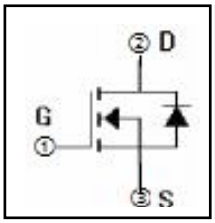
# 100A 30V N-channel Enhancement Mode Power MOSFET

## 1 Description

These N-channel Enhanced VDMOSFETs Used advanced trench technology design, provided excellent RDSON and low gate charge. Which accords with the RoHS standard.




$V_{DSS}$ = 30V

$R_{DS(on)}$ (TYP)= 4mΩ

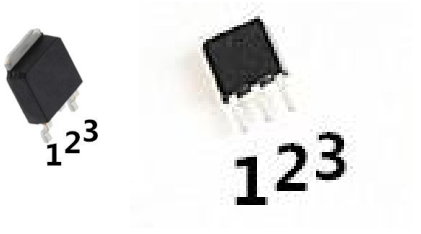
$I_D$ = 100A

## 2 Features

- Fast Switching
- Low ON Resistance(Rdson≤5.5mΩ)
- Low Gate Charge(Typical:43nC)
- Low Reverse Transfer Capacitance(Typical:215pF)
- 100% Single Pulse Avalanche Energy Test
- 100% $\Delta V_{DS}$ Test

## 3 Applications

- Power switching applications
- Inverter management system
- Electric Tools
- Automotive Electronics




TO-252B TO-251B

## 4 Electrical Characteristics

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

| Parameter | | Symbol | Value | Units |
|---|---|---|---|---|
| Maximum Drian-Source DC Voltage | | $V_{DS}$ | 30 | V |
| Maximum Gate-Drain Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current(continuous) | | $I_D$（T=25℃） | 100 | A |
| | | （T=100℃） | 70 | A |
| Drain Current(Pulsed)(Note 1) | | $I_{DM}$ | 280 | A |
| Single Pulse Avalanche Energy(Note 5) | | $E_{AS}$ | 200 | mJ |
| Total Dissipation | $T_a$=25℃ | $P_{tot}$ | 1.25 | W |
| | $T_C$=25℃ | $P_{tot}$ | 60 | W |
| Junction Temperature | | $T_j$ | -55～150 | ℃ |
| storage Temperature | | $T_{stg}$ | -55～150 | ℃ |
| Maximum Temperature for soldering | | $T_L$ | 300 | ℃ |

### 4.2 Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance Junction to Case-sink | $R_{thJC}$ | 2.08 | ℃/W |
| Thermal Resistance Junction to Ambient | $R_{thJA}$ | 100 | ℃/W |

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

| Parameter | Symbol | Test Condition | Value | | | Units |
|---|---|---|---|---|---|---|
| | | | Min | Typ | Max | |
| **Off Characteristics** | | | | | | |
| Drain-source Breakdown Voltage | $BV_{DSS}$ | $I_D$=250μA,$V_{GS}$=0V | 30 | -- | -- | V |
| Drain-to-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=30V,$V_{GS}$=0V,$T_C$=25℃ | -- | -- | 1 | μA |
| | | $V_{DS}$=24V,$V_{GS}$=0V,$T_C$=125℃ | -- | -- | 100 | μA |
| Gate-to-Source Forward Leakage | $I_{GSSF}$ | $V_{GS}$=+20V | -- | -- | 100 | nA |
| Gate-to-Source Reverse Leakage | $I_{GSSR}$ | $V_{GS}$=-20V | -- | -- | -100 | nA |
| **On Characteristics**(Note 3) | | | | | | |
| Gate threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1 | 1.7 | 3 | V |
| Drain-source on Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=20A | -- | 4 | 5.5 | mΩ |
| | | $V_{GS}$=4.5V,$I_D$=20A | -- | 7.5 | 9 | |
| **Dynamic Characteristics**(Note 4) | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V,$V_{DS}$=30V,f=1.0MHz | -- | 2250 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 235 | -- | |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 215 | -- | |
| Gate Resistance | $R_G$ | $V_{GS}$=0V,$V_{DS}$=0V,f=1.0MHz | -- | 1.3 | -- | Ω |
| **Switching Characteristics**(note4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$=12.5V, $R_L$=30Ω, $V_{GS}$=10V, $R_{GEN}$=6Ω | -- | 16 | -- | nS |
| Turn-on Rise Time | $t_r$ | | -- | 15 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 55 | -- | |
| Turn-off Fall Time | $t_f$ | | -- | 25 | -- | |
| Total Gate Charge | $Q_g$ | $I_D$=20A,$V_{DS}$=12.5V,$V_{GS}$=10V | -- | 43 | -- | nC |
| Gate-to-Source Charge | $Q_{gs}$ | | -- | 7.5 | -- | |
| Gate-to-Drain(“Miller”)Charge | $Q_{gd}$ | | -- | 10.6 | -- | |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{FSD}$ | $V_{GS}$=0V,$I_S$=20A | -- | 0.9 | 1.3 | V |
| Diode Forward Current (Note 2) | $I_S$ | | -- | -- | 100 | A |
| Reverse Recovery Time | $t_{rr}$ | $T_J$=25℃,$I_F$=20A, $dI_F/dt$=100A/μS,$V_{GS}$=0V | -- | 35 | -- | nS |
| Reverse Recovery Charge | $Q_{rr}$ | | -- | 23 | -- | nC |
| | | | | | | |

