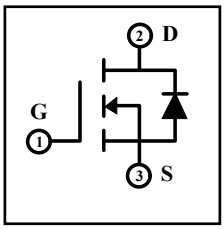
# 108A 85V N-channel Enhancement Mode Power MOSFET

## 1 Description

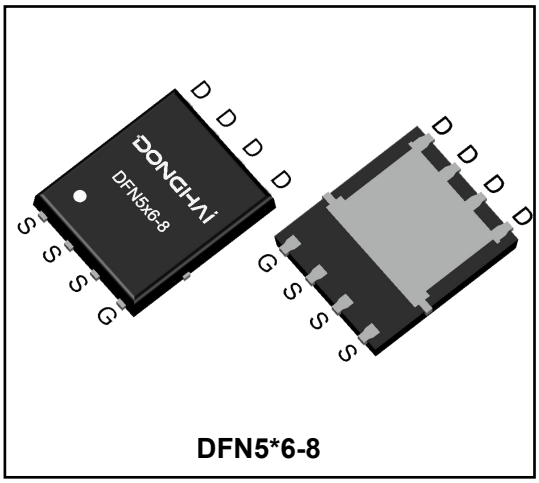
These N-channel enhancement mode power mosfets used advanced splite gate trench technology design, provided excellent Rdson and low gate charge. Which accords with the RoHS standard.




$V_{DSS}$ = 85V

$R_{DS(on)\ (TYP)}$= 4.5mΩ

$I_D$ = 108A




**DFN5*6-8**

## 2 Features

- Fast switching
- Low on resistance
- Low gate charge
- High avalanche current
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100% $\Delta V_{DS}$ test

## 3 Applications

- Synchronous rectification in SMPS
- Hard switching and high speed circuit
- Power tools
- UPS
- Motor control

## 4 Electrical Characteristics

### 4.1 Absolute Maximum Ratings （Tc=25℃,unless otherwise noted）

| Parameter | | Symbol | Rating | Units |
|---|---|---|---|---|
| Drian-to-Source Voltage | | $V_{DSS}$ | 85 | V |
| Gate-to-Source Voltage | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current | $T_C$=25℃ | $I_D$ | 108 | A |
| | $T_C$=100℃ | | 68 | A |
| Pulsed Drain Current(1) | | $I_{DM}$ | 432 | A |
| Single Pulse Avalanche Energy(4) | | $E_{AS}$ | 529 | mJ |
| Power Dissipation | $T_c$=25℃ | $P_{tot}$ | 109 | W |
| Junction Temperature Range | | $T_j$ | -55～150 | ℃ |
| Storage Temperature Range | | $T_{stg}$ | -55～150 | ℃ |

### 4.2 Thermal Characteristics

| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Thermal Resistance,Junction to Case-sink | $R_{thJC}$ | 1.15 | ℃/W |

**4.3 Electrical Characteristics** (Tc=25℃,unless otherwise noted)

| Parameter | Symbol | Test Condition | Value | | | Units |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| **Off Characteristics** | | | | | | |
| Drain-to-Source Breakdown Voltage | $BV_{DSS}$ | $I_D$=250μA,$V_{GS}$=0V | 85 | -- | -- | V |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=80V,$V_{GS}$=0V,$T_C$=25℃ | -- | -- | 1 | μA |
| | | $V_{DS}$=80V,$V_{GS}$=0V,$T_C$=125℃ | -- | -- | 100 | μA |
| Gate-to-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2 | 3 | 4 | V |
| Drain-to-Source on-state Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=20A | -- | 4.5 | 5..2 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V,$V_{DS}$=45V,f=1.0MHz | -- | 3958 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 622 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 10 | -- | |
| Gate Resisitance | $R_G$ | $V_{DD}$=0V,$V_{GS}$=0V,F=1MHz | -- | 2.7 | -- | Ω |
| **Switching Characteristics** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $I_D$=60A, $V_{DD}$=30V, $V_{GS}$=10V, $R_{GEN}$=4.7Ω | -- | 30 | -- | nS |
| Turn-on Rise Time | $t_r$ | | -- | 17 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 52 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 20 | -- | |
| Total Gate Charge | $Q_g$ | $I_D$=60A,$V_{DD}$=45V,$V_{GS}$=10V | -- | 50 | -- | nC |
| Gate-to-Source Charge | $Q_{gs}$ | | -- | 19 | -- | |
| Gate-to-Drain(“Miller”) Charge | $Q_{gd}$ | | -- | 6.8 | -- | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage(3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=20A | -- | -- | 1.2 | V |
| Diode Forward Current | $I_S$ | | -- | -- | 108 | A |
| Reverse Recovery Time(3) | $t_{rr}$ | $T_J$=25℃,$I_F$=50A, $dI_F/dt$=100A/μS,$V_{GS}$=0V | -- | 70 | -- | nS |
| Reverse Recovery Charge(3) | $Q_{rr}$ | | -- | 102 | -- | nC |

