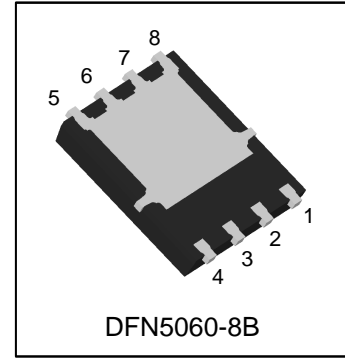


# S-LN7407DT3WG

## 40V N-Channel Power MOSFET

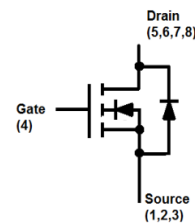


### 1. FEATURES

- Low Thermal Resistance.
- Fast switching.
- We declare that the material of product compliance with RoHS requirements and Halogen Free.
- S-prefix for automotive and other applications requiring unique site and control change requirements; AEC-Q101 qualified and PPAP capable.

### 2. APPLICATIONS

- Power Tools
- DC/DC Conversion
- Motor Control



### 3. DEVICE MARKING AND RESISTOR VALUES

| Device        | Marking | Shipping       |
|---------------|---------|----------------|
| S-LN7407DT3WG | LN7407  | 5000/Tape&Reel |

### 4. MAXIMUM RATINGS

| Parameter  |          | Symbol  | Limits   | Unit |
|--|----------|---------|----------|------|
| Drain-to-Source Voltage                          |          | VDS     | 40       | V    |
| Gate-to-Source Voltage                           |          | VGS     | ±20      | V    |
| Continuous Drain Current(Note 1)                 | TA=25°C  | ID      | 14       | A    |
|  | TA=100°C |         | 9        |      |
| Pulsed Drain Current (Note 2)                    |          | IDM     | 56       | A    |
| Continuous Drain Current                         | TC=25°C  | ID      | 72       | A    |
|  | TC=100°C |         | 45       |      |
| Pulsed Drain Current                             |          | IDM     | 288      | A    |
| Avalanche Current                                |          | IAS     | 19.2     | A    |
| Avalanche Energy(L=0.1mH)                        |          | EAS     | 18.4     | mJ   |
| Power Dissipation(Note 1)                        | TA=25°C  | PD      | 2.7      | W    |
|  | TA=100°C |         | 1.1      |      |
| Power Dissipation                                | TC=25°C  | PD      | 50       | W    |
|  | TC=100°C |         | 20       |      |
| Operating Junction and Storage Temperature Range |          | Tj/Tstg | -55~+150 | °C   |

### 5. THERMAL CHARACTERISTICS

| Parameter                                      | Symbol | Max | Unit |
|--|--------|-----|------|
| Thermal Resistance,Junction-to-Ambient(Note 1) | RθJA   | 45  | °C/W |
| Thermal Resistance,Junction-to-Case            | RθJC   | 2.5 |      |

Note:1.Surface mounted on 1.5 x 1.5 FR4 board using 1 sq in pad, 2 oz Cu.