Notes：

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

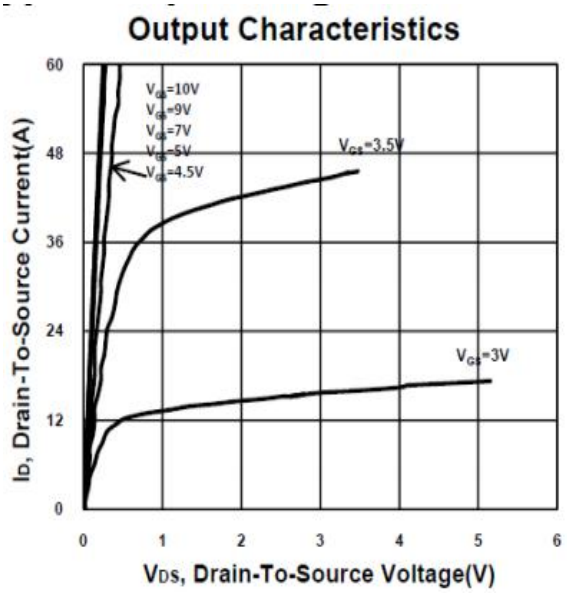
2: Surface mounted on FR4 Board, t≤10sec.

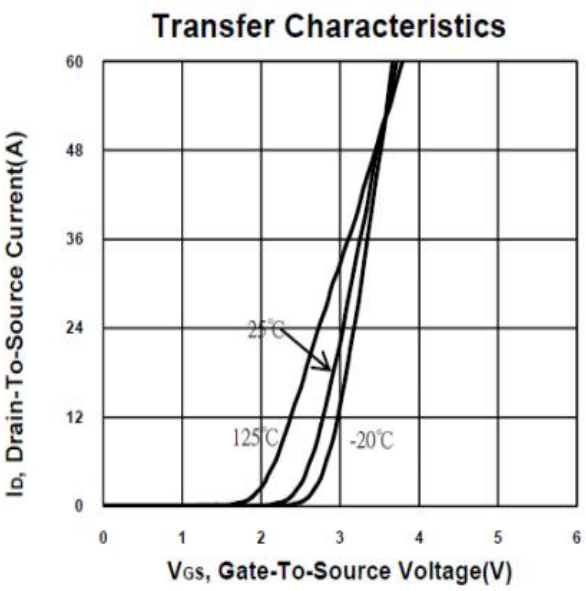
3: Pulse width ≤ 300μs, duty cycle ≤ 2%.

