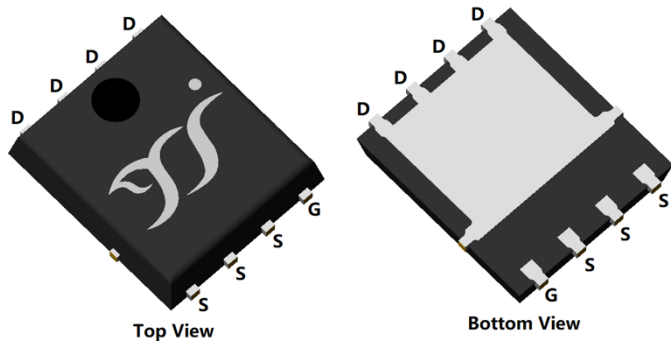
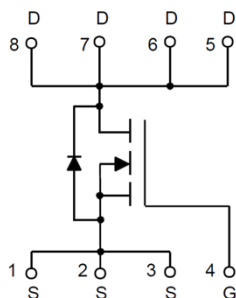


## N-Channel Enhancement Mode Field Effect Transistor



PDFN5060-8L



### Product Summary

- $V_{DS}$  30V
- $I_D$  50A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ )  $<4.7m\Omega$
- $R_{DS(ON)}$  (at  $V_{GS}=4.5V$ )  $<6.0m\Omega$
- 100% EAS Tested
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Trench Power LV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Halogen Free

### Applications

- High current load applications
- Load switching
- Hard switched and high frequency circuits
- Uninterruptible power supply

### ■ Absolute Maximum Ratings ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter                                        |                         | Symbol          | Limit           | Unit                      |
|--------------------------------------------------|-------------------------|-----------------|-----------------|---------------------------|
| Drain-source Voltage                             |                         | $V_{DS}$        | 30              | V                         |
| Gate-source Voltage                              |                         | $V_{GS}$        | $\pm 20$        | V                         |
| Drain Current                                    | $T_C=25^\circ\text{C}$  | $I_D$           | 50              | A                         |
|                                                  | $T_C=100^\circ\text{C}$ |                 | 31.6            |                           |
| Pulsed Drain Current <sup>A</sup>                |                         | $I_{DM}$        | 190             | A                         |
| Total Power Dissipation                          | $T_C=25^\circ\text{C}$  | $P_D$           | 45              | W                         |
|                                                  | $T_C=100^\circ\text{C}$ |                 | 17.8            |                           |
| Single Pulse Avalanche Energy <sup>B</sup>       |                         | $E_{AS}$        | 196             | mJ                        |
| Thermal Resistance Junction-to-Case <sup>C</sup> |                         | $R_{\theta JC}$ | 2.8             | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range           |                         | $T_J, T_{STG}$  | $-55 \sim +150$ | $^\circ\text{C}$          |

### ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking   | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|-----------|----------------------|-------------------------|----------------------------|---------------|
| YJG50N03A     | F1           | YJG50N03A | 5000                 | 10000                   | 100000                     | 13" reel      |



# YJG50N03A

## ■ Electrical Characteristics (T<sub>j</sub>=25℃ unless otherwise noted)

| Parameter                             | Symbol              | Conditions                                                                          | Min | Typ  | Max  | Units |
|---------------------------------------|---------------------|-------------------------------------------------------------------------------------|-----|------|------|-------|
| Static Parameter                      |                     |                                                                                     |     |      |      |       |
| Drain-Source Breakdown Voltage        | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> =250μA                                         | 30  |      |      | V     |
| Zero Gate Voltage Drain Current       | I <sub>DSS</sub>    | V <sub>DS</sub> =30V,V <sub>GS</sub> =0V                                            |     |      | 1    | μA    |
| Gate-Body Leakage Current             | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V                                         |     |      | ±100 | nA    |
| Gate Threshold Voltage                | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                           | 1.0 | 1.5  | 2.5  | V     |
| Static Drain-Source On-Resistance     | R <sub>DS(ON)</sub> | V <sub>GS</sub> = 10V, I <sub>D</sub> =15A                                          |     | 3.9  | 4.7  | mΩ    |
|                                       |                     | V <sub>GS</sub> = 4.5V, I <sub>D</sub> =15A                                         |     | 5.0  | 6.0  |       |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =15A,V <sub>GS</sub> =0V                                             |     | 0.85 | 1.2  | V     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                     |     |      | 50   | A     |
| Dynamic Parameters                    |                     |                                                                                     |     |      |      |       |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =15V,V <sub>GS</sub> =0V,f=1MHZ                                     |     | 2504 |      | pF    |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                     |     | 323  |      |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                     |     | 283  |      |       |
| Switching Parameters                  |                     |                                                                                     |     |      |      |       |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =10V,V <sub>DS</sub> =15V,I <sub>D</sub> =20A                       |     | 54   |      | nC    |
| Gate-Source Charge                    | Q <sub>gs</sub>     |                                                                                     |     | 8.5  |      |       |
| Gate-Drain Charge                     | Q <sub>gd</sub>     |                                                                                     |     | 10.2 |      |       |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | I <sub>F</sub> =15A, di/dt=100A/us                                                  |     | 6.5  |      | ns    |
| Reverse Recovery Time                 | t <sub>rr</sub>     |                                                                                     |     | 15   |      |       |
| Turn-on Delay Time                    | t <sub>D(on)</sub>  | V <sub>GS</sub> =10V,V <sub>DD</sub> =20V, I <sub>D</sub> =2A, R <sub>GEN</sub> =3Ω |     | 11   |      |       |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                     |     | 20   |      |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub> |                                                                                     |     | 41   |      |       |
| Turn-off fall Time                    | t <sub>f</sub>      |                                                                                     |     | 25   |      |       |