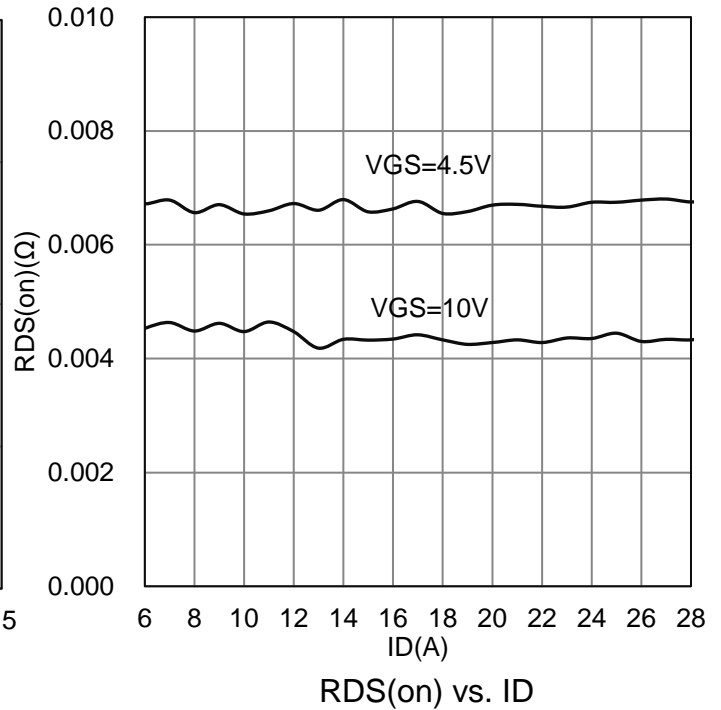
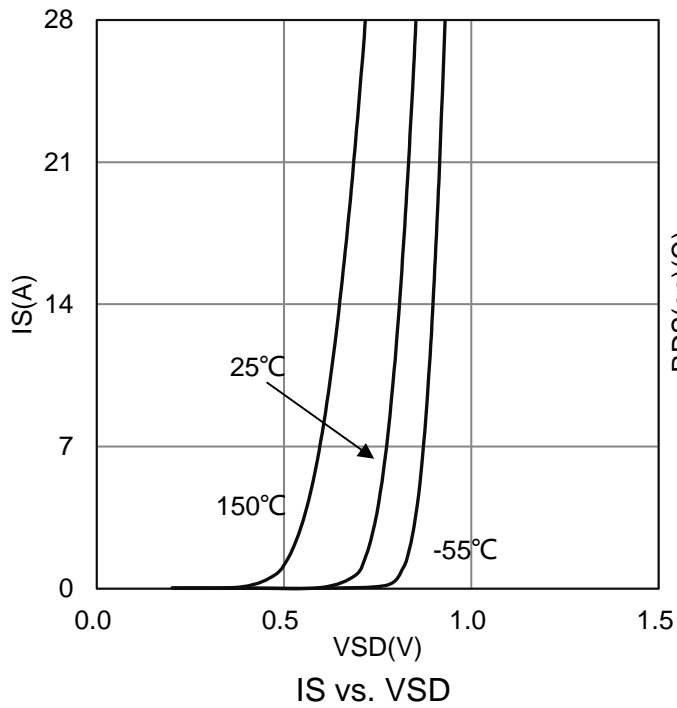
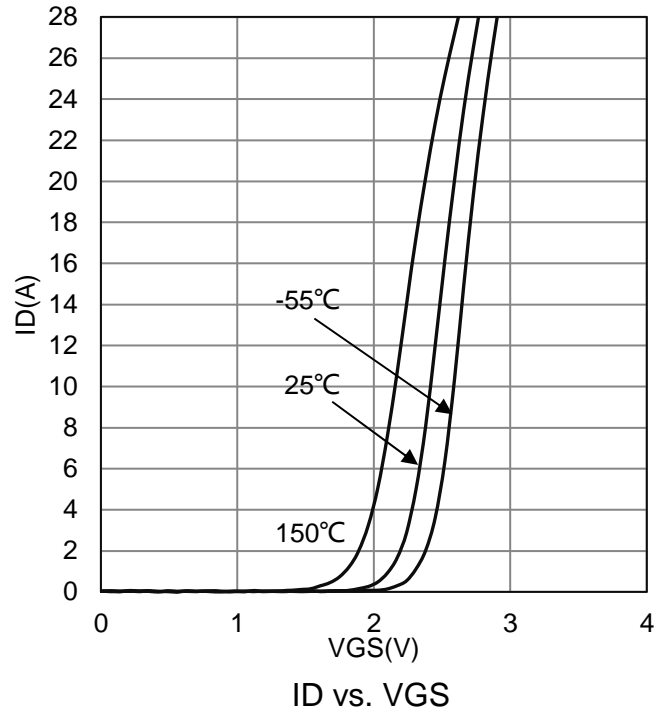
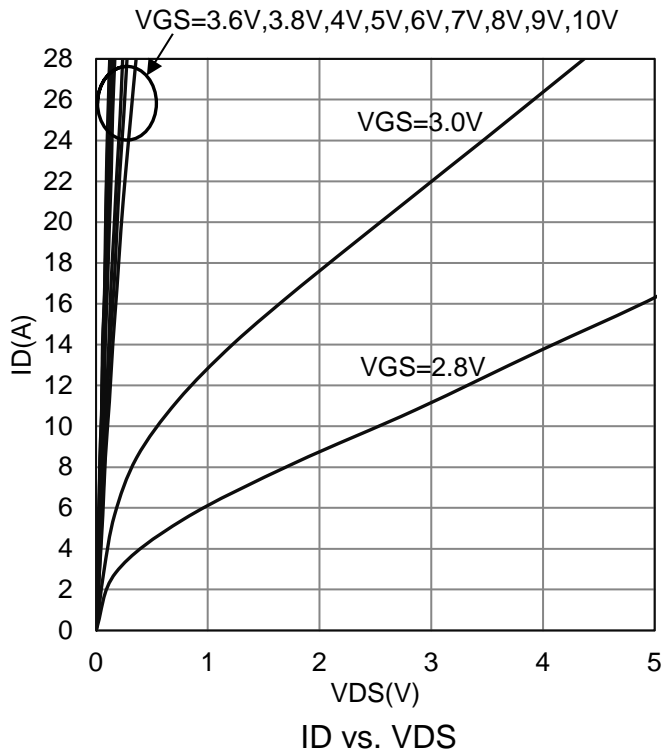
2.Pulse width limited by maximum junction temperature.