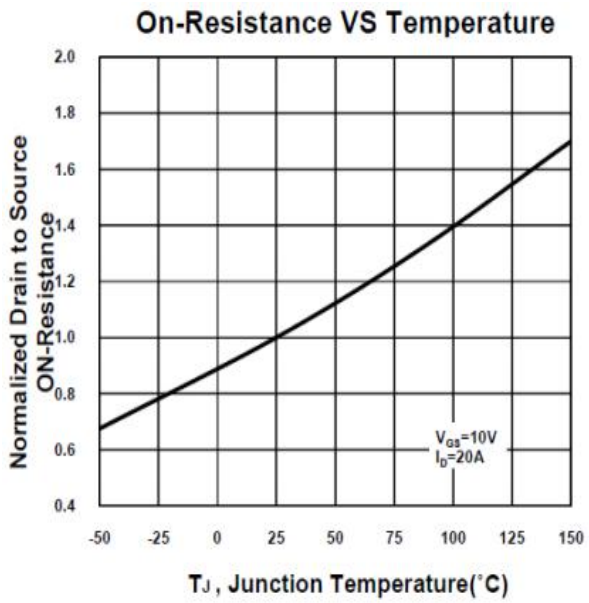
4: Guaranteed by design, not subject to production.

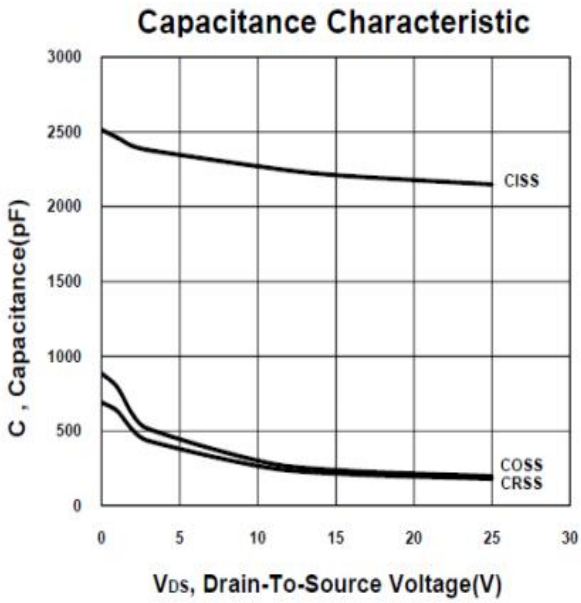
5. L=0.5mH,$I_D$=8A,$V_{DD}$=50V,$V_{GATE}$=100V,Start $T_J$=25℃.

