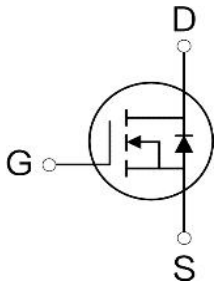
| ID | $R_{DS}$(ON)(Typ ) | VDSS |
|---|---|---|
| 130A | 1.45mΩ | 40V |


## Applications:
- Load Switch
- PWM Applications
- Power Managment

## Features:
- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

## Ordering Information

| Part Number | Package | Marking | Packing | Qty. |
|---|---|---|---|---|
| RS40N130G | DFN5*6 | RS40N130G | Tape&reel | 5000 PCS |

## Absolute Maximun Ratings Tc= 2 5℃ unless otherwise specified

| Symbol | Parameter | RS40N130G | Units |
|---|---|---|---|
| VDSS | Drain-to-Source Voltage | 40 | V |
| ID | Continuous Drain Current TC=25℃ | 130 | A |
| ID | Continuous Drain Current TC=100℃ | 82 | |
| IDM | Pulsed Drain Current (Note*1) | 390 | |
| PD | Power Dissipation | 115 | W |
| VGS | Gate- to- Source Voltage | ±20 | V |
| EAS | Single Pulse Avalanche Engergy<br>L = 3mH, VDD = 25V, RG = 25 Ω,TC=25℃ | 720 | mJ |
| TL TPKG | Maximum Temperature for Soldering | 300<br>260 | ℃ |
| | Leads at 0.063in(1.6mm)from Case for 10 seconds<br>Package Body for 10 seconds | | |
| TJ and TSTG | Operating Junction and Storage Temperature Range | -55 to 150 | |

* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the“ Absolute Maximum Ratings” Table may cause permanent damage to the device.

## Thermal Resistance

| Symbol | Parameter | RS40N130G | Units | Test Conditions |
|---|---|---|---|---|
| RθJC | Junction-to-Case | 0.9 | ℃/ W | Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 1 5 0 ℃ |
| RθJA | Junction-to-Ambient | 40 | | 1 cubic foot chamber,free air. |

## OFF Characteristics TJ= 25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| BVDSS | Drain- to- source Breakdown Voltage | 40 | -- | -- | V | VGS=0V,ID=250μA |
| IDSS | Drain- to- Source Leakage Current | -- | -- | 1 | μA | VDS=40V,VGS=0V |
| IGSS | Gate- to- Source Forward Leakage | -- | -- | 100 | nA | VGS=20V ,VDS=0V |
| | Gate- to- Source Reverse Leakage | -- | -- | -100 | | VGS=-20V ,VDS=0 V |

## ON Characteristics TJ=25℃ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| RDS(on) | Static Drain- to- Source On-Resistance(Note*2) | -- | 1.45 | 1.75 | mΩ | VGS=10V,ID=20A |
| | | -- | 1.9 | 2.5 | mΩ | VGS=4.5V,ID=20A |
| VGS(TH) | Gate Threshold Voltage | 1 | -- | 2.5 | V | VGS=VDS,ID=250μA |

## Resistive Switching Characteristics Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| td(ON) | Turn- on Delay Time | -- | 18.8 | -- | nS | VDS=20V<br>ID=20A<br>RG=2.2Ω<br>VGS=10V |
| trise | Rise Time | -- | 70.1 | -- | | |
| td(OFF) | Turn- OFF Delay Time | -- | 136.8 | -- | | |
| tfall | Fall Time | -- | 92.3 | -- | | |

**Dynamic Characteristics** Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| Ciss | Input Capacitance | -- | 7100 | -- | pF | VGS=0V<br>VDS=25V<br>f=1MHz |
| Coss | Output Capacitance | -- | 1298 | -- | | |
| Crss | Reverse Transfer Capacitance | -- | 55 | -- | | |
| Qg | Total Gate Charge | -- | 132 | -- | nC | VDS=20V<br>ID=20A<br>VGS=10V |
| Qgs | Gate- to- Source Charge | -- | 25 | -- | | |
| Qgd | Gate-to-Drain(" Miller") Charge | -- | 24.6 | -- | | |

