SEMICONDUCTOR

# D016N08T

## 360A 80V N-Channel Enhancement Mode Power MOSFET

## Features

- Uses advanced SGT technology
- Extremely low on-resistance RDS(on)
- Excellent gate charge x RDS(on) product(FOM)

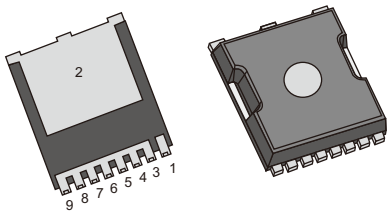
| Product Summary | | | |
|---|---|---|---|
| $V_{DS}$ | $R_{DS(on)}$ (mΩ) Typ | $I_D$ (A) | Qg (Typ) |
| 80V | 1. 27 @ 10V 50A | 360 | 205nc |

## Mechanical Data

- Case:TOLL Package

TOLL

D016N08T




## Application

- Motor control and drives
- Battery management
- DC/DC converter
- General purpose applications

## Ordering Information

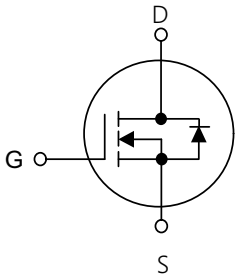
| Part No. | Package Type | Package | Quality(box) |
|---|---|---|---|
| D016N08T | TOLL | Tape & Reel | 2000 |

Pin Definition:

1. Gate
2. Drain

3/4/5/6/7/8/9. Source

## Block Diagram




## Table1 Absolute Maximum Ratings ($T_C$=25°C, unless otherwise specified)

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 80 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current | $T_C$=25°C | $I_D$ | 360 | A |
| | $T_C$=100°C | | 227 | |
| Pulsed Drain Current (Note 1) | | $I_{DM}$ | 1080 | A |
| Single Pulse Avalanche Energy(Note 2) | | $E_{AS}$ | 2704 | mJ |
| Power Dissipation | $T_C$=25°C | $P_D$ | 312 | W |
| Operating Junction and Storage Temperature | | $T_J$/$T_{STG}$ | -55~+150 | °C |

Table 2.Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal resistance Junction to Ambient | $R_{\theta JA}$ | 62 | °C/W |
| Thermal resistance Junction to Case | $R_{\theta JC}$ | 0.4 | °C/W |

Table 3. Electrical Characteristics ($T_J$=25°C, unless otherwise specified)

| Parameter | | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| Off Characteristics | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | $V_{GS}$=0V,$I_D$=250μA | 80 | - | - | V |
| Drain-Source Leakage Current | | $I_{DSS}$ | $V_{DS}$=80V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate- Source Leakage Current | Forward | $I_{GSS}$ | $V_{GS}$=20V,$V_{DS}$=0V | - | - | 100 | nA |
| | Reverse | | $V_{GS}$=-20V,$V_{DS}$=0V | - | - | -100 | nA |
| On Characteristics(Note 3) | | | | | | | |
| Gate Threshold Voltage | | $V_{GS(TH)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 2.0 | 3.0 | 4.0 | V |
| Static Drain-Source On-State Resistance | | $R_{DS(ON)}$ | $V_{GS}$=10V,$I_D$=50A | - | 1.27 | 1.6 | mΩ |
| Transconductance | | $g_{fs}$ | $V_{GS}$=5V,$I_D$=40A | - | 227 | - | s |
| Dynamic Characteristics(Note 4) | | | | | | | |
| Input Capacitance | | $C_{ISS}$ | $V_{DS}$=40V,$V_{GS}$=0V,f=1MHz | - | 14140 | - | pF |
| Output Capacitance | | $C_{OSS}$ | | - | 2259 | - | pF |
| Reverse Transfer Capacitance | | $C_{RSS}$ | | - | 61 | - | pF |
| Gate Resisitance | | $R_G$ | $V_{DD}$=0V,$V_{GS}$=0V,f=1MHz | - | 1.85 | - | Ω |
| Switching Characteristics (Note 4) | | | | | | | |
| Turn-On Delay Time | | $t_{d(on)}$ | $V_{DS}$=40V, $V_{GS}$=10V,$R_L$=3Ω, | - | 38 | - | ns |
| Turn-On Rise Time | | $t_R$ | | - | 132 | - | ns |
| Turn-Off Delay Time | | td(off) | | - | 126 | - | ns |
| Turn-Off Fall Time | | tf | | - | 153 | - | ns |
| Total Gate Charge | | $Q_G$ | $V_{DS}$=40V,$I_D$=50A, $V_{GS}$=10V | - | 205 | - | nC |
| Gate-Source Charge | | $Q_{GS}$ | | - | 54 | - | nC |
| Gate-Drain Charge | | $Q_{GD}$ | | - | 46 | - | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | | |
| Drain-Source Diode Forward Voltage | | $V_{SD}$ | $V_{GS}$=0V, $I_S$=50A | - | 0.8 | 1.2 | V |
| Maximum Continuous Drain-Source Diode Forward Current | | $I_S$ | | - | - | 360 | A |
| Reverse Recovery Time | | trr | $V_{GS}$=0V, $I_F$=30A dI$_F$/dt=500A/μs | - | 112 | - | ns |
| Reverse Recovery Charge | | $Q_{RR}$ | | - | 220 | - | nC |