## 5 Typical characteristics diagrams



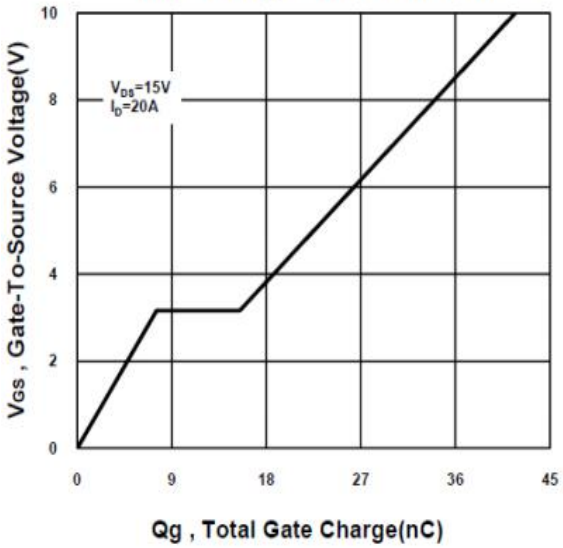



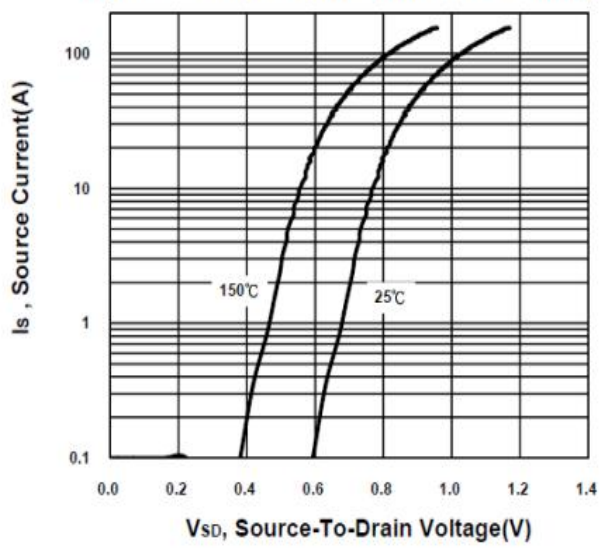



## 5 Typical characteristics diagrams(continues)

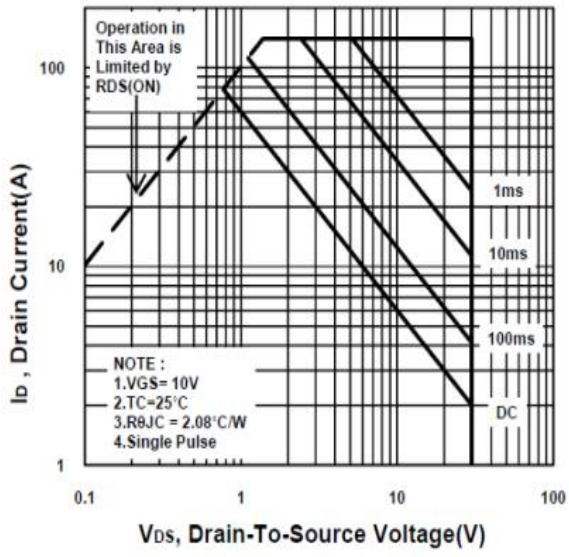
Gate charge Characteristics



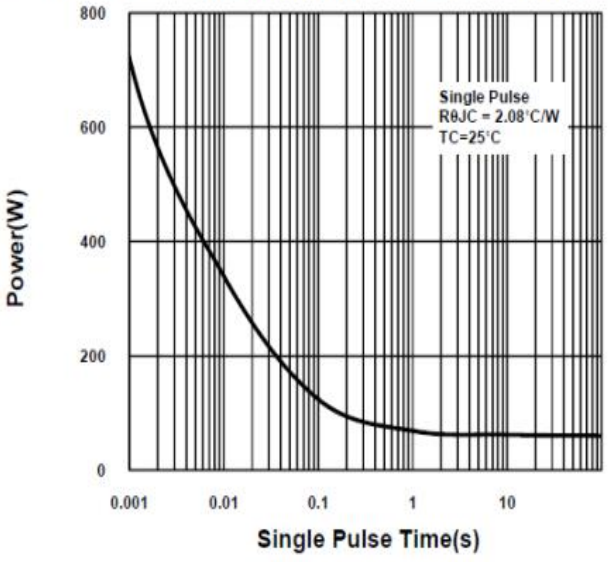

Source-Drain Diode Forward Voltage



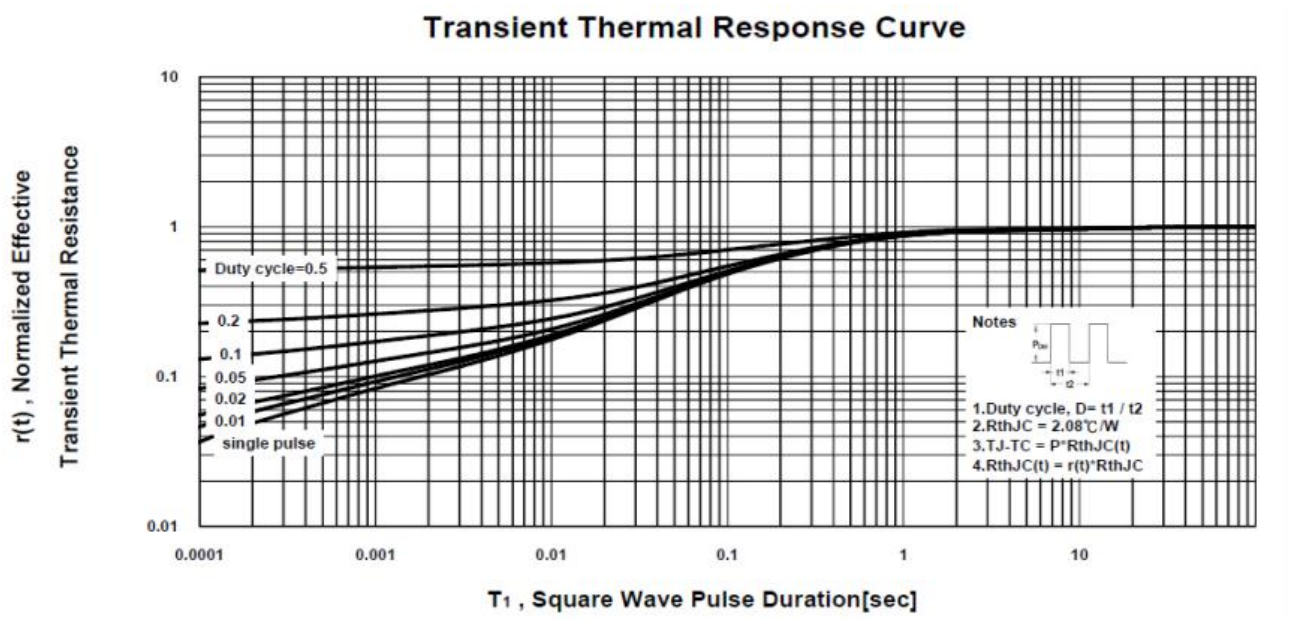

Safe Operating Area




Single Pulse Maximum Power Dissipation



