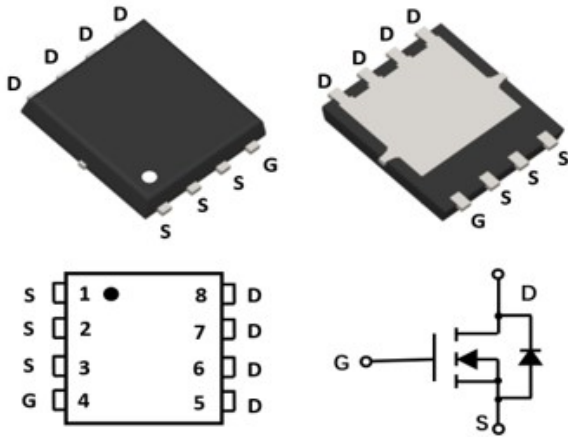


## N-Channel Enhancement Mode Field Effect Transistor

### PDFN 5X6



### Product Summary

- $V_{DS}$  30V
- $I_D$  105A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ )  $<3.0m\Omega$
- $R_{DS(ON)}$  (at  $V_{GS}=4.5V$ )  $<4.0m\Omega$
- 100% UIS Tested
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

### Applications

- DC-DC Converters
- Power management functions
- Backlighting

### ■ 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                                    | $T_C=25^\circ\text{C}$  | $I_D$           | 105             | A                         |
|                                                  | $T_C=100^\circ\text{C}$ |                 | 66              |                           |
| Pulsed Drain Current <sup>A</sup>                |                         | $I_{DM}$        | 415             | A                         |
| Total Power Dissipation @ $T_C=25^\circ\text{C}$ |                         | $P_D$           | 70              | W                         |
| Single Pulse Avalanche Energy <sup>B</sup>       |                         | $E_{AS}$        | 507             | mJ                        |
| Thermal Resistance Junction-to-Case              |                         | $R_{\theta JC}$ | 1.8             | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range           |                         | $T_J, T_{STG}$  | $-55 \sim +150$ | $^\circ\text{C}$          |

### ■ Ordering Information (Example)

| PREFERED P/N | PACKING CODE | Marking    | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|--------------|--------------|------------|----------------------|-------------------------|----------------------------|---------------|
| YJG105N03A   | F1           | YJG105N03A | 5000                 | 10000                   | 100000                     | 13" reel      |



# YJG105N03A

## ■ 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> =20A                                          |     | 2.45 | 3.0  | mΩ    |
|                                       |                     | V <sub>GS</sub> = 4.5V, I <sub>D</sub> =15A                                         |     | 2.9  | 4.0  |       |
| Diode Forward Voltage                 | V <sub>SD</sub>     | I <sub>S</sub> =20A,V <sub>GS</sub> =0V                                             |     | 0.85 | 1.2  | V     |
| Maximum Body-Diode Continuous Current | I <sub>S</sub>      |                                                                                     |     |      | 105  | A     |
| Dynamic Parameters                    |                     |                                                                                     |     |      |      |       |
| Input Capacitance                     | C <sub>iss</sub>    | V <sub>DS</sub> =15V,V <sub>GS</sub> =0V,f=1MHZ                                     |     | 4401 |      | pF    |
| Output Capacitance                    | C <sub>oss</sub>    |                                                                                     |     | 581  |      |       |
| Reverse Transfer Capacitance          | C <sub>rss</sub>    |                                                                                     |     | 439  |      |       |
| Switching Parameters                  |                     |                                                                                     |     |      |      |       |
| Total Gate Charge                     | Q <sub>g</sub>      | V <sub>GS</sub> =10V,V <sub>DS</sub> =20V,I <sub>D</sub> =20A                       |     | 49.5 |      | nC    |
| Gate-Source Charge                    | Q <sub>gs</sub>     |                                                                                     |     | 10.4 |      |       |
| Gate-Drain Charge                     | Q <sub>gd</sub>     |                                                                                     |     | 8.9  |      |       |
| Reverse Recovery Charge               | Q <sub>rr</sub>     | I <sub>F</sub> =20A, di/dt=500A/us                                                  |     | 7.5  |      | ns    |
| Reverse Recovery Time                 | t <sub>rr</sub>     |                                                                                     |     | 23   |      |       |
| Turn-on Delay Time                    | t <sub>D(on)</sub>  | V <sub>GS</sub> =10V, V <sub>DD</sub> =15V, I <sub>D</sub> =2A,R <sub>GEN</sub> =3Ω |     | 13   |      |       |
| Turn-on Rise Time                     | t <sub>r</sub>      |                                                                                     |     | 22   |      |       |
| Turn-off Delay Time                   | t <sub>D(off)</sub> |                                                                                     |     | 63   |      |       |
| Turn-off fall Time                    | t <sub>f</sub>      |                                                                                     |     | 33   |      |       |