Notes : 1 Repetitive Rating:Pulse width limited by maximum junction temperature
2 L=0.5mH, $R_G$=25Ω,Starting $T_J$=25°C
3 Pulse Test: Pulse width ≤300μS, Duty cycle≤2%
4 Guaranteed by design,not subject to production

## Typical Characteristics Diagrams

Fig 1: Output Characteristics

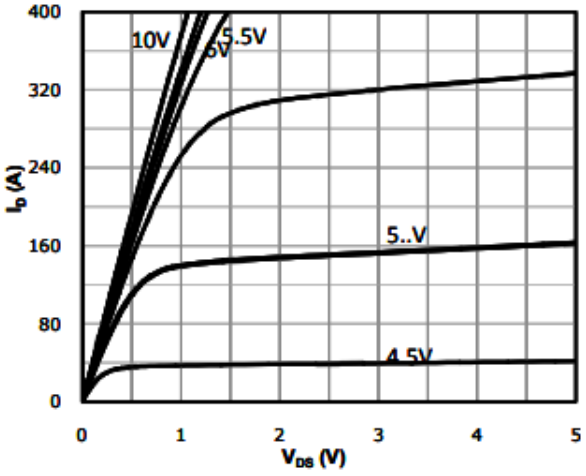



Fig 2: Transfer Characteristics

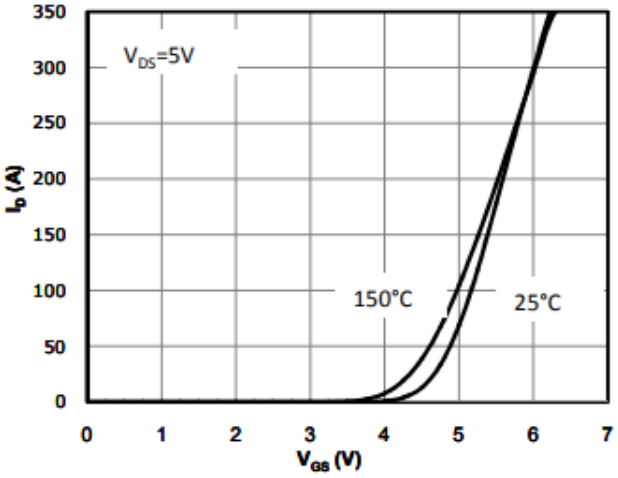



Fig 3: Rdson Vs Ids Characteristics(Tc=25℃)