## 5 Typical characteristics diagrams(continues)



## 6 Typical Test Circuit and Waveform

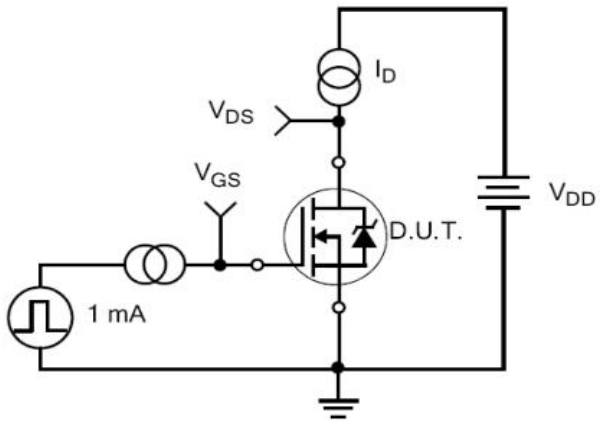



Figure 17. Gate Charge Test Circuit

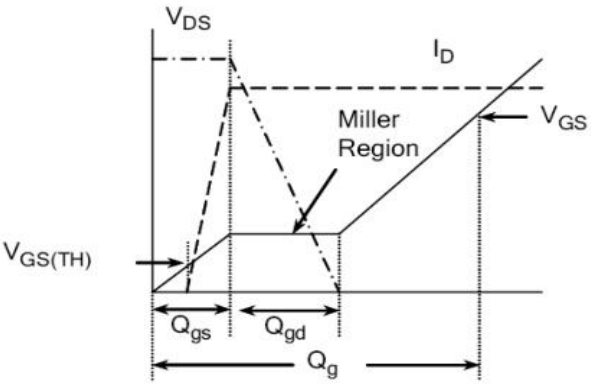



Figure 18. Gate Charge Waveform

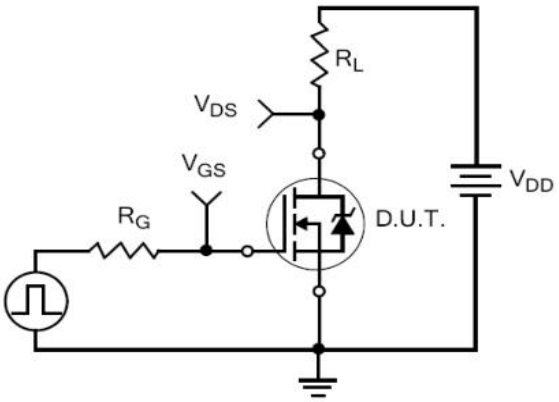



Figure 19. Resistive Switching Test Circuit

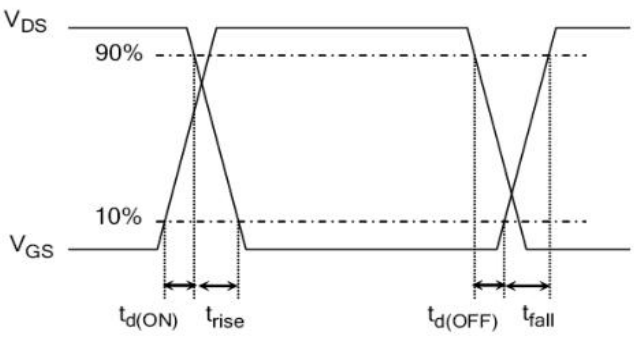



Figure 20. Resistive Switching Waveforms

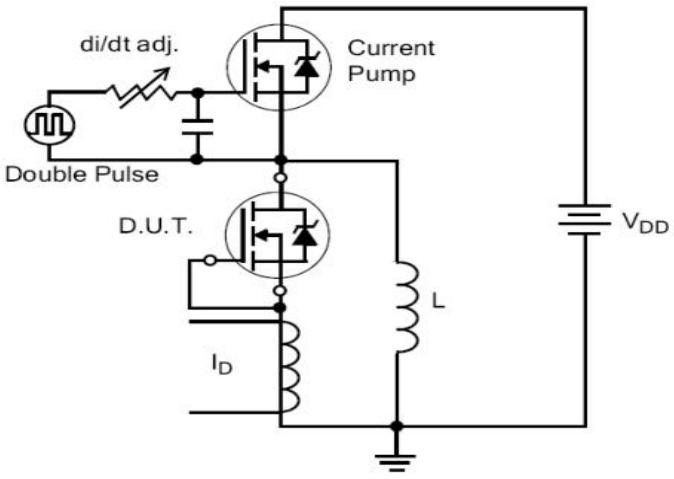



Figure 21. Diode Reverse Recovery Test Circuit

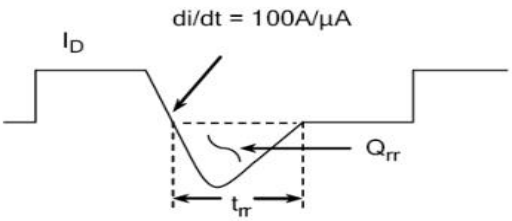