A. Pulse Test: Pulse Width≤300us, Duty cycle ≤2%.

B. T<sub>j</sub>=25℃, V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=2mH, I<sub>AS</sub>=14A.

C. R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design, while R<sub>θJA</sub> is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.



## ■ Typical Performance Characteristics

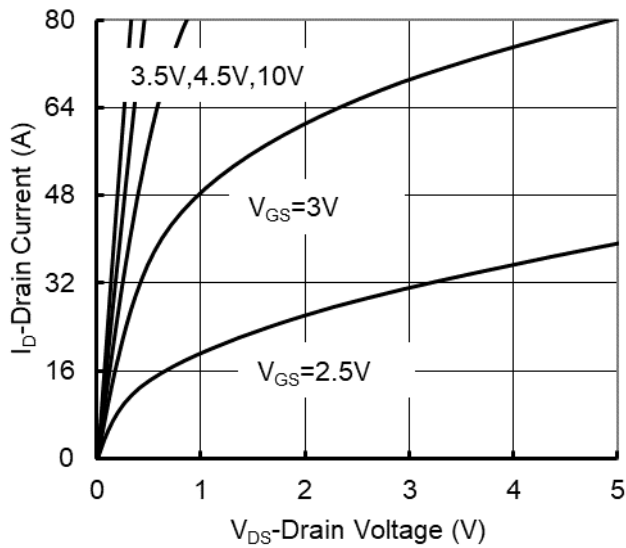


Figure 1. Output Characteristics

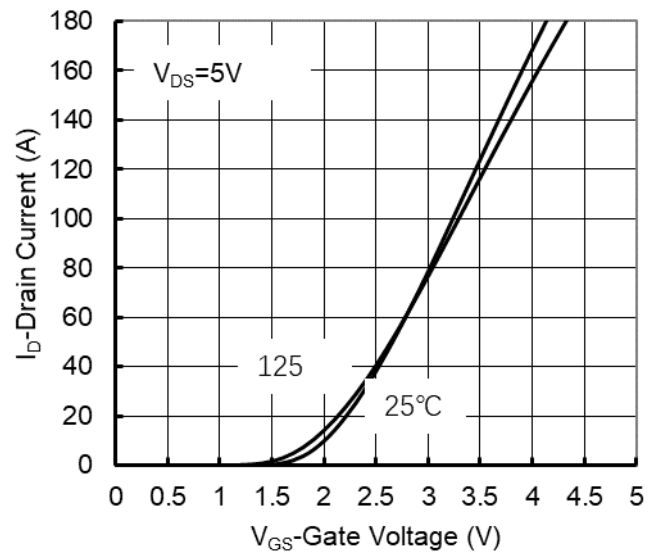


Figure 2. Transfer Characteristics

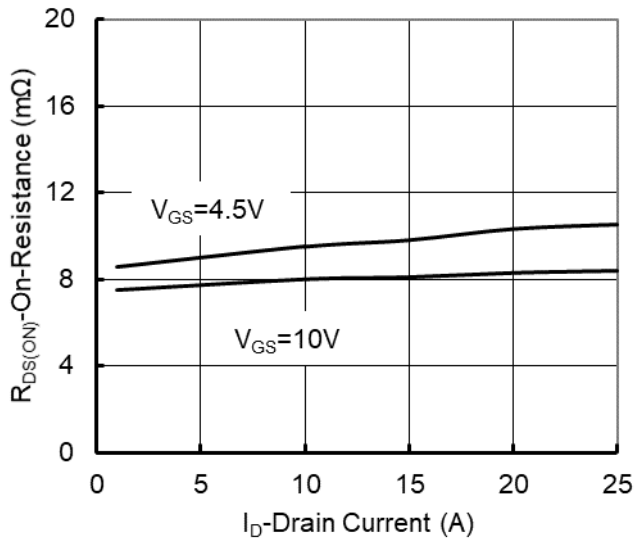


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

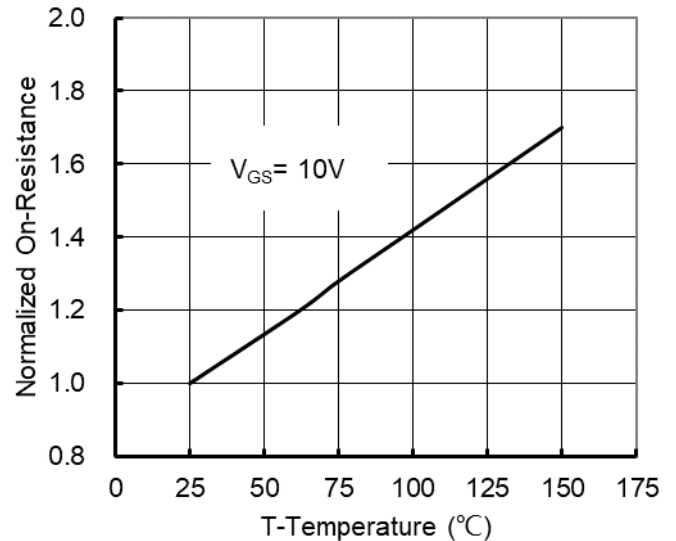


Figure 4. On-Resistance vs. Junction Temperature