**6. ELECTRICAL CHARACTERISTICS**

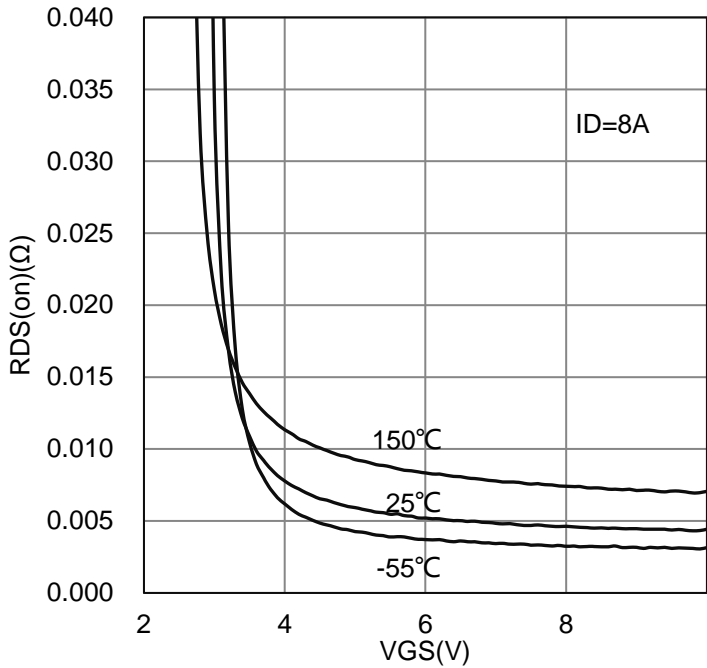
| Characteristic   | Symbol   | Min.    | Typ.       | Max.       | Unit       |    |
|--|--|---------|------------|------------|------------|----|
| <b>Static</b>  |  |         |            |            |            |    |
| Drain to Source Breakdown Voltage<br>(VGS = 0 V, ID = 250 $\mu$ A)                         | BVDSS  | 40      | -          | -          | V          |    |
| Gate Threshold Voltage<br>(VDS = VGS, ID = 250 $\mu$ A)                                    | VGS(th)  | 1.0     | -          | 2.5        | V          |    |
| Gate-Body leakage current<br>(VDS = 0 V, VGS = $\pm$ 20 V)                                 | IGSS   | -       | -          | $\pm$ 100  | nA         |    |
| Zero Gate Voltage Drain Current<br>(VDS = 40 V, VGS = 0 V)                                 | IDSS   | -       | -          | 1          | $\mu$ A    |    |
| Drain-to-Source On-Resistance(Note 3)<br>(VGS = 10 V, ID = 8 A)<br>(VGS = 4.5 V, ID = 5 A) | RDS(ON)  | -<br>-  | 4.1<br>6.3 | 4.9<br>8.1 | m $\Omega$ |    |
| Transconductance<br>(VDS = 5 V, ID = 5 A)  | gfs  | -       | 28.5       | -          | S          |    |
| <b>Dynamic</b>   |  |         |            |            |            |    |
| Total Gate Charge  | (VDS = 20 V,<br>VGS = 10 V, ID<br>= 8 A)                     | Qg      | -          | 19.2       | 29         | nC |
| Gate to Source Charge  |  | Qgs     | -          | 2.3        | 3.5        |    |
| Gate to Drain Charge   |  | Qgd     | -          | 6          | 9          |    |
| Turn-on Delay Time   | (VDS= 20 V,<br>ID= 8 A,<br>VGEN= 10 V<br>RGEN = 6 $\Omega$ ) | td(on)  | -          | 8.2        | 13         | nS |
| Rise Time  |  | tr      | -          | 12         | 18         |    |
| Turn-Off Delay Time  |  | td(off) | -          | 35         | 53         |    |
| Fall Time  |  | tf      | -          | 17         | 26         |    |
| Input Capacitance  | (VDS = 20 V,<br>VGS = 0 V, f =<br>1 MHz)                     | Ciss    | -          | 935        | 1403       | pF |
| Output Capacitance   |  | Coss    | -          | 364        | 546        |    |
| Reverse Transfer Capacitance   |  | Crss    | -          | 37         | 56         |    |
| <b>Diode characteristics</b>   |  |         |            |            |            |    |
| Continuous Current TC =25° C   | IS   | -       | -          | 72         | A          |    |
| Plused Current TC =25° C   | ISM  | -       | -          | 288        | A          |    |
| Diode Forward Voltage<br>(IS = 15 A, VGS = 0 V)  | VSD  | -       | -          | 1.2        | V          |    |
| Reverse Recovery Time<br>(VR=20V, IF=7A, dIF/dt=100A/us)                                   | trr  | -       | 73         | -          | ns         |    |
| Reverse Recovery Charge<br>(VR=20V, IF=7A, dIF/dt=100A/us)                                 | Qrr  | -       | 58         | -          | nC         |    |
| Reverse Recovery Current<br>(VR=20V, IF=7A, dIF/dt=100A/us)                                | IRRM   | -       | 1.6        | -          | A          |    |