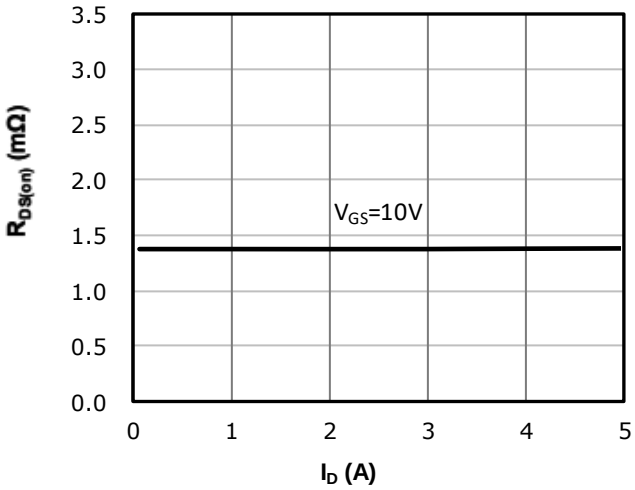



Fig 4: Rds(on) vs Gate Voltage

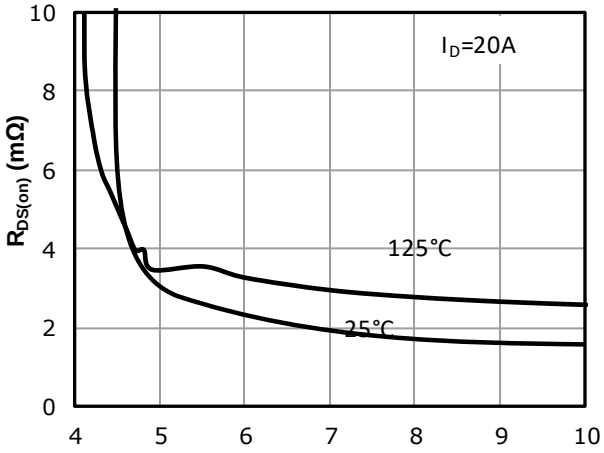



Fig 5: Rds(on) vs. Temperature

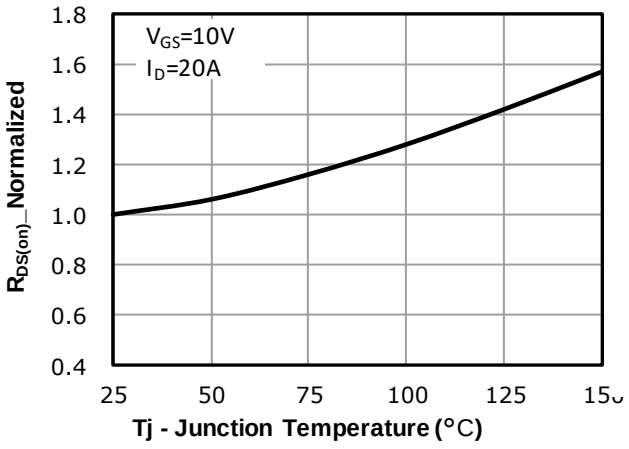



Fig 6: VGS(TH) Vs Tj Temperature Characteristics

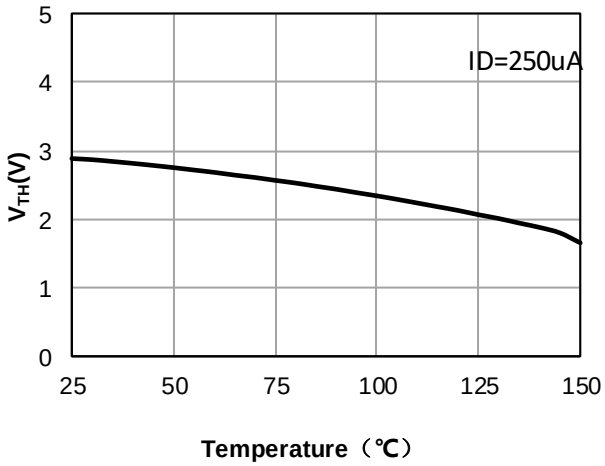


Fig 7: BVDSS vs. Temperature

