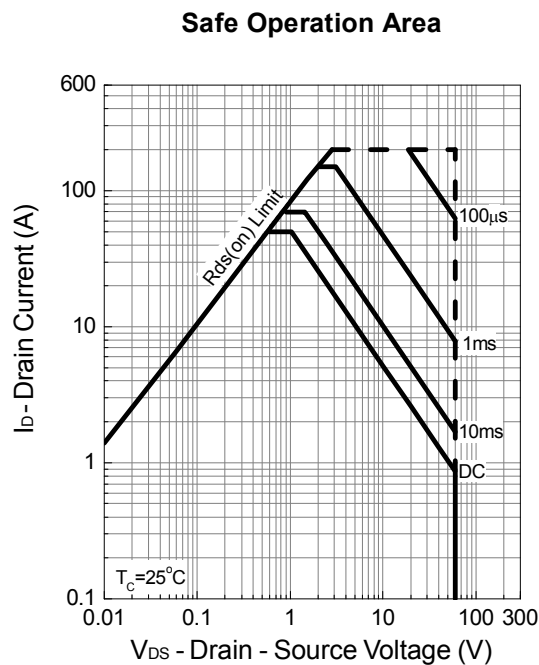
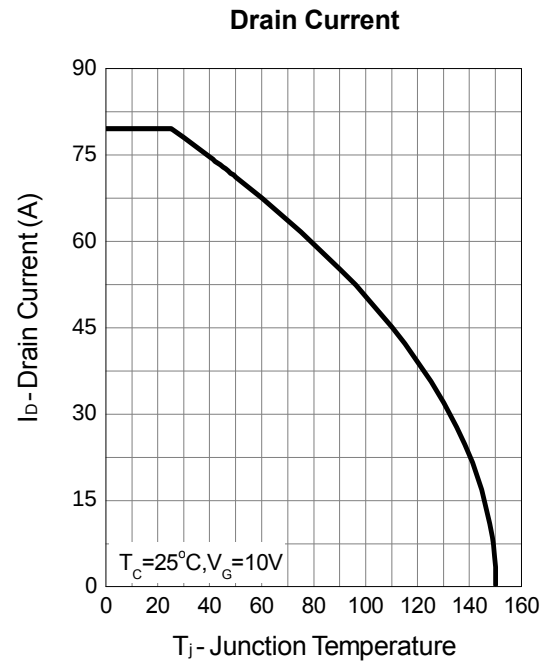
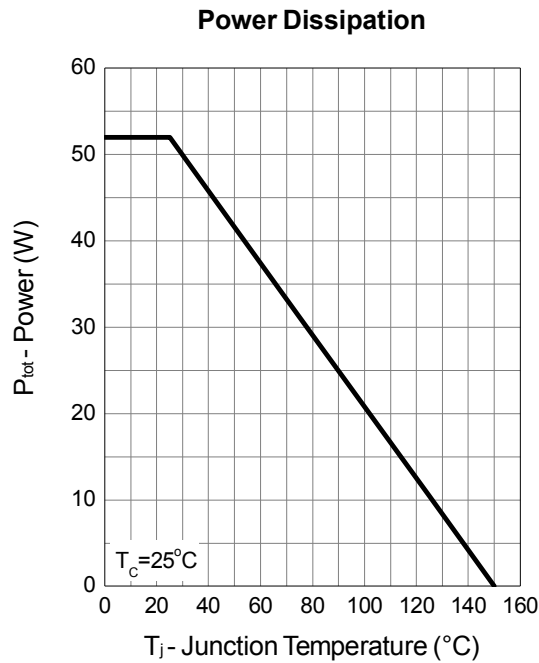
| Symbol                                   | Parameter                        | Test Conditions                                                                                           | Min. | Typ. | Max. | Unit |
|------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------|------|------|------|------|
| Static Characteristics                   |                                  |                                                                                                           |      |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                                               | 60   | -    | -    | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =48V, 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                                                 | 2    | 3    | 4    | 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> =25A                                                                | -    | 7    | 9    | mΩ   |
| Diode Characteristics                    |                                  |                                                                                                           |      |      |      |      |
| V <sub>SD</sub> <sup>d</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =25A, V <sub>GS</sub> =0V                                                                 | -    | 0.8  | 1.3  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =25A, dI <sub>SD</sub> /dt=100A/μs                                                        | -    | 28   | -    | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                           | -    | 30   | -    | nC   |
| Dynamic Characteristics <sup>e</sup>     |                                  |                                                                                                           |      |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                                          | -    | 1.0  | -    | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> =30V, Frequency=1.0MHz                                               | -    | 2500 | 3500 | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                                           | -    | 215  | -    |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                                           | -    | 105  | -    |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =30V, R <sub>L</sub> =30Ω, I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V, R <sub>G</sub> =6Ω | -    | 20   | 36   | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                           | -    | 9    | 16   |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                           | -    | 55   | 99   |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                           | -    | 20   | 36   |      |
| Gate Charge Characteristics <sup>e</sup> |                                  |                                                                                                           |      |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =30V, V <sub>GS</sub> =10V, I <sub>DS</sub> =25A                                          | -    | 45   | 65   | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                           | -    | 9    | -    |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                           | -    | 8.5  | -    |      |