3. Pulse test: PW  $\leq$  300us duty cycle  $\leq$  2%.

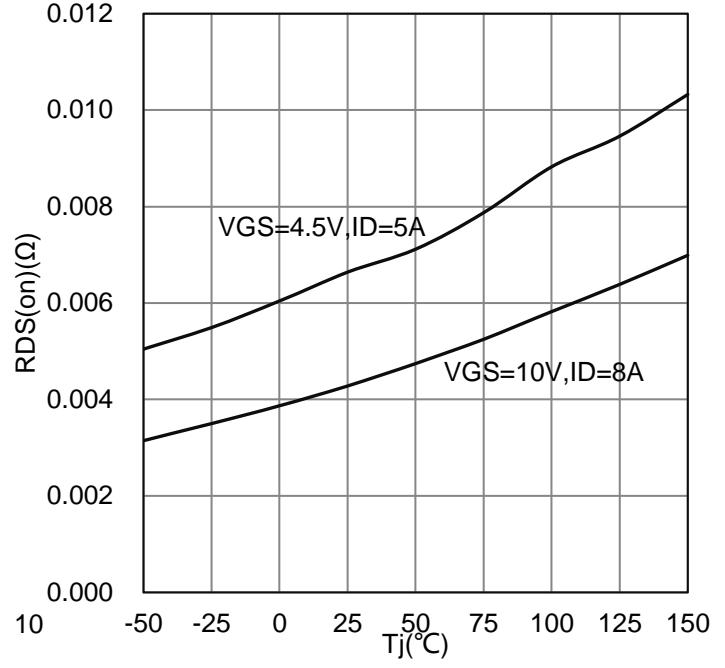
### 7. ELECTRICAL CHARACTERISTICS CURVES