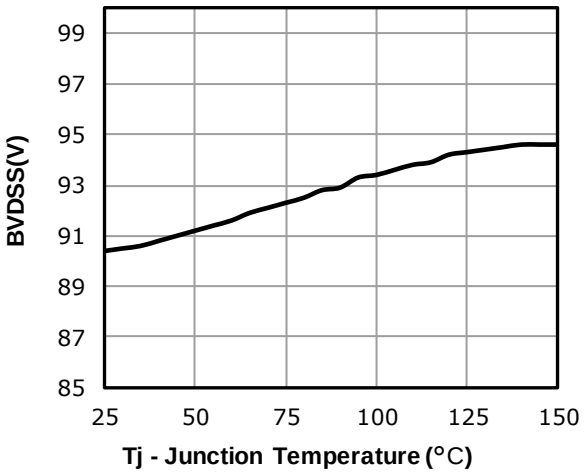



Fig 8: Capacitance Characteristics

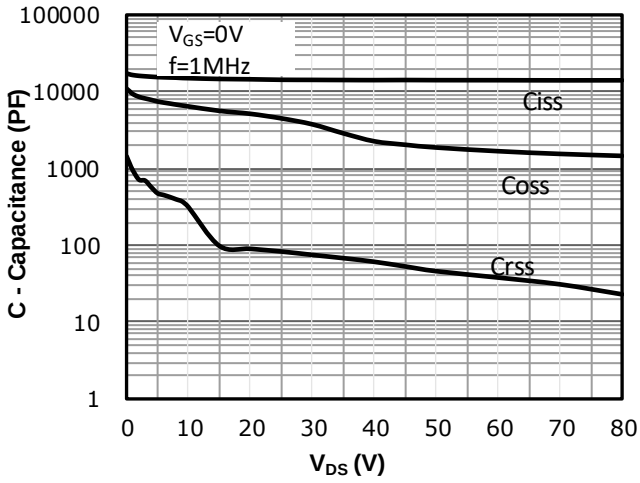



Fig 9: Gate Charge Characteristics

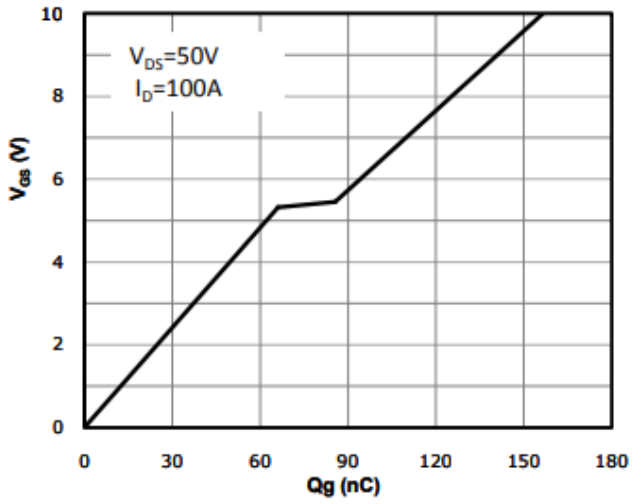



Fig 10: Body-diode Forward Characteristics

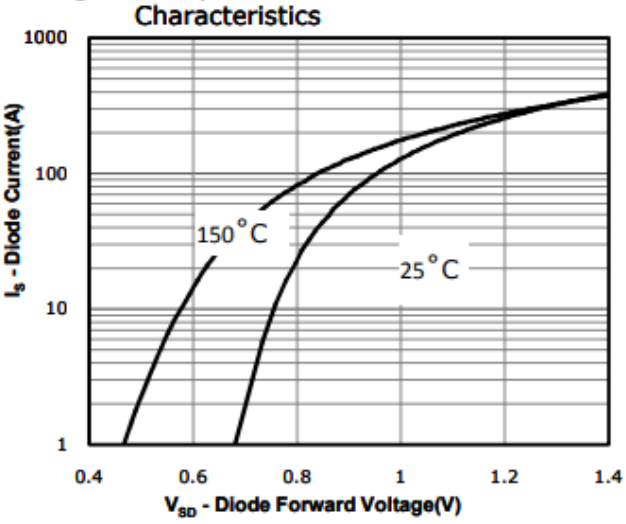