**Source- Drain Diode Characteristics**

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---|---|---|---|---|---|---|
| IS | Continuous Source Current | -- | -- | 130 | A | Integral pn- diode in MOSFET |
| ISM | Maximum Pulsed Current | -- | -- | 390 | A | |
| VSD | Diode Forward Voltage | -- | -- | 1.3 | V | IS=20A,VGS=0V |
| trr | Reverse Recovery Time | -- | 56 | -- | nS | IS=20A<br>di/dt=100A/μs |
| Qrr | Reverse Recovery Charge | -- | 54 | -- | nC | |

**Notes:**
* 1. Repetitive rating, pulse width limited by maximum junction temperature.
* 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

## Typical Feature Curve

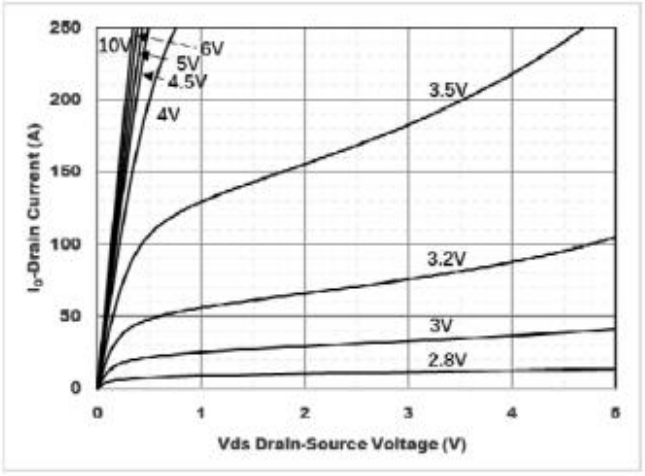



Figure1. Output Characteristics

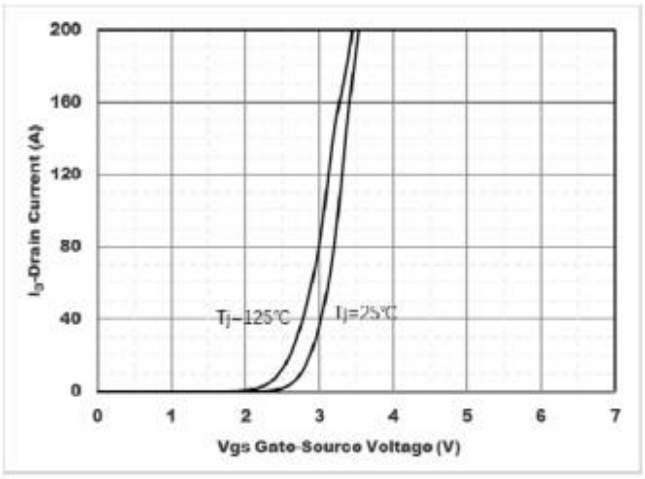



Figure2. Transfer Characteristics