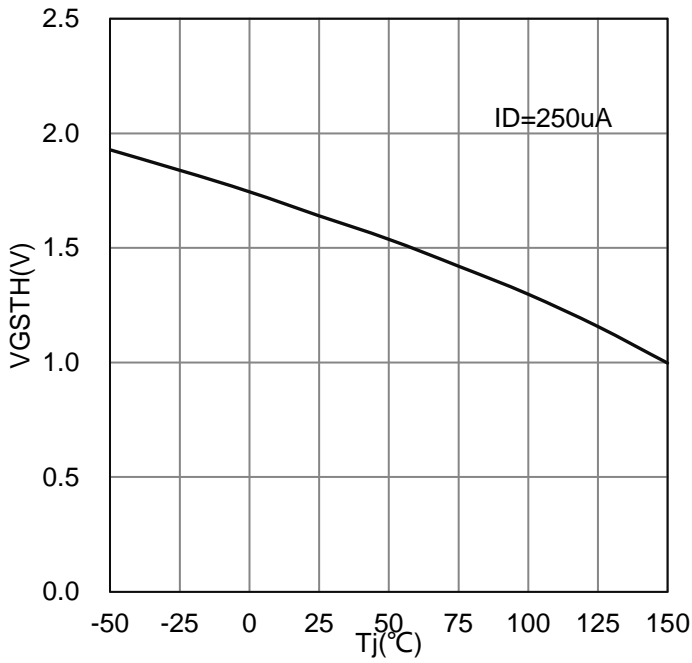
### 7. ELECTRICAL CHARACTERISTICS CURVES(Con.)