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

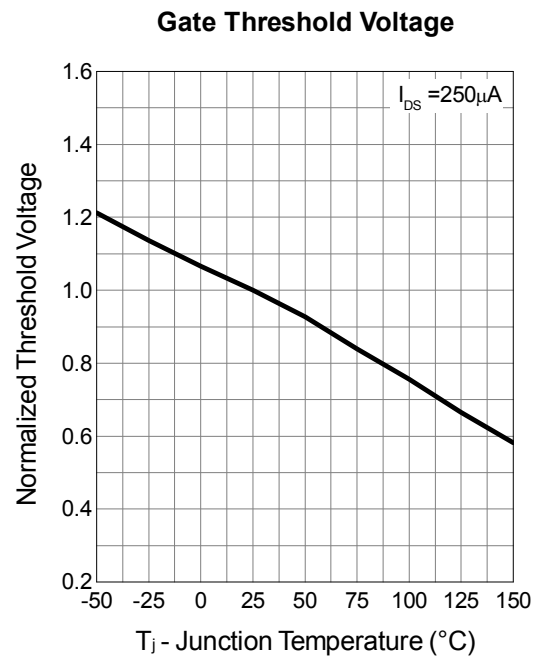
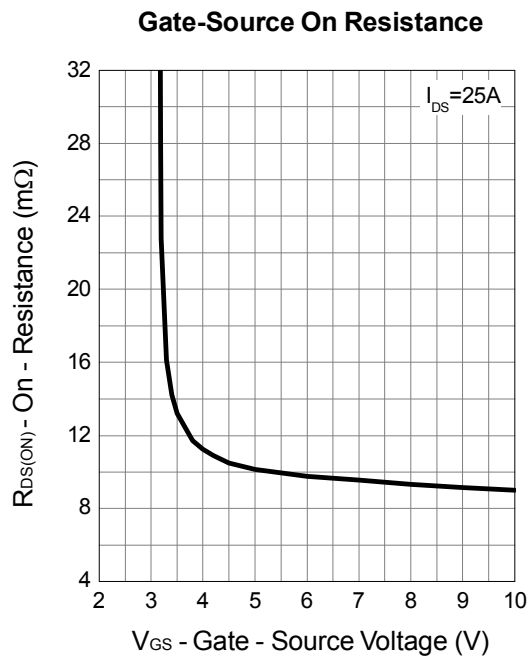
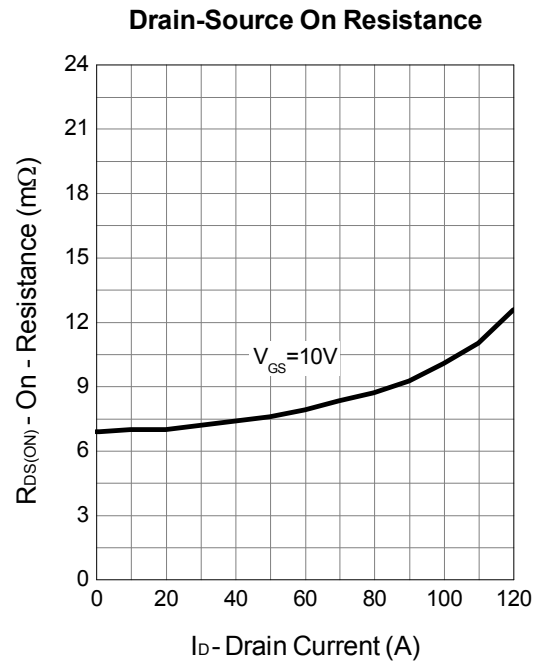
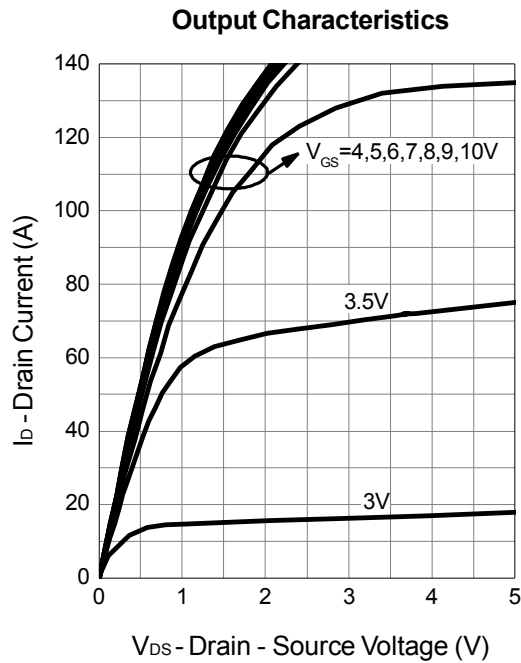
Note e : Guaranteed by design, not subject to production testing.