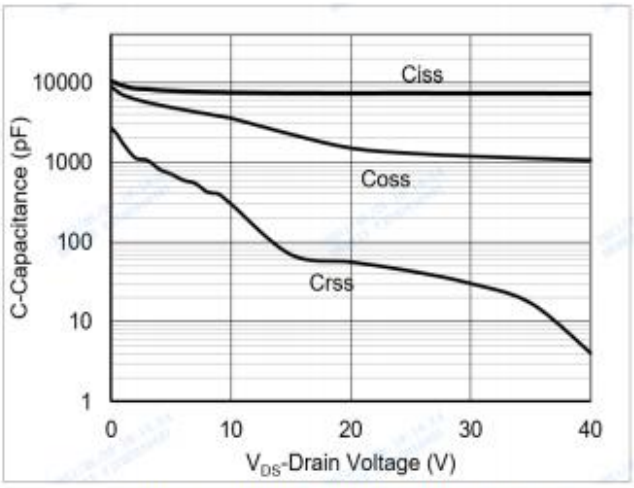



Figure3. Capacitance Characteristics

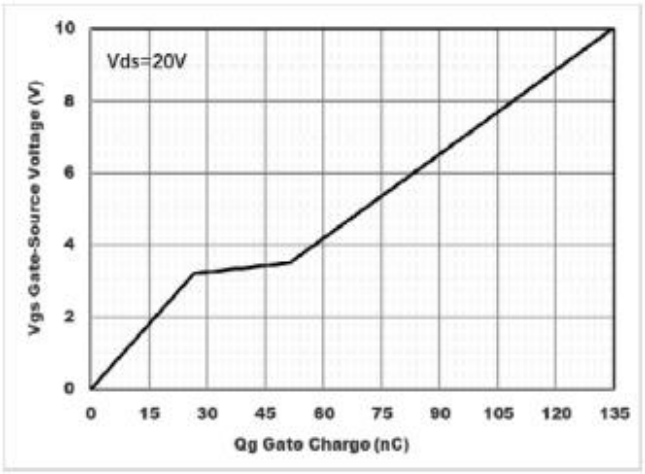



Figure4. Gate Charge

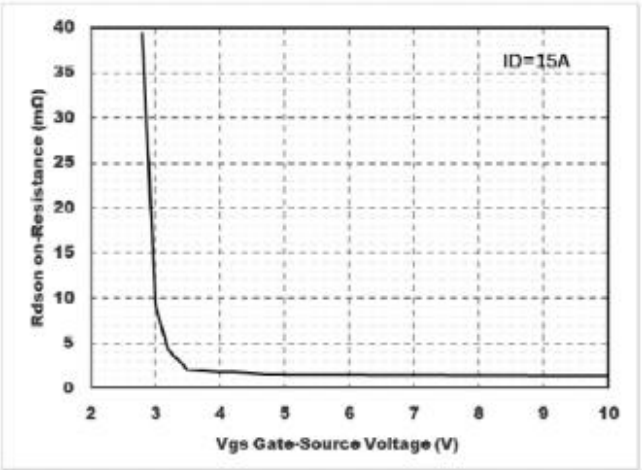



Figure5. : On-Resistance vs. Drain Current and Gate Voltage

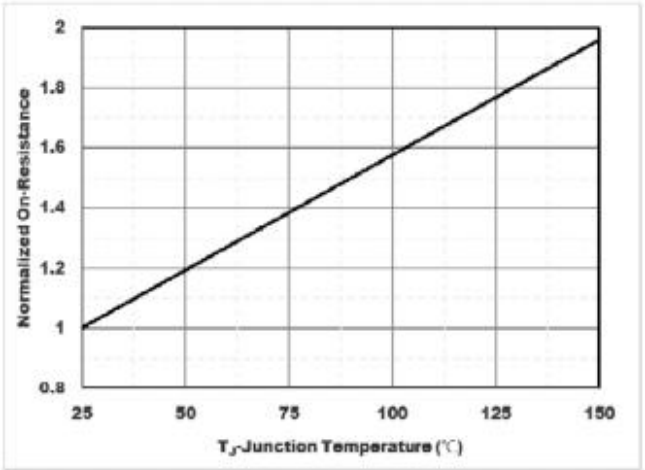



Figure6.Normalized On-Resistance

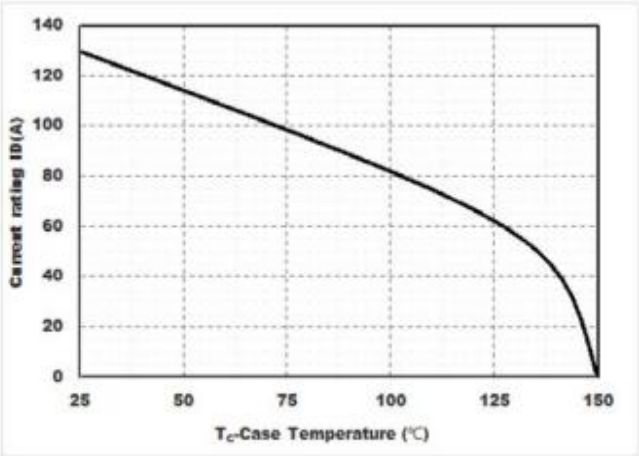



Figure7. Drain current