Fig 11: Power Dissipation

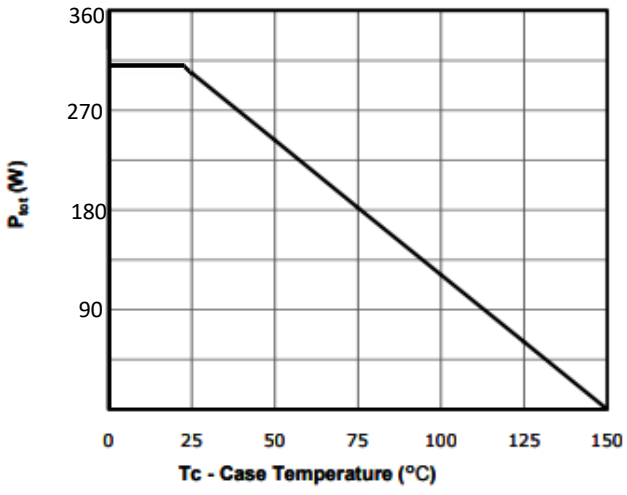



Fig 12: Drain Current Derating

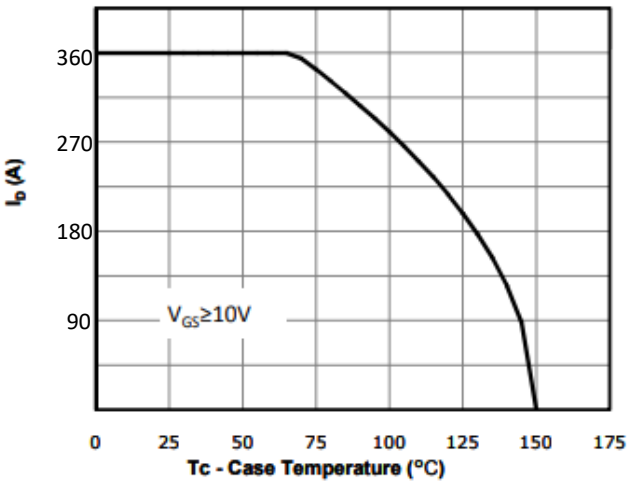


**Fig 13： Safe Operating Area**

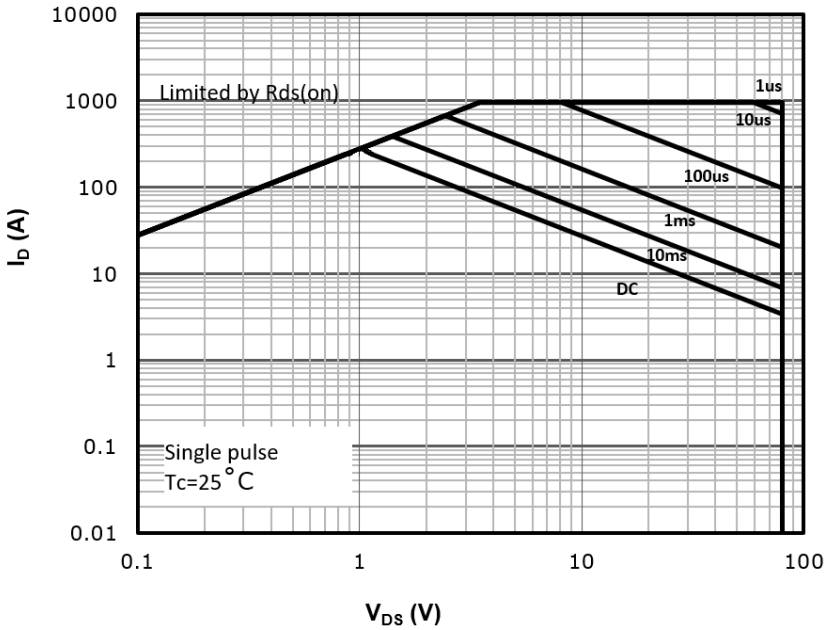
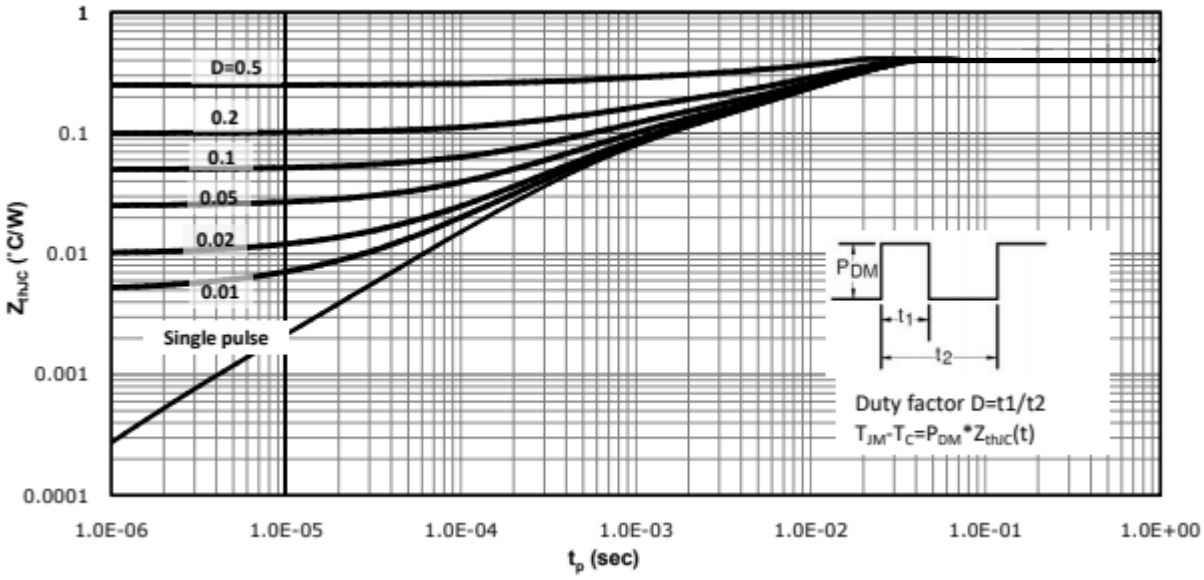
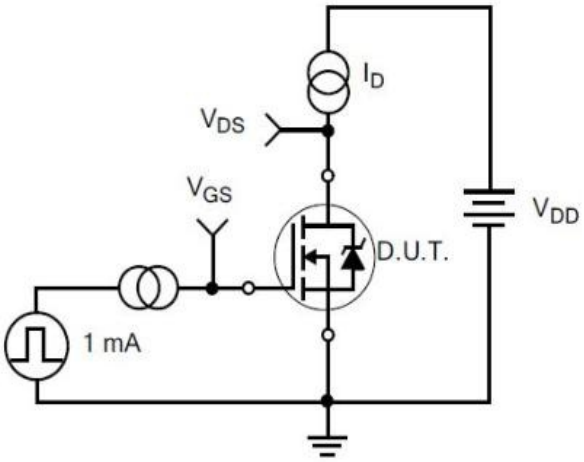