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

B. 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

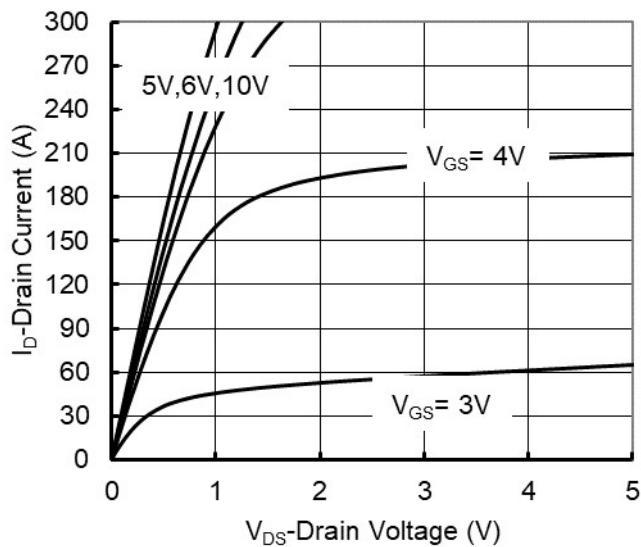


Figure 1. Output Characteristics

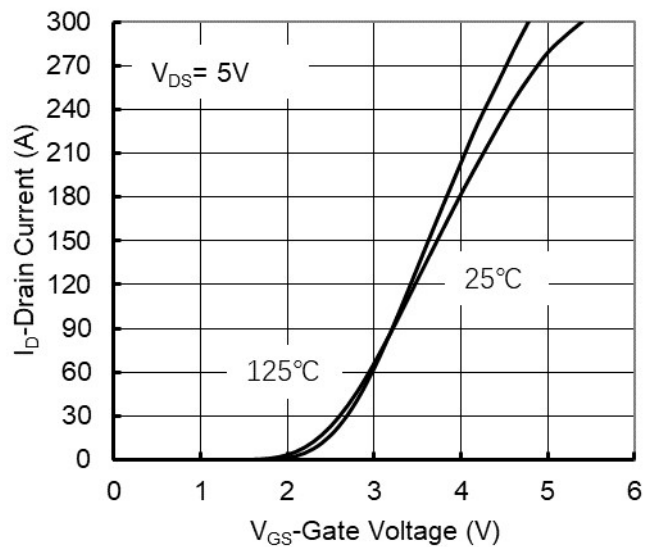


Figure 2. Transfer Characteristics

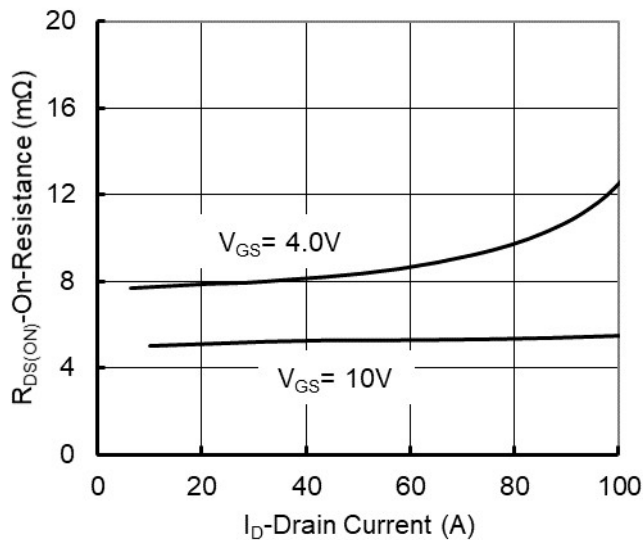