Notes：

1: Repetitive rating, pulse width limited by maximum junction temperature.

2: Surface mounted on FR4 Board, t≤10sec.

3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

4: L=0.5mH,$V_{DD}$=50V,$V_{GATE}$=85V,Start $T_J$=25℃.

## 5 Typical characteristics diagrams

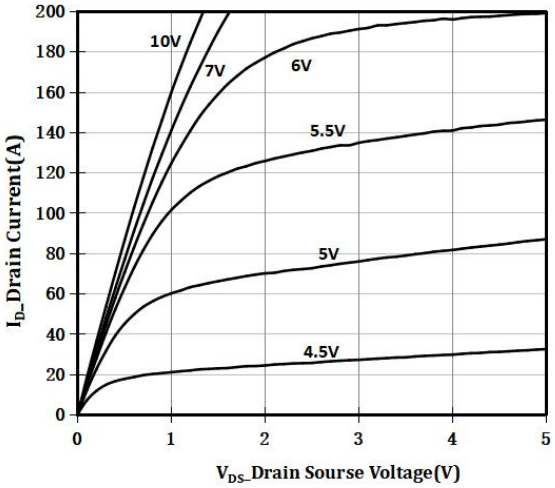



Figure 1. Output Characteristics

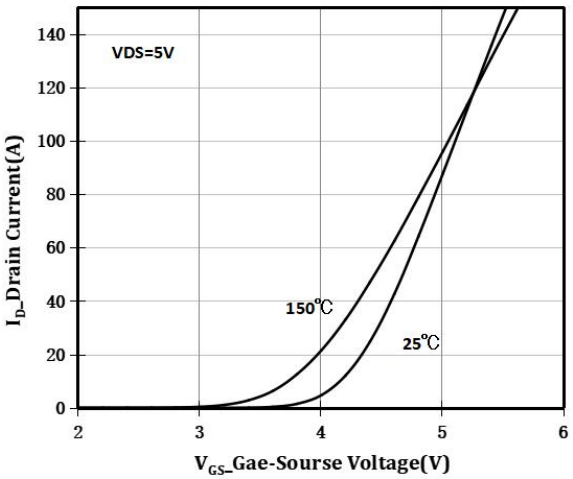



Figure 2. Transfer Characteristics

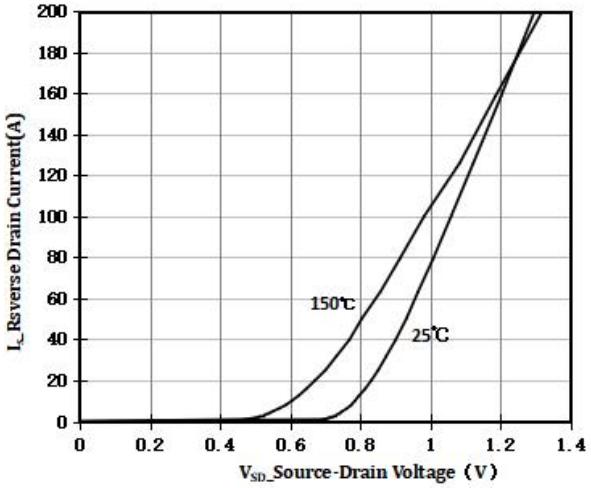



Figure 3. Source-Drain Diode Forward

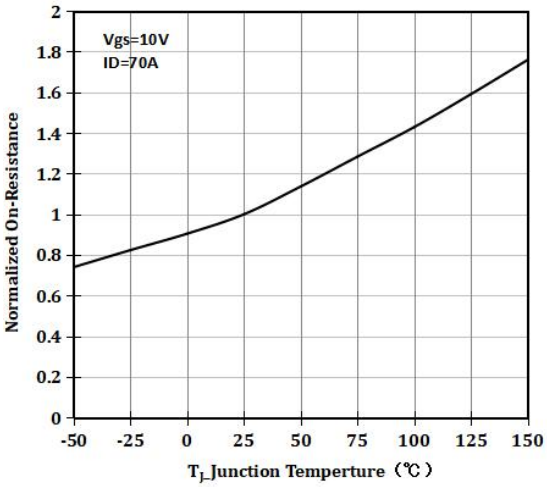



Figure 4. Rdson-Junction Temperature

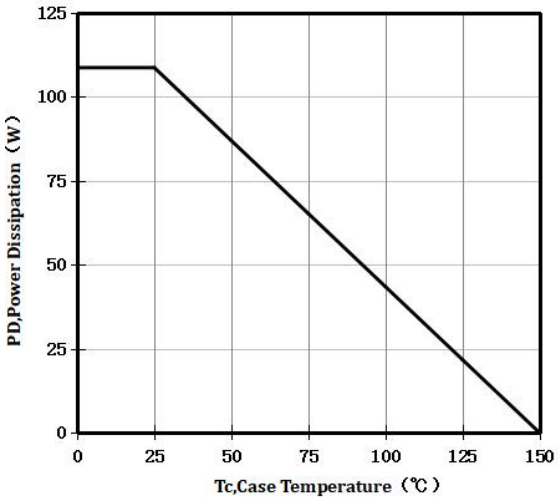



Figure 5. Power De-rating

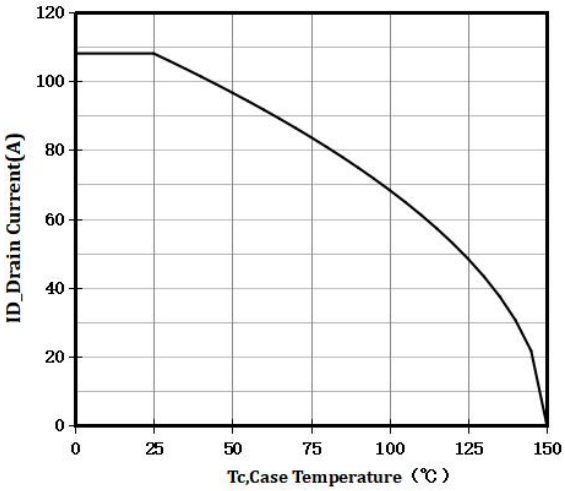



Figure 6. Current De-rating