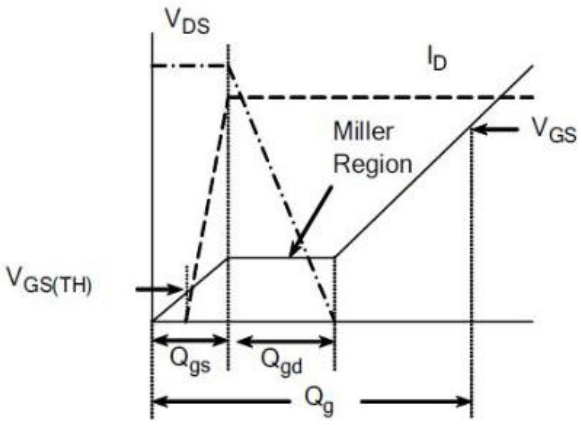

**Fig 14： Max.Transient Thermal impedance**



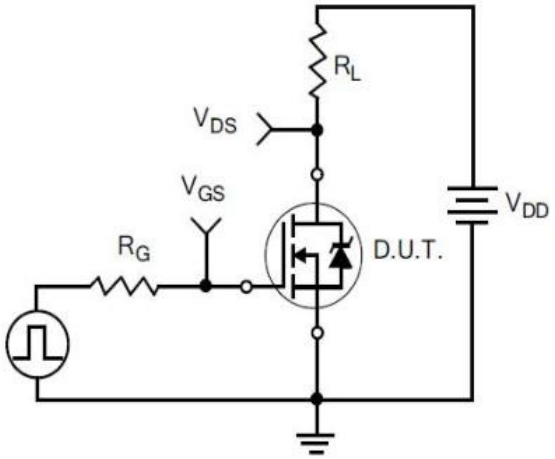
Typical Test Circuit



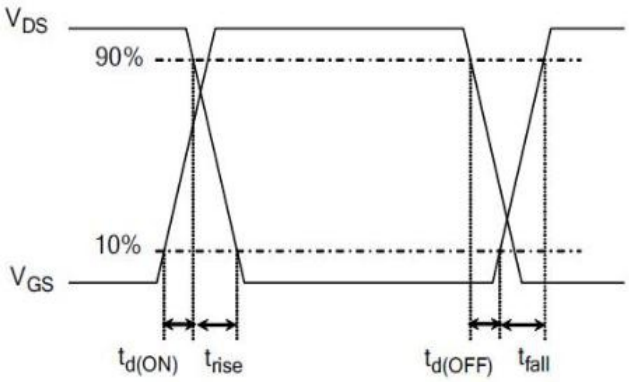

1) Gate Charge Test Circuit



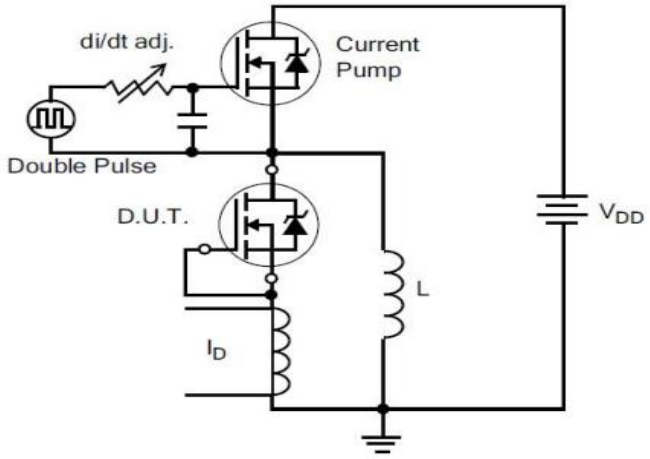

2) . Gate Charge Waveform