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

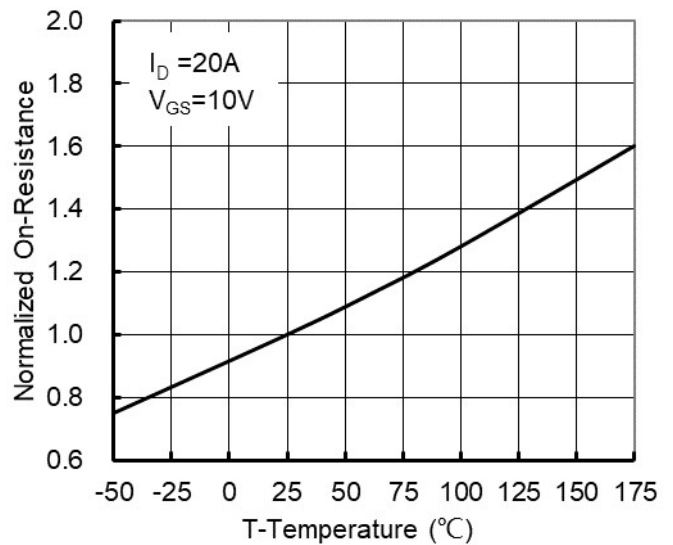


Figure 4. On-Resistance vs. Junction Temperature

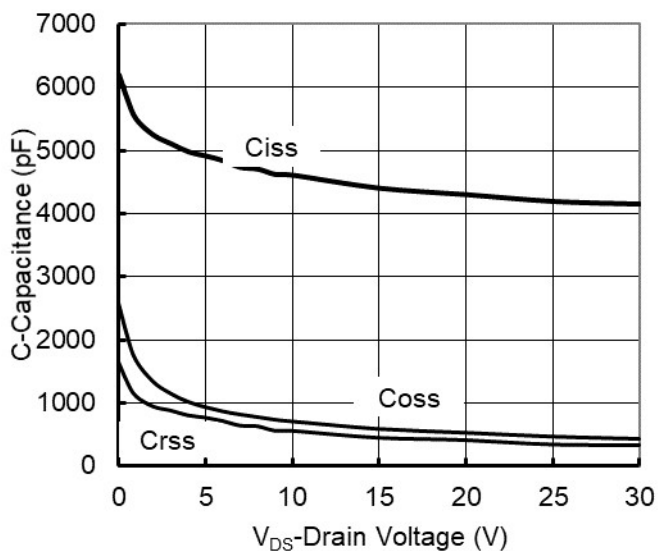


Figure 5. Capacitance Characteristics

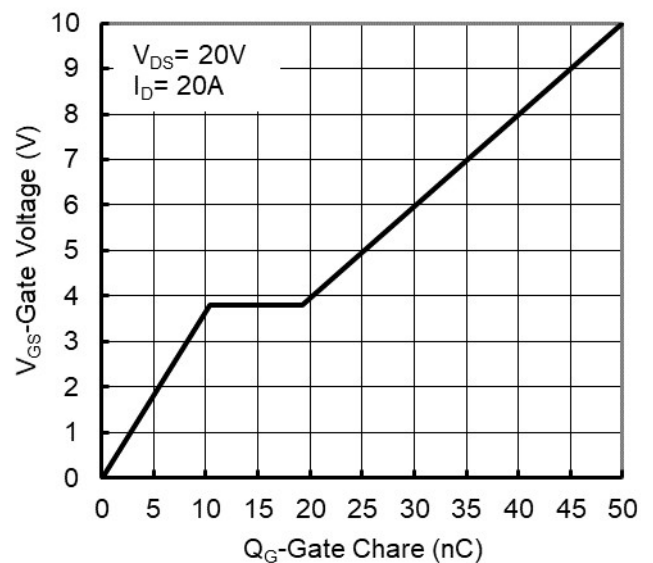


Figure 6. Gate Charge

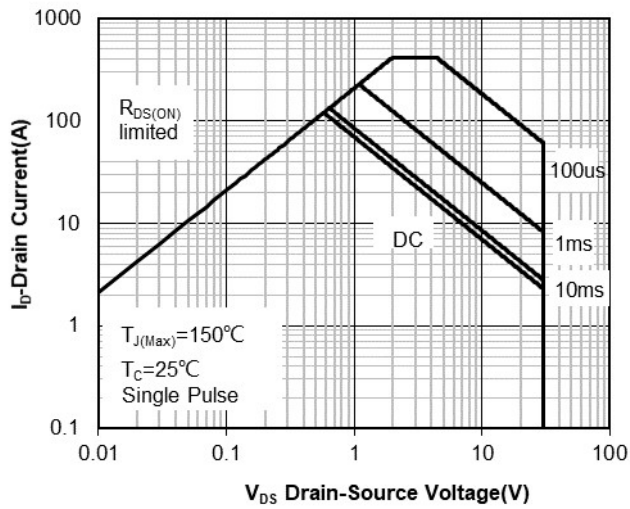