## 5 Typical characteristics diagrams(continues)

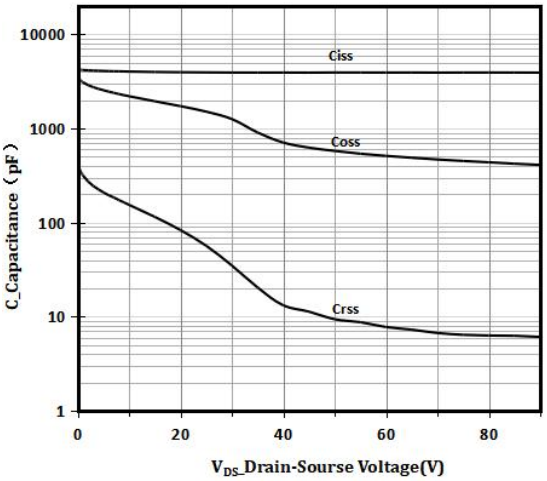



Figure 7. Capacitance vs Vds

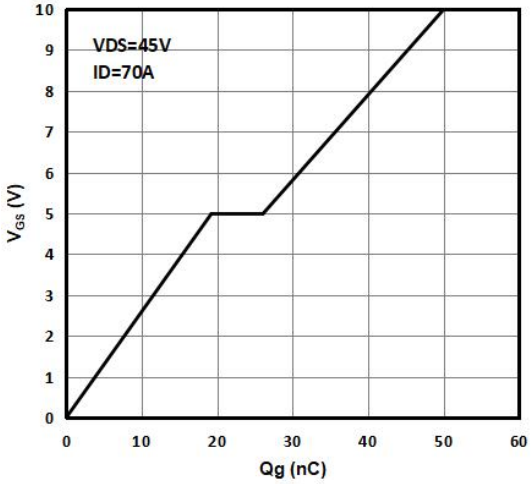



Figure 8. Gate Charge

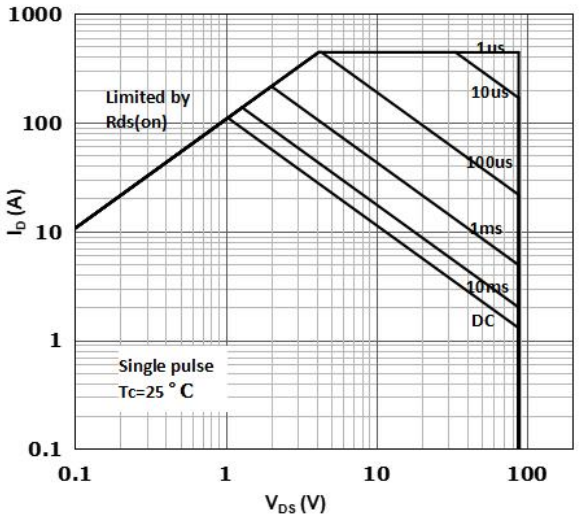



Figure 9. SOA

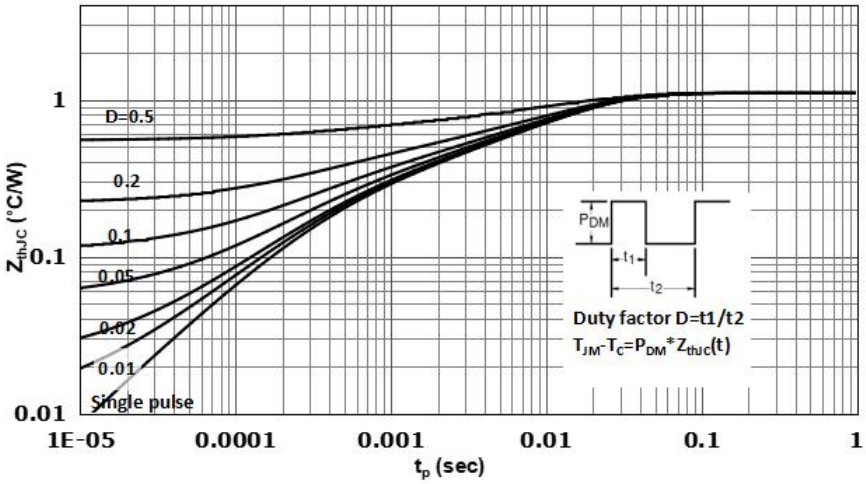
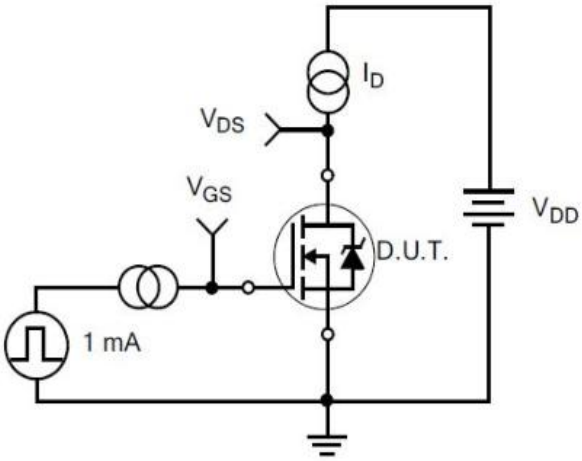
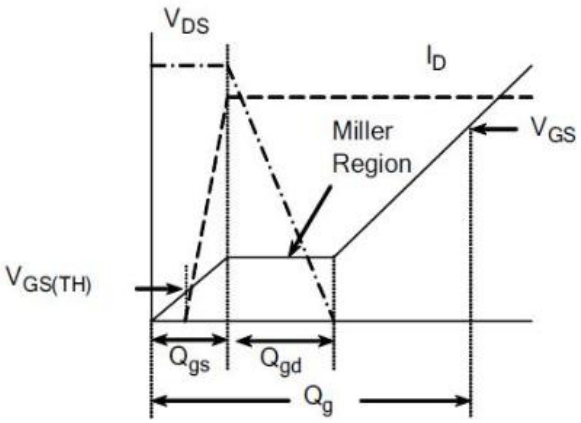