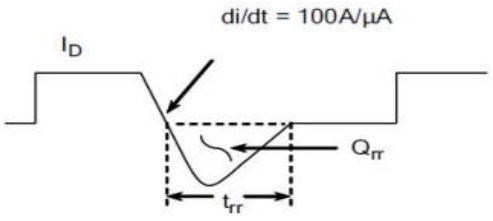

3) Resistive Switching Test Circuit



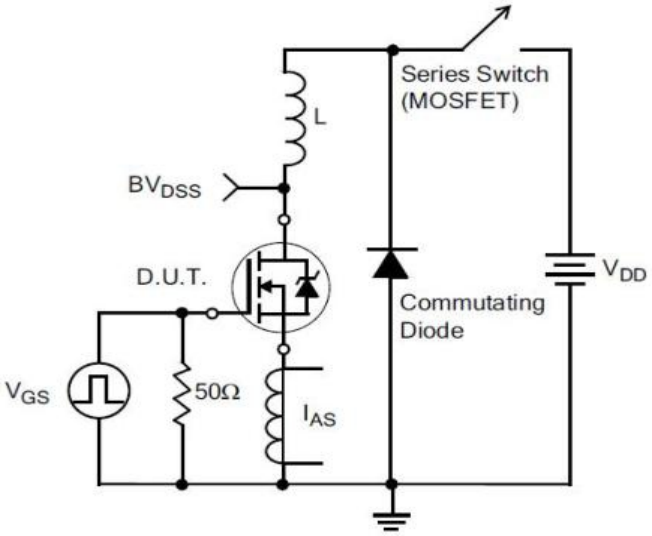

4) Resistive Switching Waveforms



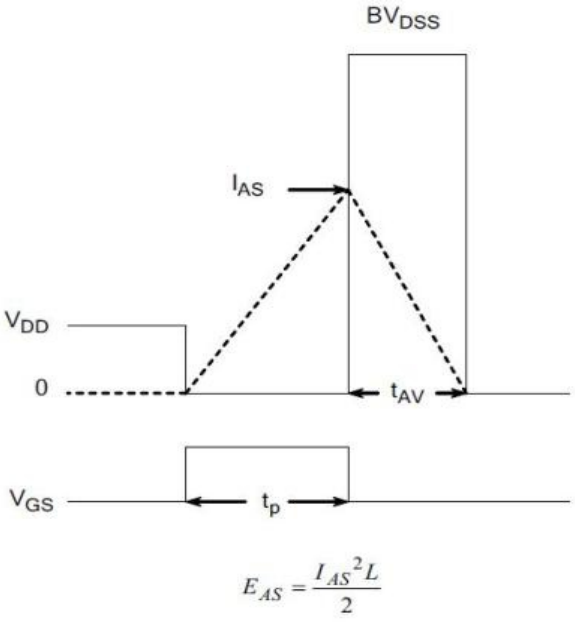

5) Diode Reverse Recovery Test Circuit




6) Diode Reverse Recovery Waveform

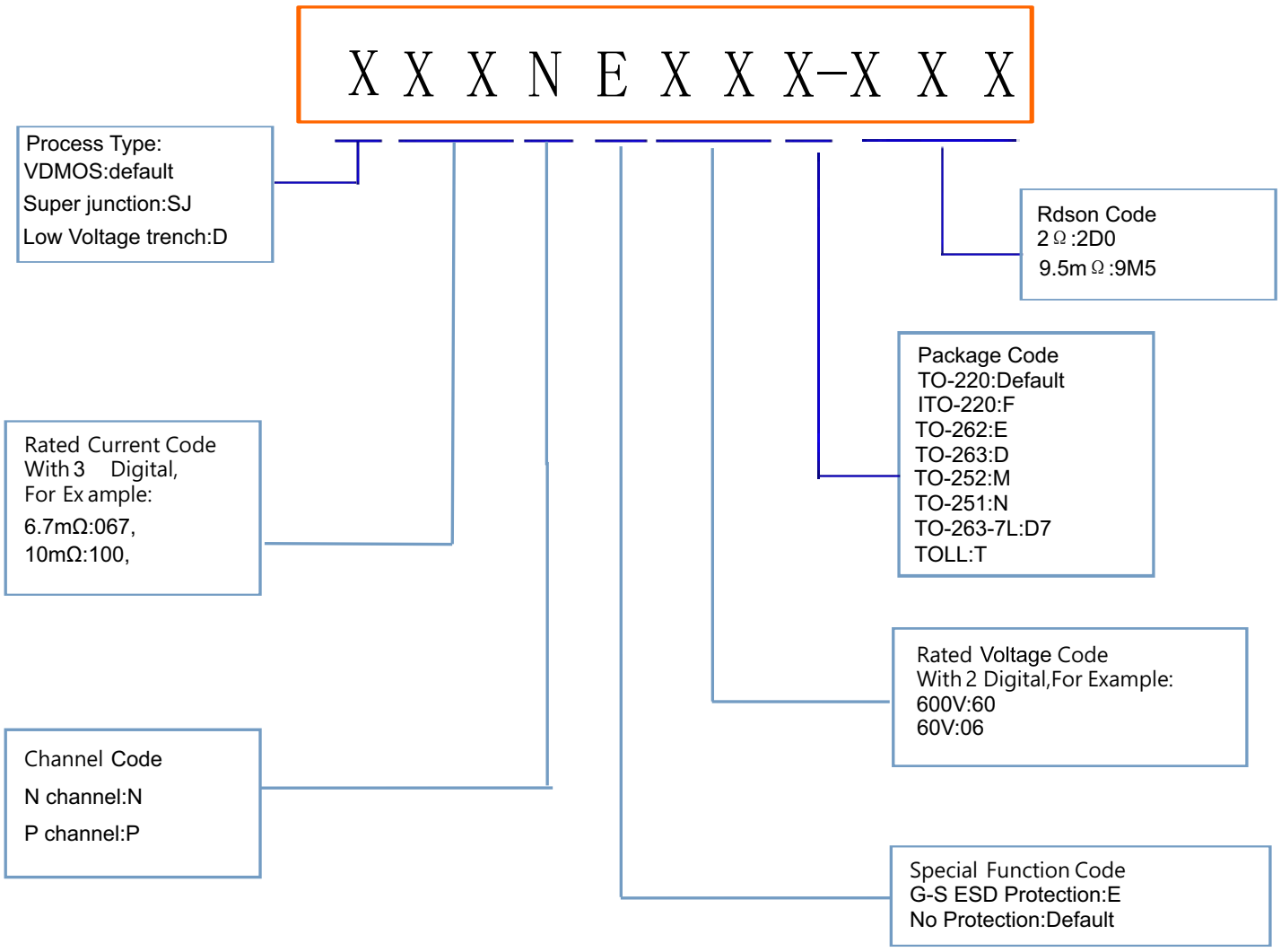