:

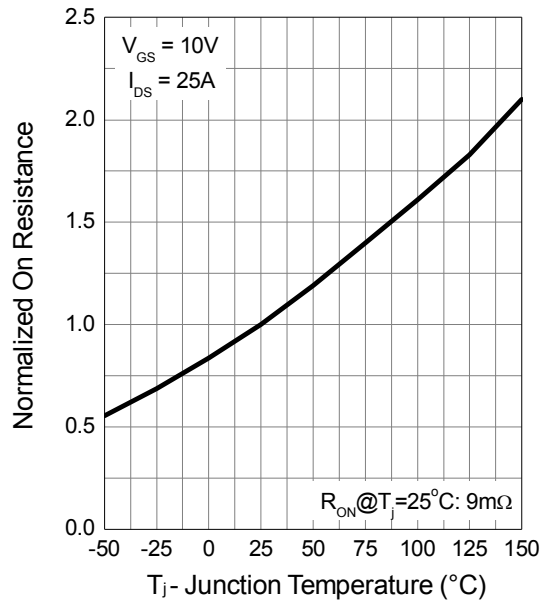
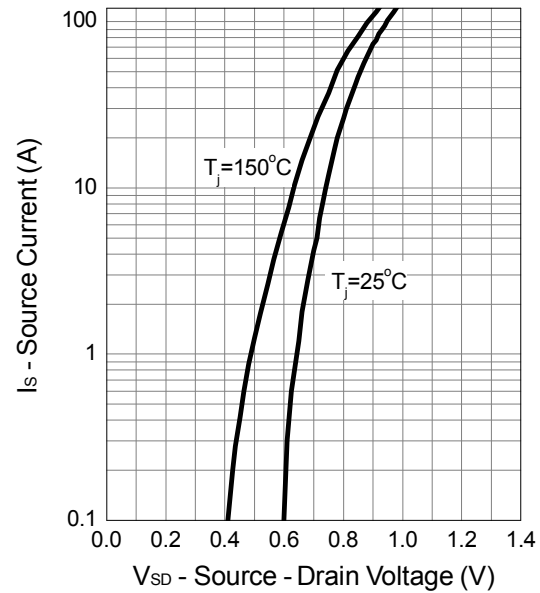
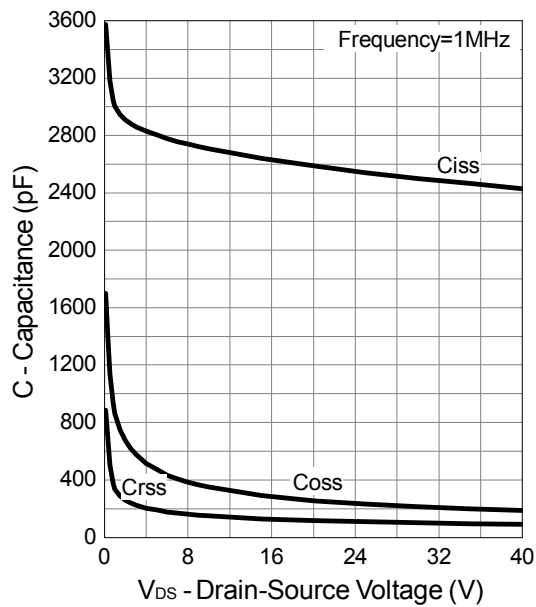
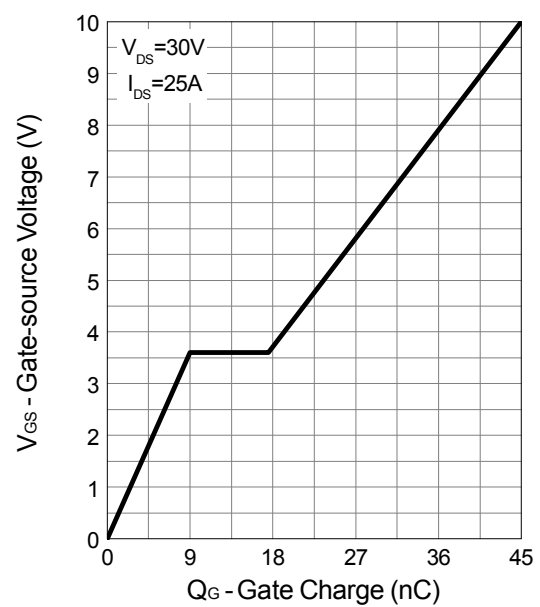
### Typical Operating Characteristics



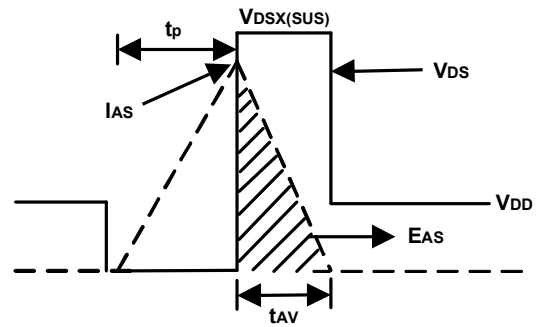
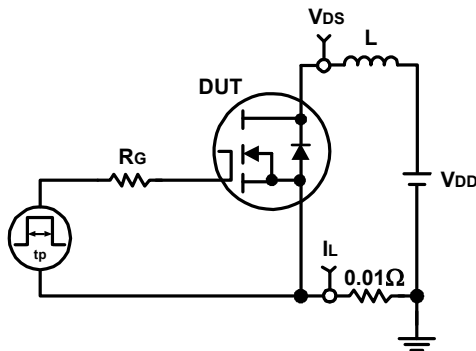
### Typical Operating Characteristics (Cont.)