Figure 22. Diode Reverse Recovery Waveform

## 6 Typical Test Circuit and Waveform(continues)

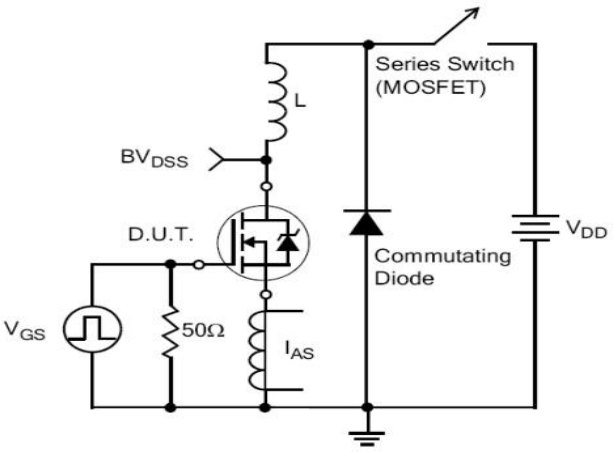



Figure 23. Unclamped Inductive Switching Test Circuit

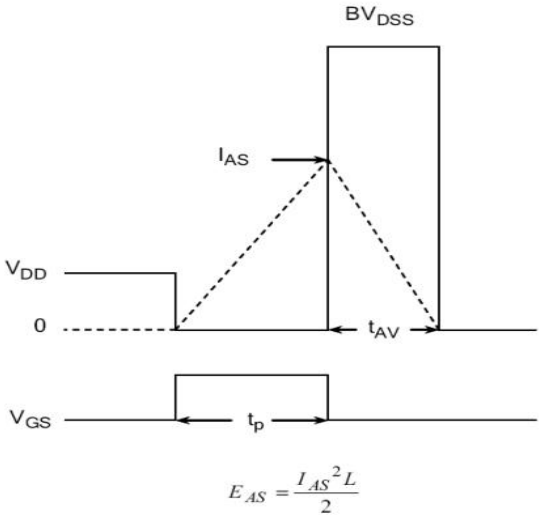



Figure 24. Unclamped Inductive Switching Waveforms

## 7 Product Names Rules

F X X N E X X

Packaging Code
220F: F 220: Nothing
251: B 252: D
262: I 263: E

Rated Voltage Code
With 2 Digital,For Example:
60 on behalf of 600V,
06 on behalf of 60v