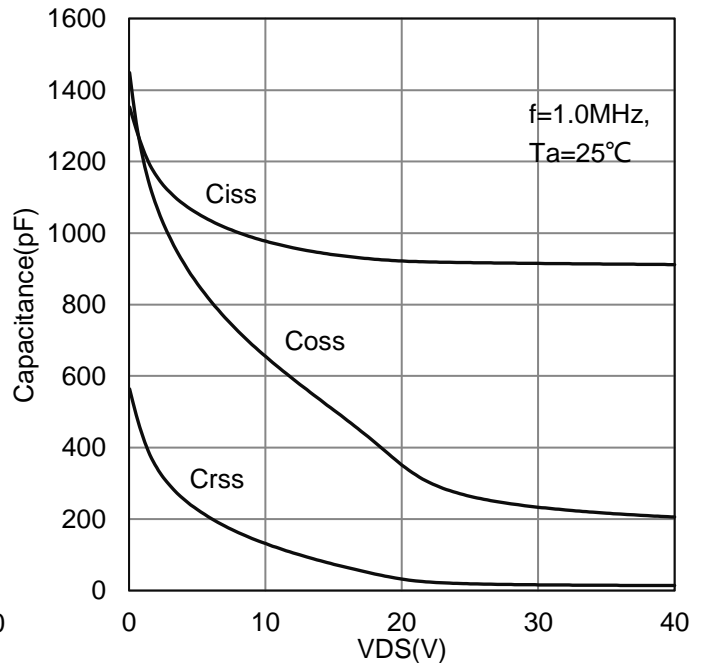
RDS(on) vs. VGS



RDS(on) vs. Tj

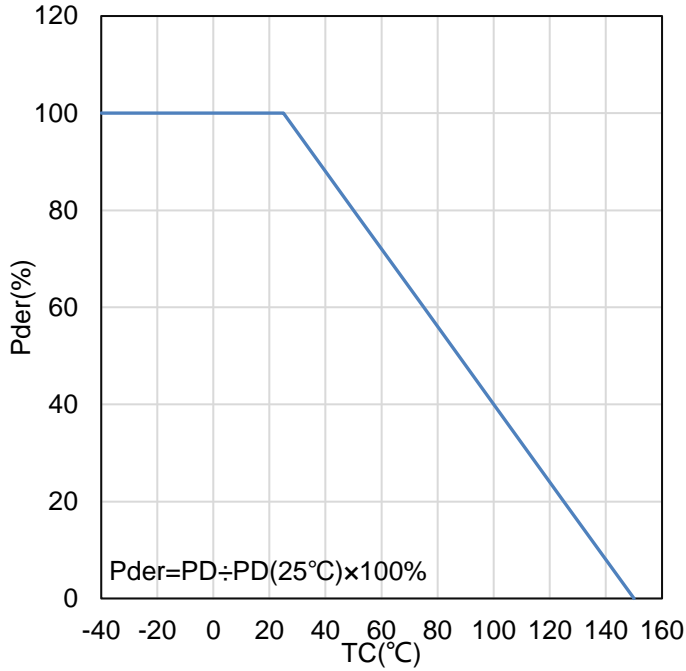


VGStH vs. Tj

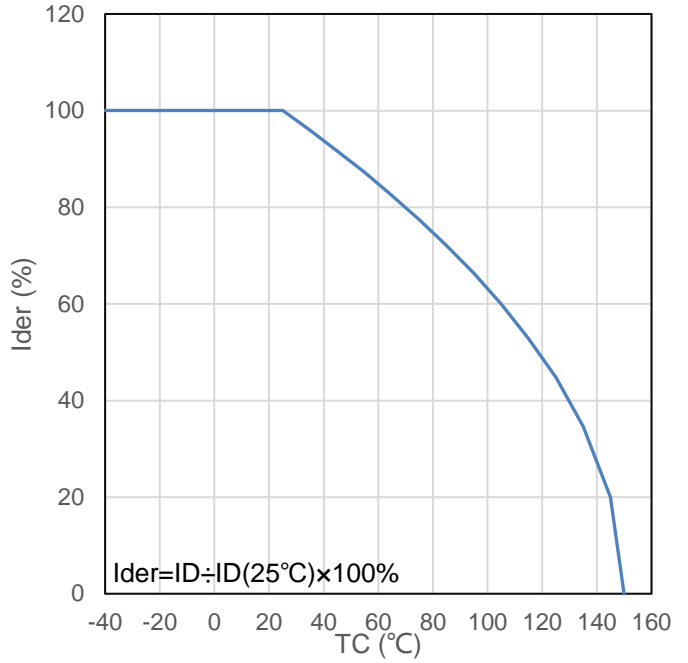


Capacitance

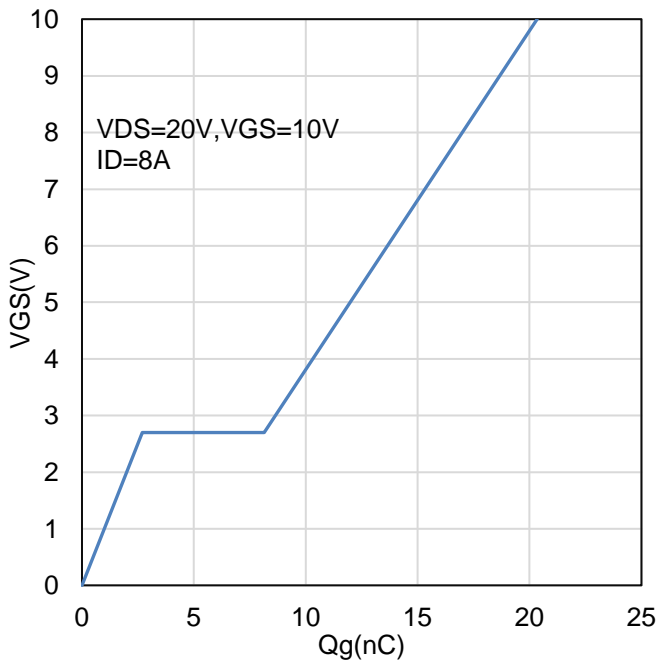
### 7. ELECTRICAL CHARACTERISTICS CURVES(Con.)