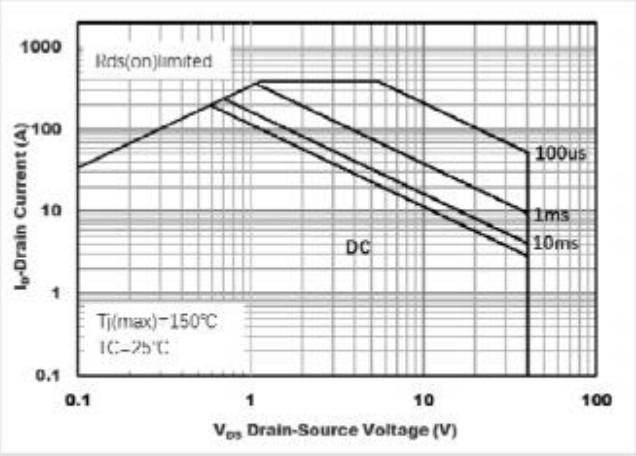



Figure8.Safe Operation Area

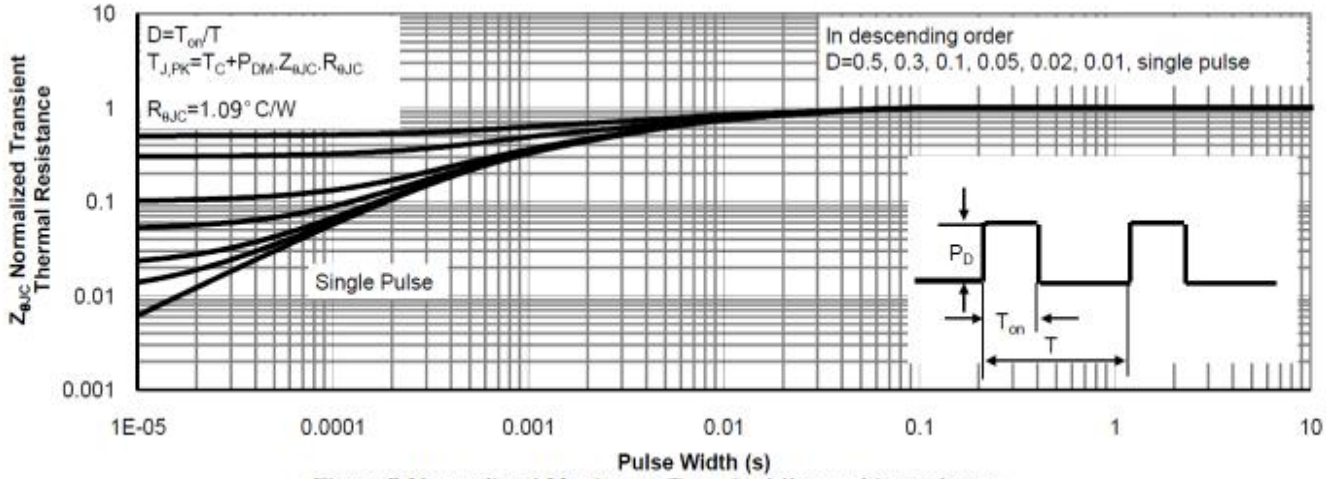



Figure9.Normalized Maximum Transient thermal impedance

## Test ircuits and Waveforms

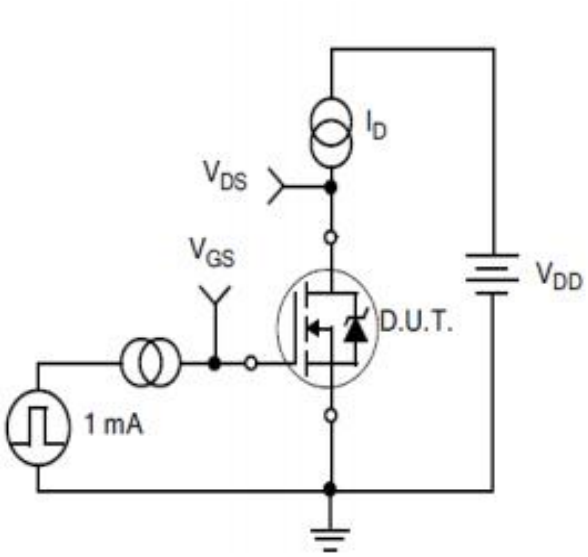



Figure A.
Gate Charge Test Circuit

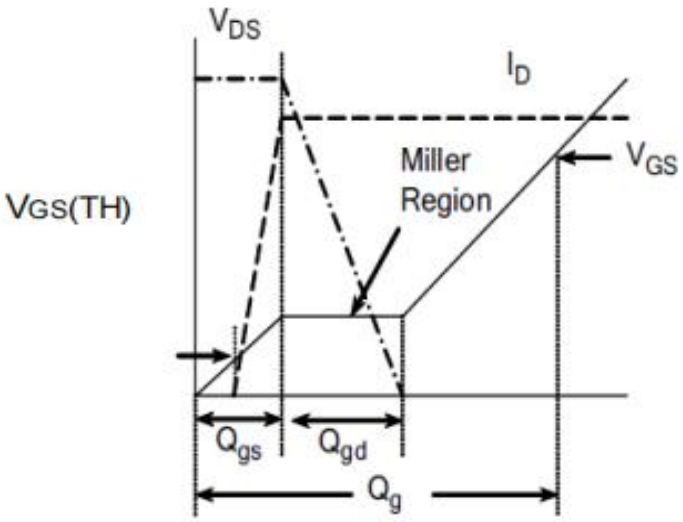



Figure B.
Gate Charge Waveform

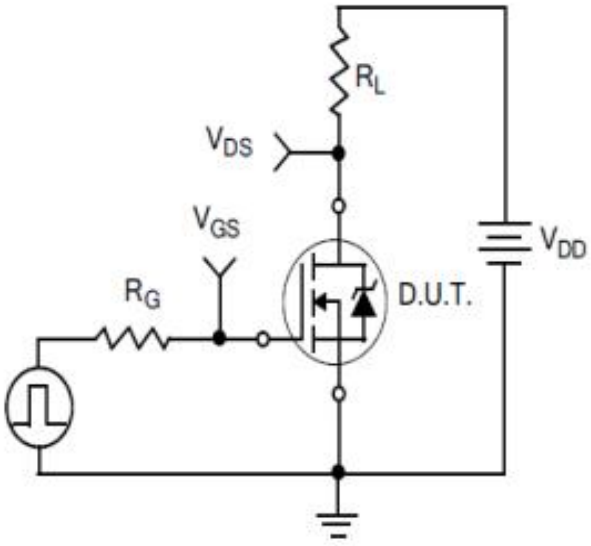



Figure C.