Figure 7. Safe Operation Area

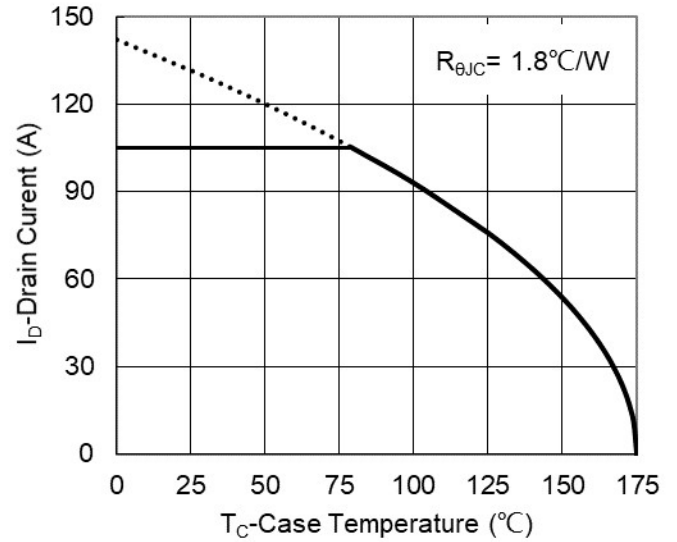


Figure 8. Maximum Continuous Drain Current vs Case Temperature

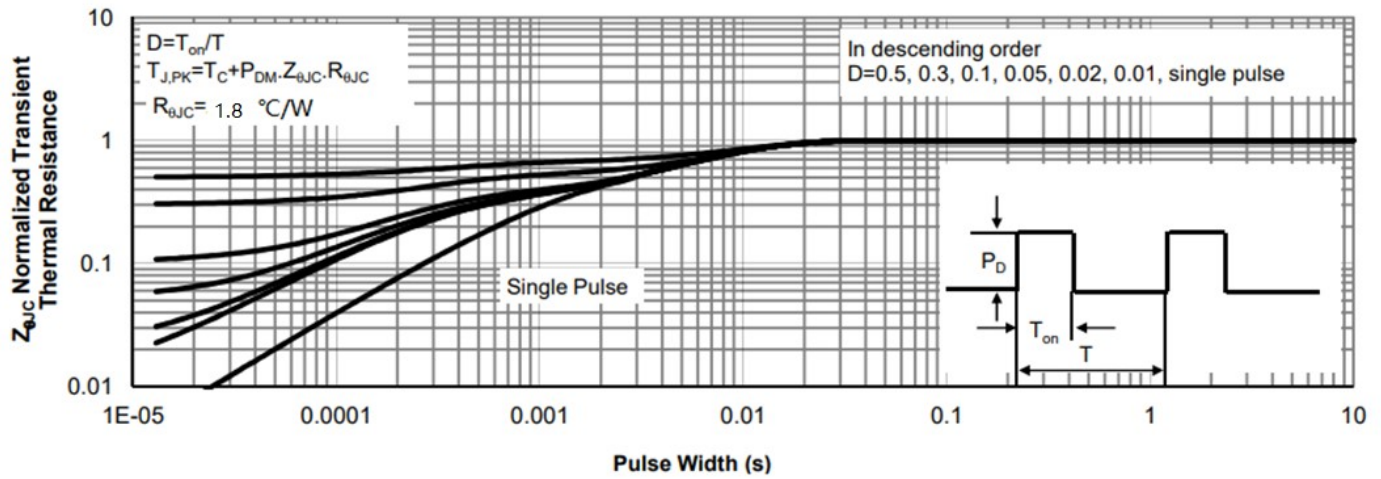
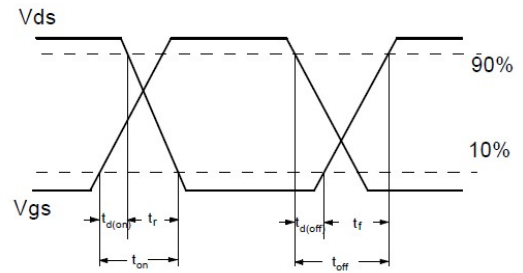
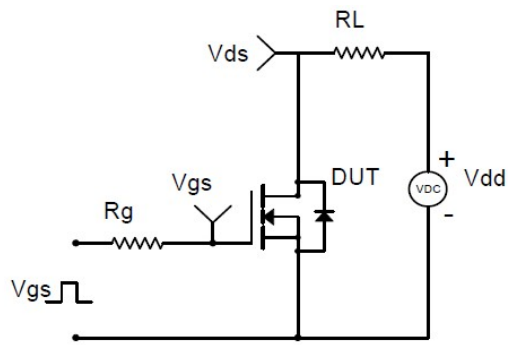
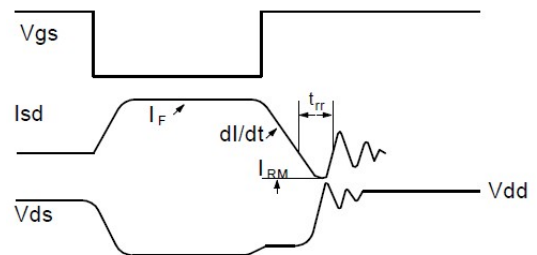