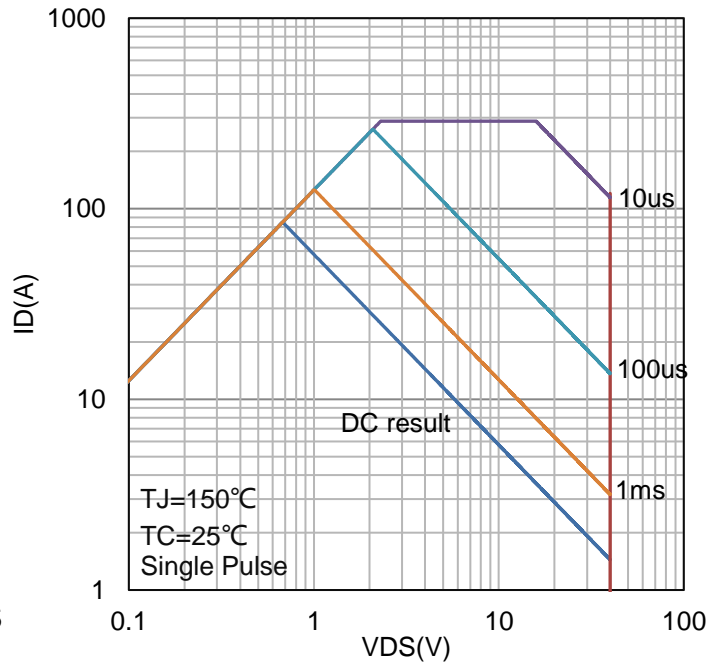
Normalized Derating Curve



Normalized drain Current

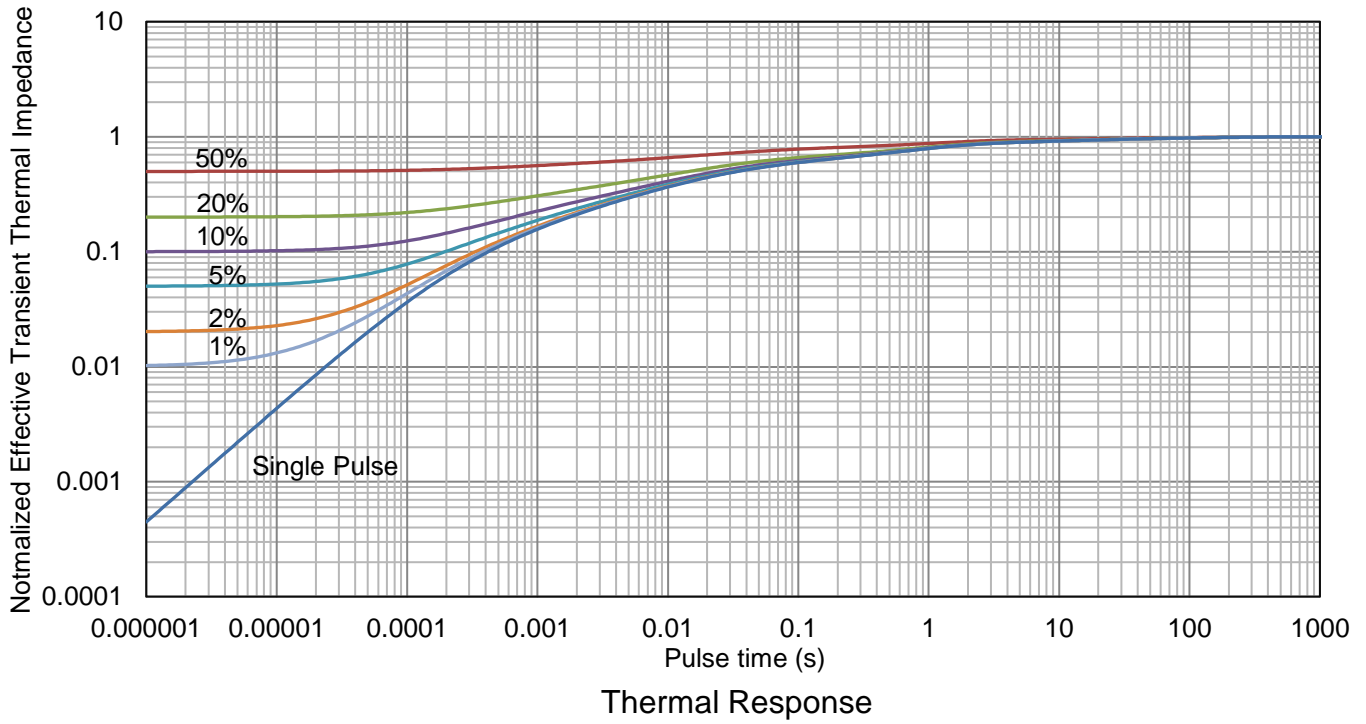


VGS vs. Qg



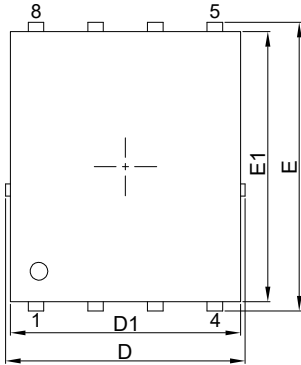
Safe Operating Area

### 7. ELECTRICAL CHARACTERISTICS CURVES(Con.)

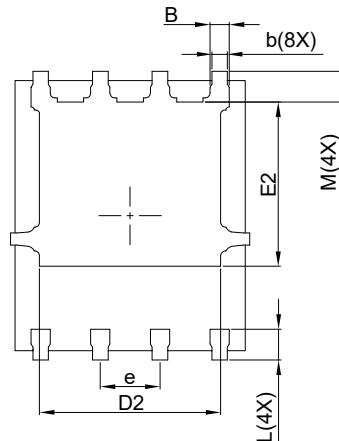


### 8.OUTLINE AND DIMENSIONS

#### DFN5060-8B

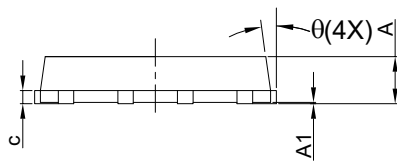


TOP VIEW



BOTTOM VIEW

| DFN5060-8B |           |      |      |
|------------|-----------|------|------|
| DIM        | MIN       | NOR  | MAX  |
| A          | 0.90      | 1.00 | 1.10 |
| A1         | 0.00      | 0.02 | 0.05 |
| E          | 6.00      | 6.15 | 6.30 |
| E1         | 5.66      | 5.76 | 5.86 |
| E2         | 3.40      | 3.50 | 3.60 |
| D          | 4.95      | 5.10 | 5.25 |
| D1         | 4.80      | 4.90 | 5.00 |
| D2         | 3.76      | 3.86 | 3.96 |
| b          | 0.30      | 0.35 | 0.40 |
| B          | 0.36      | 0.41 | 0.46 |
| L          | 0.56      | 0.66 | 0.76 |
| M          | 0.56      | 0.66 | 0.76 |