Resistive Switching Test Circuit

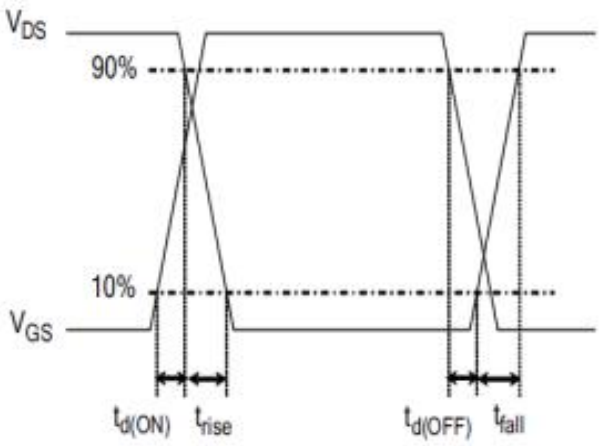



Figure D.
Resistive Switching Waveforms

## Test Circuits and Waveforms

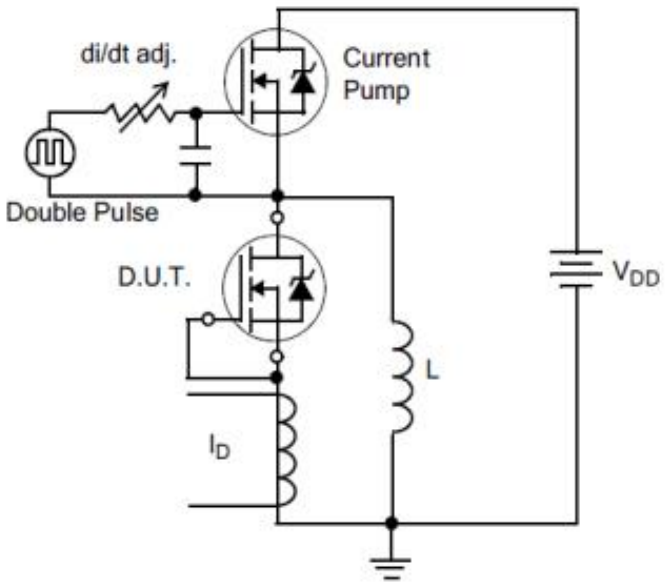



Figure E.Diode Reverse Recovery Test Circuit

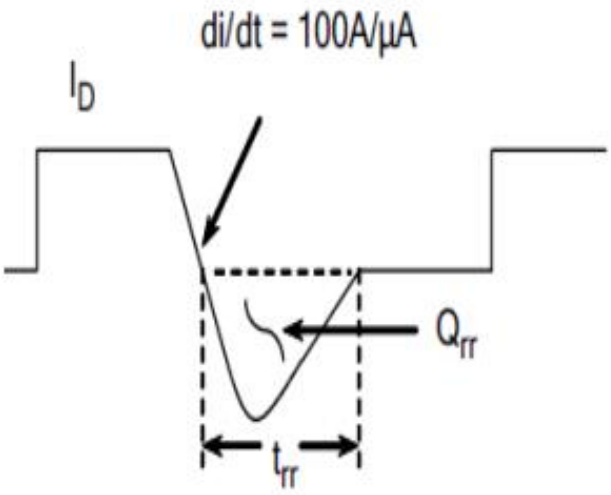



Figure F.Diode Reverse Recovery Waveform

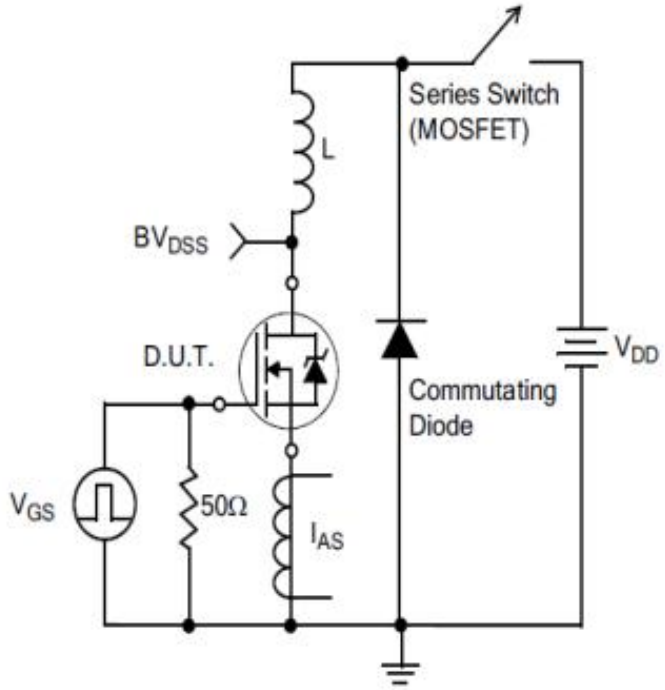
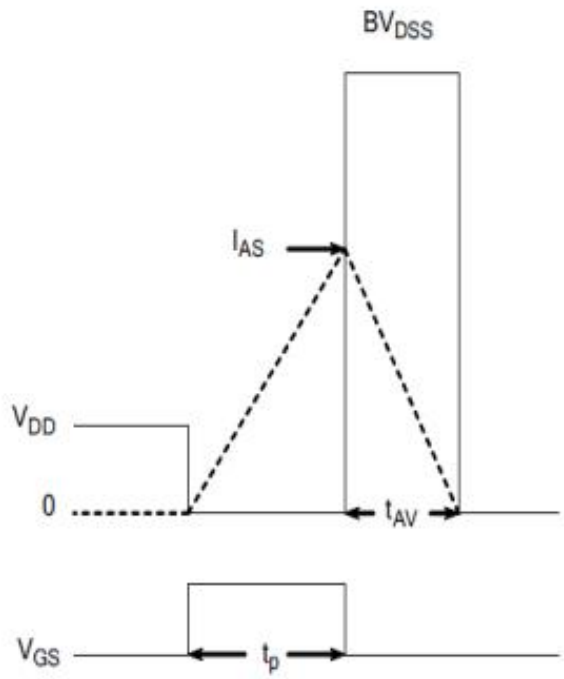