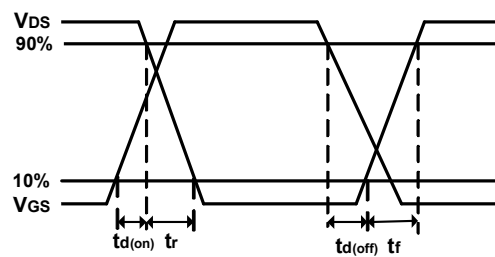
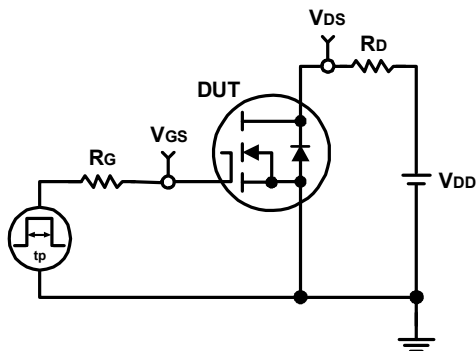
## Typical Operating Characteristics (Cont.)

**Drain-Source On Resistance**

**Source-Drain Diode Forward**

**Capacitance**

**Gate Charge**


## Avalanche Test Circuit and Waveforms

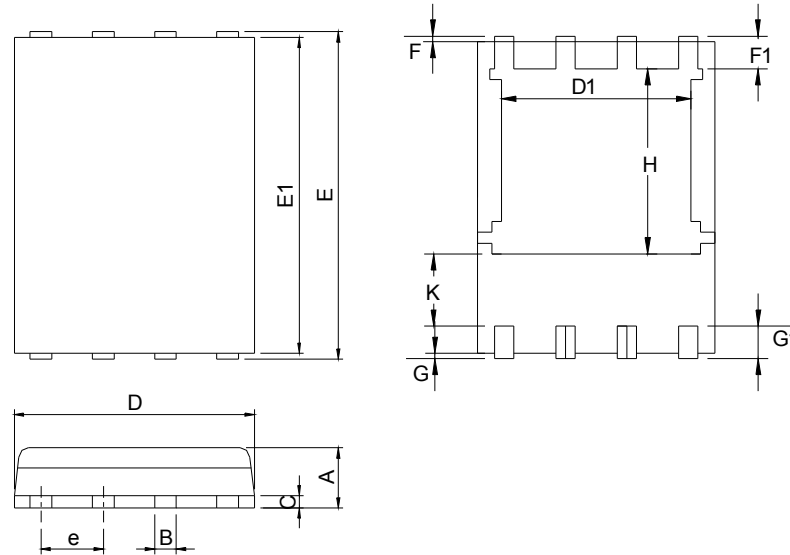


## Switching Time Test Circuit and Waveforms



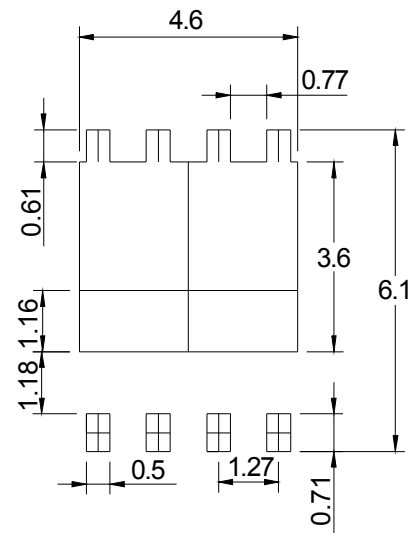
## Package Information

### DFN5x6-8



| SYMBOL | 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      | -     |

### RECOMMENDED LAND PATTERN



UNIT: mm

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