| e          | 1.27BSC   |      |      |
| c          | 0.254REF. |      |      |
| θ          | 0°        | -    | 12°  |

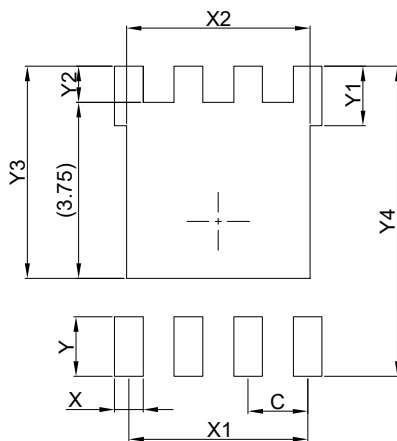


SIDE VIEW

#### GENERAL NOTES

1. Top package surface finish Ra Max0.4um
2. Bottom package surface finish Ra Max0.4um
3. Side package surface finish Ra Max0.4um
4. Protrusion or Gate Burrs shall not exceed 0.05mm per side
5. Offcenter Max0.038mm; Mismatch Max 0.038mm.

### 9.SOLDERING FOOTPRINT



| DFN5060-8B |      |
|------------|------|
| DIM        | (mm) |
| C          | 1.27 |
| X          | 0.61 |
| X1         | 3.81 |
| X2         | 3.91 |
| Y          | 1.27 |
| Y1         | 1.27 |
| Y2         | 0.77 |
| Y3         | 4.52 |
| Y4         | 6.61 |

## **DISCLAIMER**

- Curve guarantee in the specification. The curve of test items with electric parameter is used as quality guarantee. The curve of test items without electric parameter is used as reference only.
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