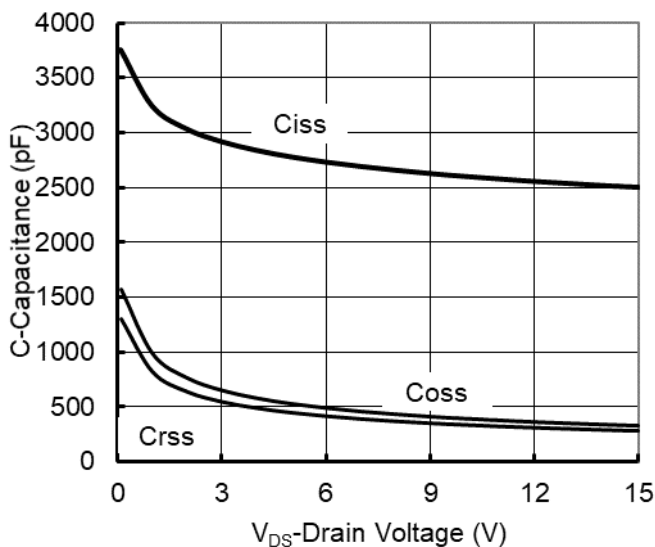


Figure 5. Capacitance Characteristics

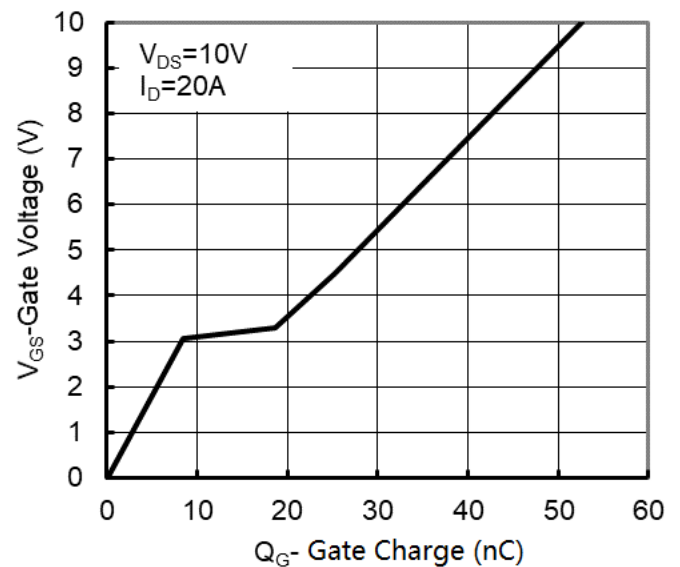


Figure 6. Gate Charge

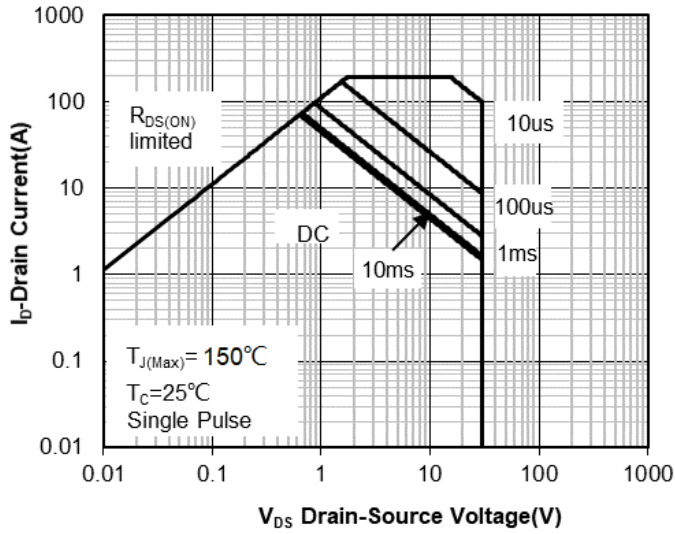


Figure 7. Safe Operation Area

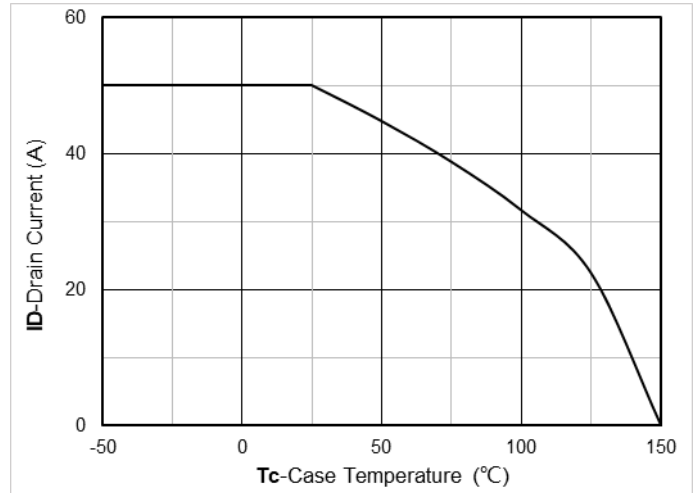


Figure 8. Maximum Continuous Drain Current vs Case Temperature