Figure 10. Normalized Maximum Transient Thermal Impedance

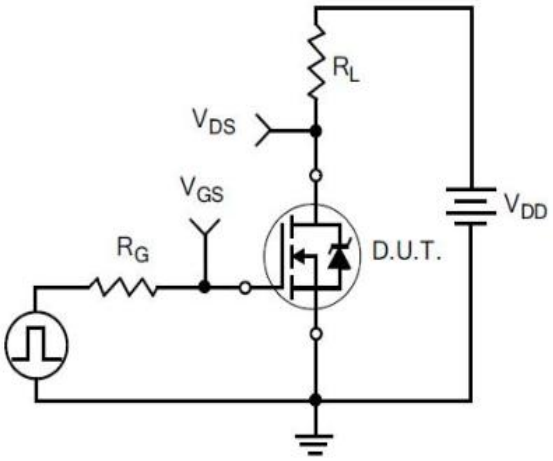
## 6 Typical Test Circuit and Waveform



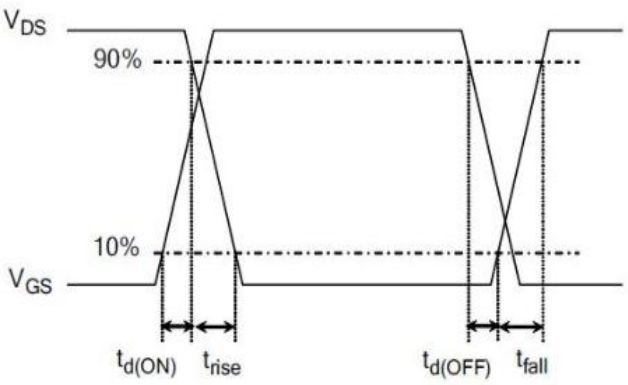

1) Gate Charge Test Circuit




2) . Gate Charge Waveform

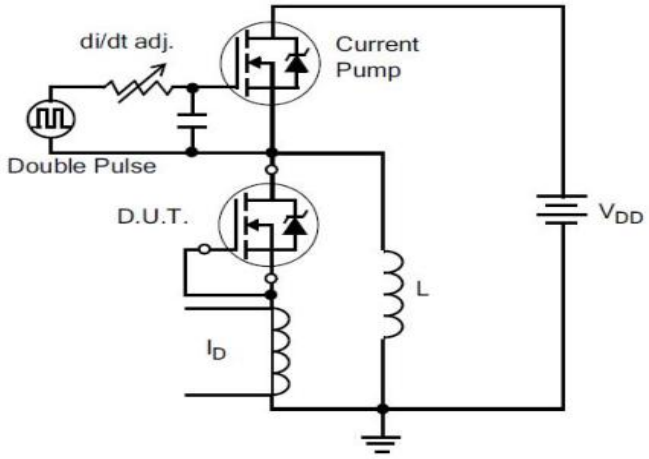



3) Resistive Switching Test Circuit

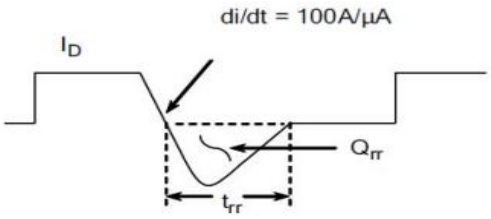



4) Resistive Switching Waveforms

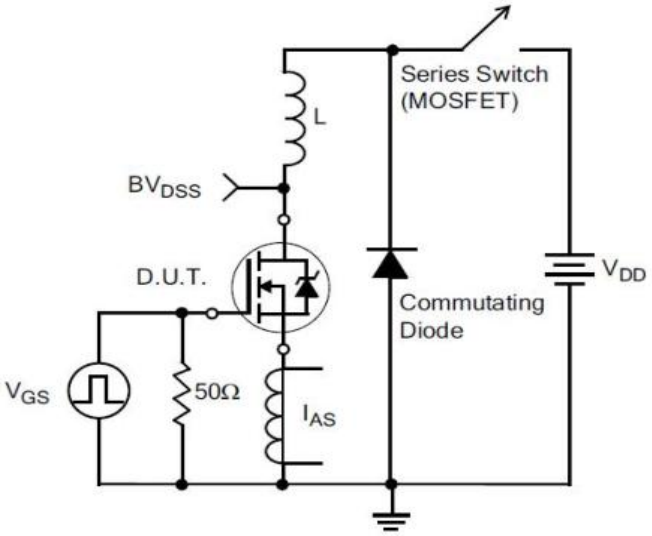
## 6 Typical Test Circuit and Waveform(continues)