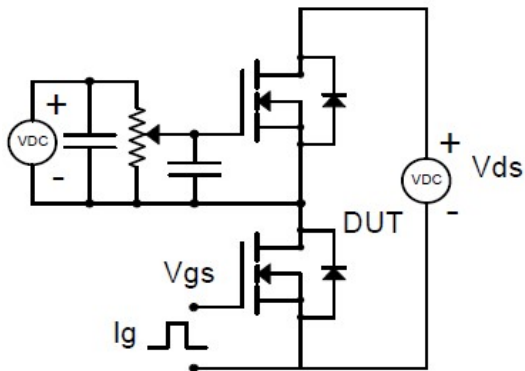
Figure 9. Normalized Maximum Transient Thermal Impedance



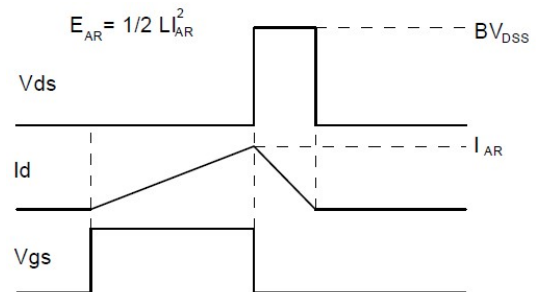
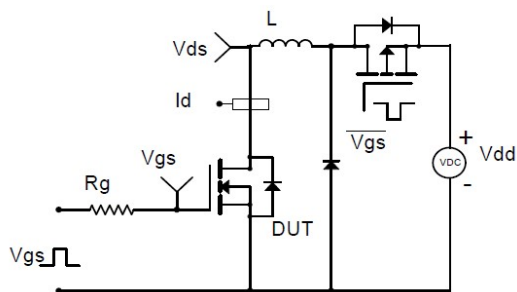
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



**Gate Charge Test Circuit & Waveform**

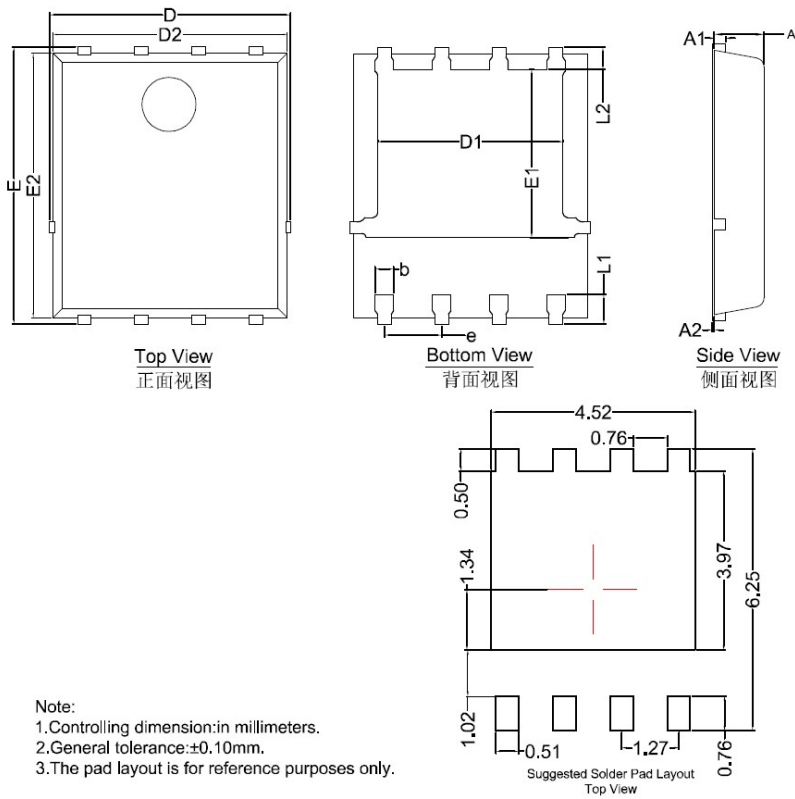


**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



# YJG105N03A

## ■ PDFN5X6 Package Information



| 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 |
| L1     | 0.56       | 0.66 | 0.76 |
| L2     | 0.50 BSC   |      |      |
| b      | 0.31       | 0.41 | 0.51 |
| e      | 1.27 BSC   |      |      |



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