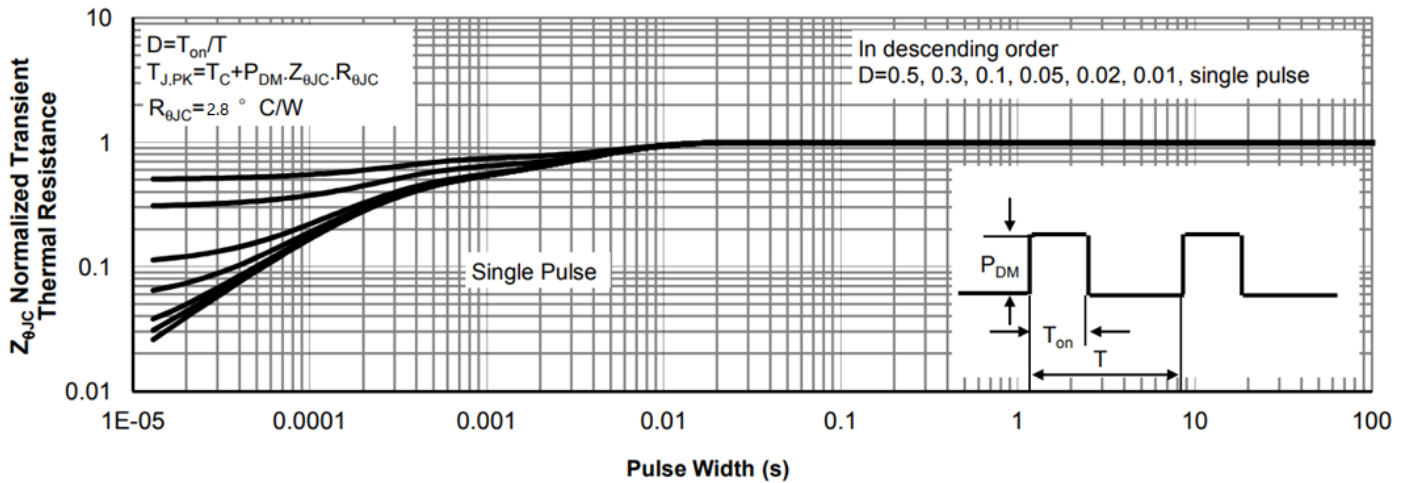
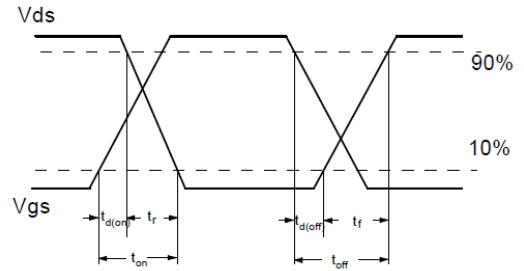
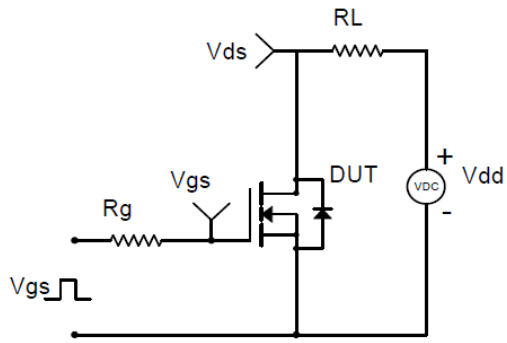
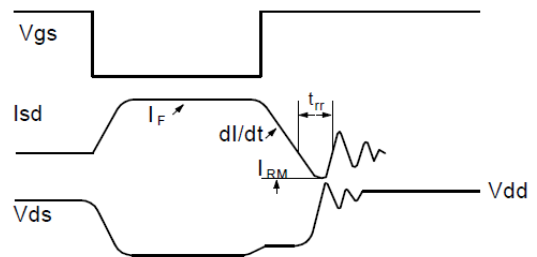
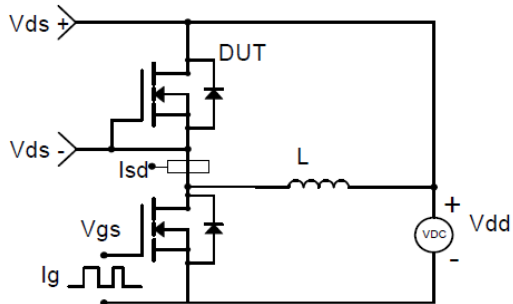


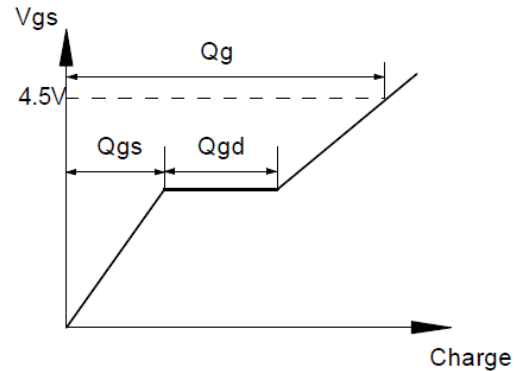
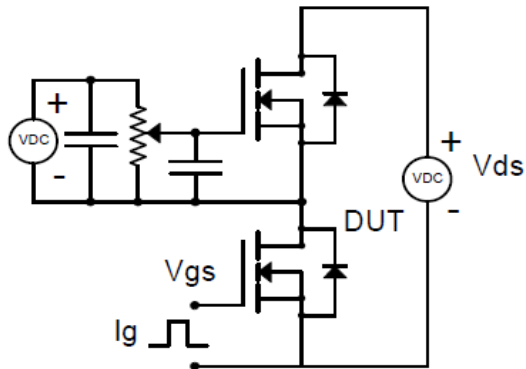
Figure 9. Normalized Maximum Transient Thermal Impedance