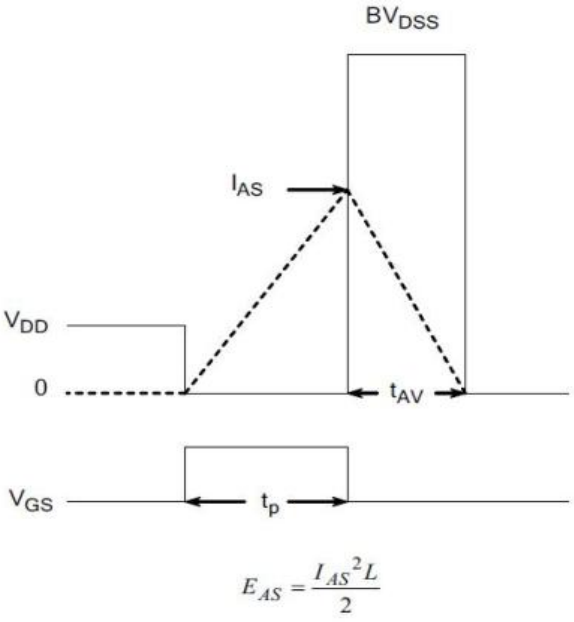

5) Diode Reverse Recovery Test Circuit




6) Diode Reverse Recovery Waveform

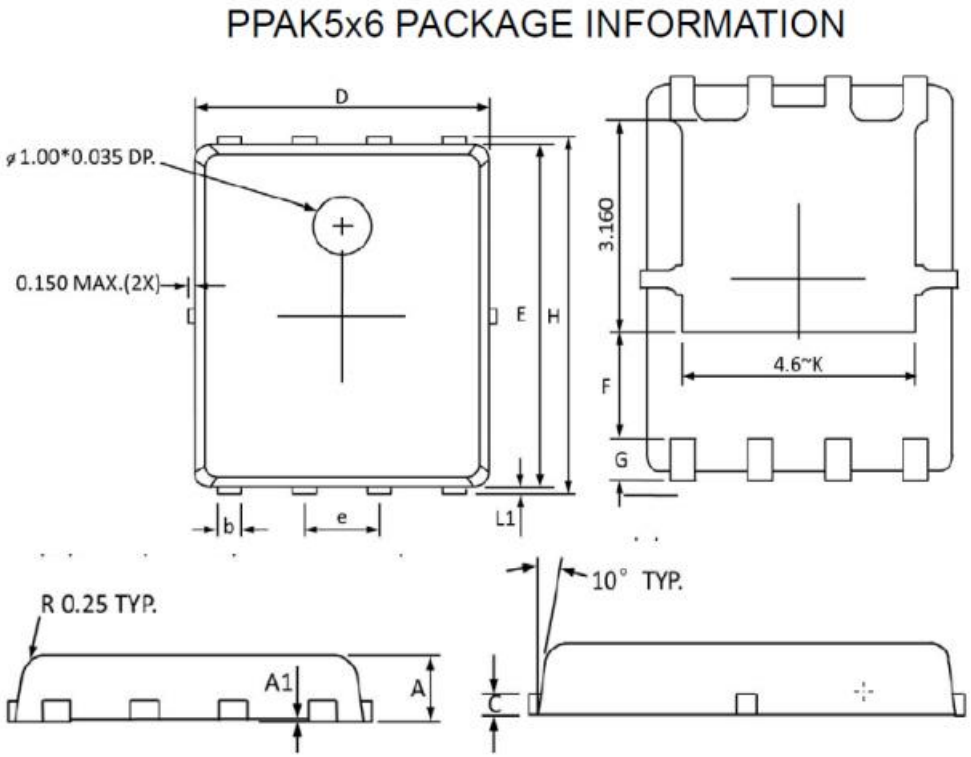



7) . Unclamped Inductive Switching Test Circuit




8) Unclamped Inductive Switching Waveforms

## 7 Dimensions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.800 | 1.000 | 0.032 | 0.039 |
| A1 | 0.000 | 0.005 | 0.000 | 0.000 |
| b | 0.350 | 0.490 | 0.014 | 0.019 |
| C | 0.254 Ref | | 0.254 Ref | |
| D | 4.900 | 5.100 | 0.193 | 0.200 |
| E | 5.700 | 5.900 | 0.225 | 0.232 |
| e | 1.27 BSC | | 1.27 BSC | |
| F | 1.600 Ref | | 1.600 Ref | |
| G | 0.600 Ref | | 0.600 Ref | |
| H | 5.950 | 6.200 | 0.235 | 0.244 |
| L1 | 0.100 | 0.180 | 0.004 | 0.007 |
| K | 3.200 Ref | | 3.200 Ref | |

## 8 Product Specifications and Packaging Models

| Product Model | Package Type | Mark Name | RoHS | Package | Quantity |
|---|---|---|---|---|---|
| DHS042N85P | DFN5*6-8 | DHS042N85P | Pb-free | Tape & Reel | 3000/box |

## 9 Attentions

- Jiangsu Donghai Semiconductor Technology CO.,LTD. reserves the right to change the specification without prior notice! The customer should obtain the latest version of the information before making the order and verify that the information is complete and up to date.
- It is the responsibility of the purchaser for any failure or failure of any semiconductor product under certain conditions. It is the responsibility of the purchaser to comply with safety standards and to take safety measures in the system design and machine manufacturing of Donghai products in order to avoid potential risk of failure. Injury or property damage.
- Product promotion is endless, our company will be dedicated to provide customers with better products.

## 10 Appendix

Revision history:

| Date | REV. | Description | Page |
|---|---|---|---|
| 2019.10.19 | 1.0 | Original | 10 |
| 2023.7.25 | 2.0 | Update | 10 |