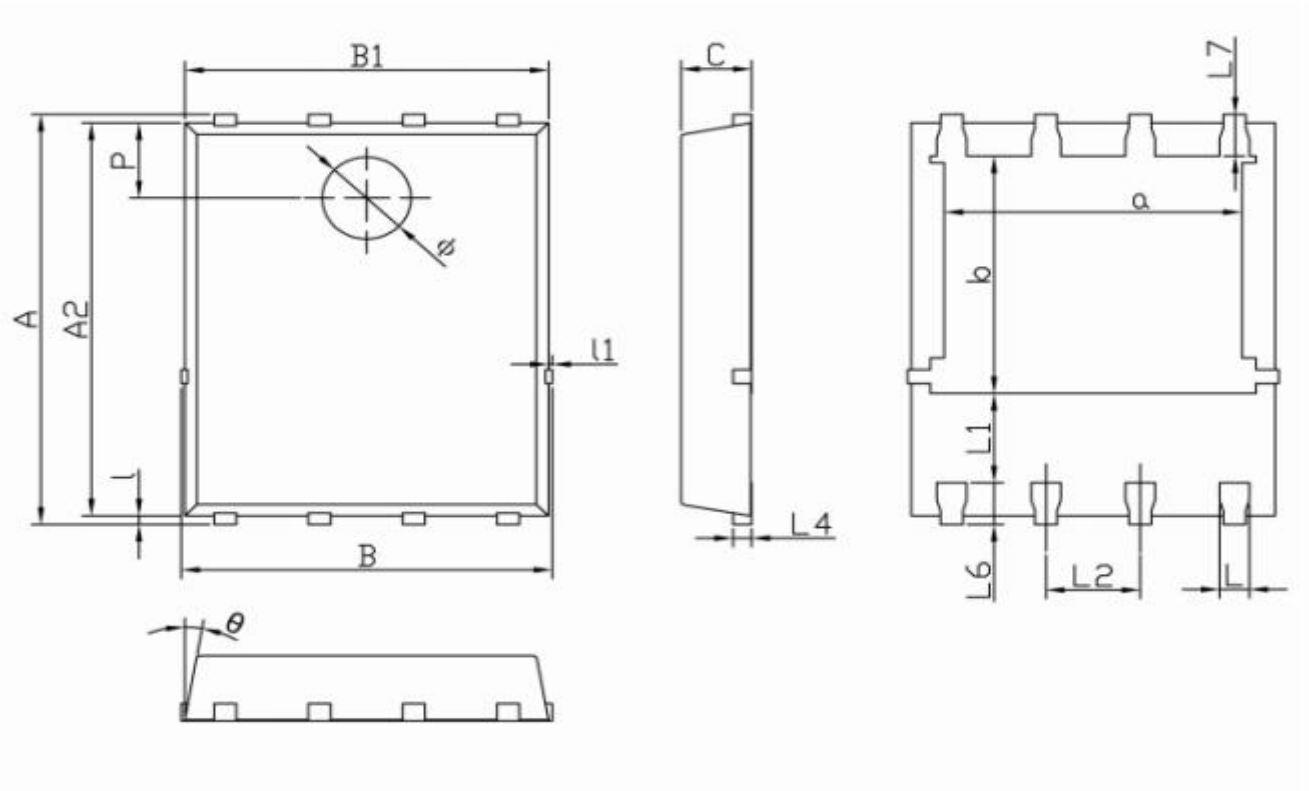

Figure G.Unclamped Inductive Switching Test Circuit




$$E_{AS}=\frac{I_{AS}^2 L}{2}$$

Figure H.Unclamped Inductive Switching Waveforms

## Package outline drawing(DFN5*6 Unit: mm )




| Dimensions In Millimeterer | | | |
|---|---|---|---|
| Symbol | MIN | TYP | MAX |
| A | 5.90 | 6.00 | 6.10 |
| a | 3.91 | 4.01 | 4.11 |
| A2 | 5.70 | 5.75 | 5.80 |
| B | 4.90 | 5.00 | 5.10 |
| b | 3.37 | 3.47 | 3.57 |
| B1 | 4.80 | 4.90 | 5.00 |
| C | 0.90 | 0.95 | 1.00 |
| L | 0.35 | 0.40 | 0.45 |
| l | 0.06 | 0.13 | 0.20 |
| L1 | 1.10 | – | – |
| l1 | – | – | 0.10 |
| L2 | 1.17 | 1.27 | 1.37 |
| L4 | 0.21 | 0.26 | 0.34 |
| L6 | 0.51 | 0.61 | 0.71 |
| L7 | 0.51 | 0.61 | 0.71 |
| P | 1.00 | 1.10 | 1.20 |
| θ | 8° | 10° | 12° |
| Φ | 1.10 | 1.20 | 1.30 |

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