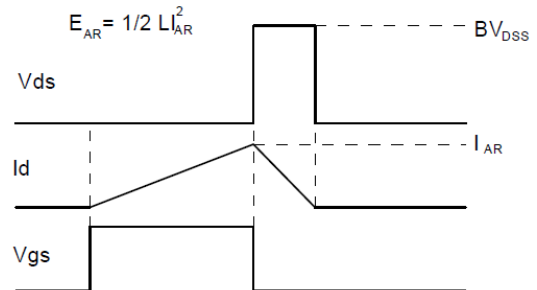
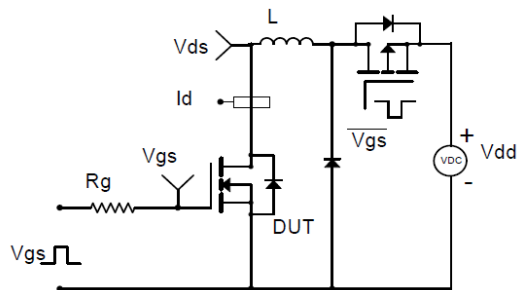
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**

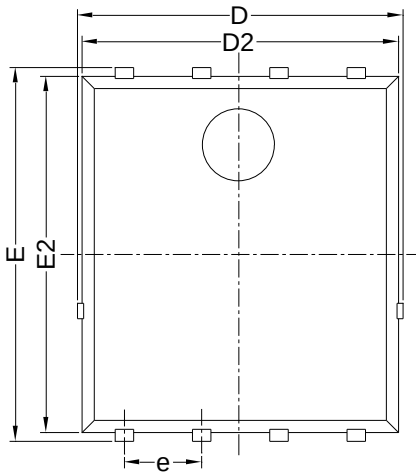


**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**

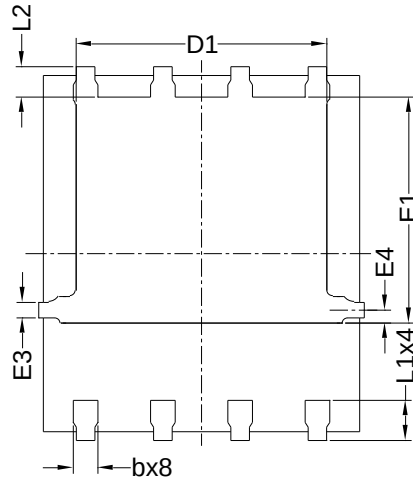


## YJG50N03A

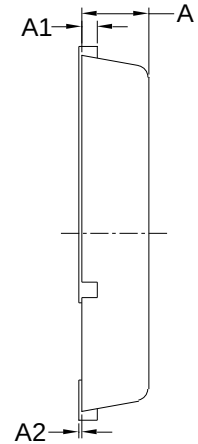
### ■ PDFN5060-8L-B-1.1MM Package Information



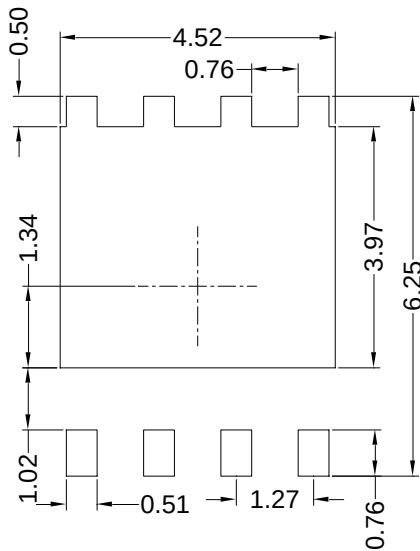
Top View  
正面视图



Bottom View  
背面视图



Side View  
侧面视图



Suggested Solder Pad Layout  
Top View

| SYMBOL | MILLIMETER |      |      |
|--------|------------|------|------|
|        | MIN        | NOM  | MAX  |
| D      | 5.15       | 5.35 | 5.55 |
| E      | 5.95       | 6.15 | 6.35 |
| A      | 1.00       | 1.10 | 1.20 |
| A1     | 0.254 BSC  |      |      |
| A2     |            |      | 0.10 |
| D1     | 3.92       | 4.12 | 4.32 |
| E1     | 3.52       | 3.72 | 3.92 |
| D2     | 5.00       | 5.20 | 5.40 |
| E2     | 5.66       | 5.86 | 6.06 |
| E3     | 0.254 REF  |      |      |
| E4     | 0.21 REF   |      |      |
| L1     | 0.56       | 0.66 | 0.76 |
| L2     | 0.50 BSC   |      |      |
| b      | 0.31       | 0.41 | 0.51 |
| e      | 1.27 BSC   |      |      |

Note:

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.10$  mm.
3. The pad layout is for reference purposes only.



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