7) . Unclamped Inductive Switching Test Circuit



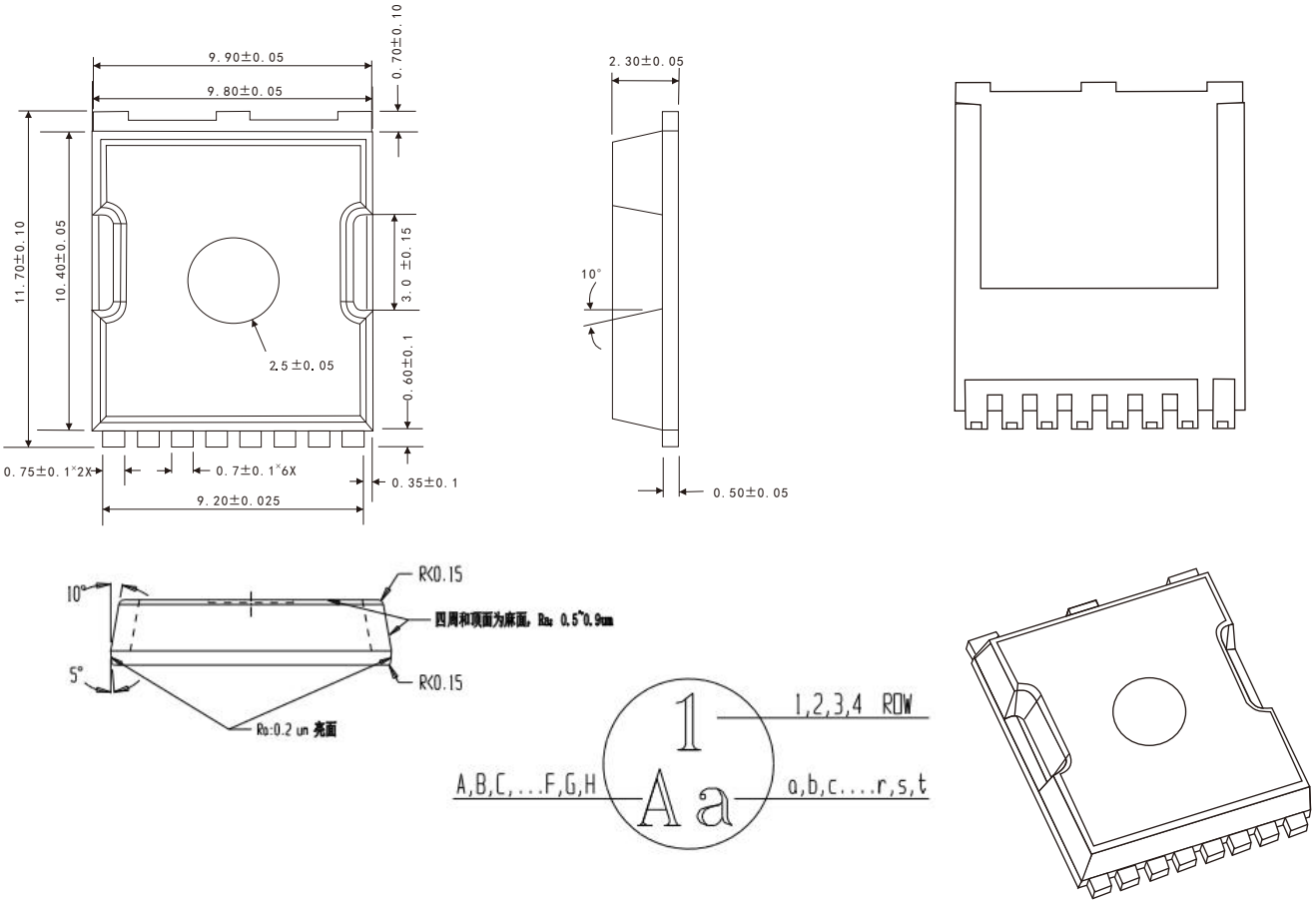

8) Unclamped Inductive Switching Waveforms

## Product Names Rules

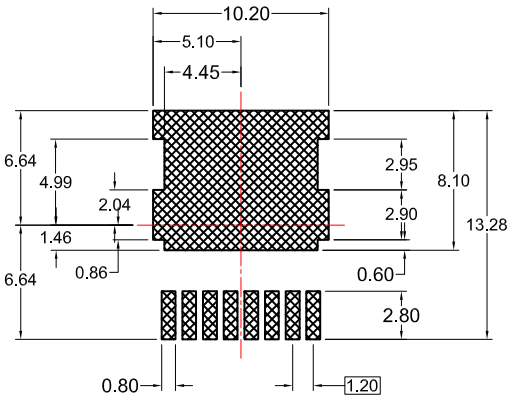


Dimensions

## TOLL PACKAGE OUTLINE DIMENSIONS




## Suggested Pad Layout



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