Rated Current Code
With 1-2 Digital,
For Example:
4 on behalf of 4A,
10 on behalf of 10A,
08 on behalf of 0.8A

Special Function Code
E on behalf of build-in ESD
Nothing on behalf of not ESD

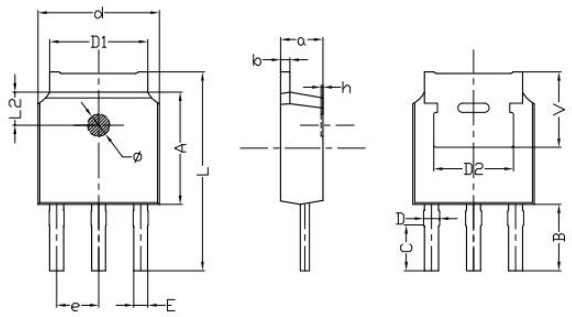
Channel Polarity Code
N on behalf of N channel
P on behalf of P channel

## 8 Product Specifications and Packaging Models

| Product Model | Package Type | Mark Name | RoHS | Package | Quantity |
|---|---|---|---|---|---|
| 30H10I | TO-251 | 30H10I | Pb-free | Tube | 3000/box |
| 30H10K | TO-252 | 30H10K | Pb-free | Tape & Reel | 2500/box |

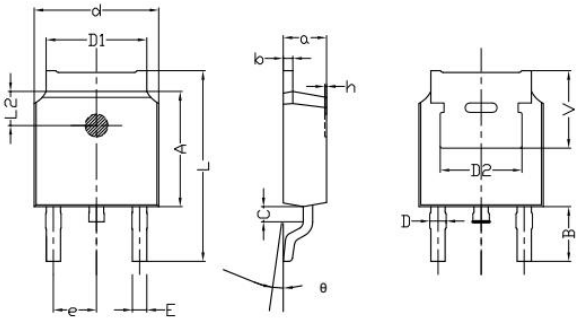
## 9 Dimensions

TO-251B PACKAGE OUTLINE DIMENSIONS




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | min. | max. | min. | max. |
| a | 2.20 | 2.40 | 0.087 | 0.0946 |
| b | 0.46 | 0.58 | 0.018 | 0.023 |
| C | 2.45 | 2.65 | 0.097 | 0.104 |
| D | 0.80 | 0.90 | 0.032 | 0.035 |
| d | 6.30 | 6.70 | 0.248 | 0.264 |
| D1 | 5.00 | 5.50 | 0.197 | 0.217 |
| D2 | TYP 4.83 | | TYP 0.190 | |
| A | 5.80 | 6.20 | 0.228 | 0.244 |
| e | 2.19 | 2.39 | 0.086 | 0.094 |
| L | 10.40 | 11.00 | 0.4098 | 0.4334 |
| B | 3.50 | 3.70 | 0.1379 | 0.1458 |
| L2 | 1.5 | 1.8 | 0.059 | 0.071 |
| ϕ | 1.10 | 1.30 | 0.0433 | 0.0512 |
| h | 0.00 | 0.30 | 0.000 | 0.012 |
| V | 5.25 | 5.85 | 0.207 | 0.230 |
| E | 0.60 | 0.80 | 0.0236 | 0.0315 |

TO-252B PACKAGE OUTLINE DIMENSIONS




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | min. | max. | min. | max. |
| a | 2.20 | 2.40 | 0.087 | 0.095 |
| b | 0.46 | 0.58 | 0.018 | 0.023 |
| c | 0.70 | 0.90 | 0.028 | 0.035 |
| D | 0.80 | 1.00 | 0.032 | 0.039 |
| d | 6.30 | 6.70 | 0.248 | 0.264 |
| D1 | 5.00 | 5.50 | 0.197 | 0.217 |
| D2 | TYP 4.83 | | TYP 0.190 | |
| A | 5.80 | 6.20 | 0.228 | 0.244 |
| e | 2.19 | 2.39 | 0.086 | 0.094 |
| L | 9.40 | 10.40 | 0.370 | 0.409 |
| B | 2.6 | 3.2 | 0.102 | 0.126 |
| L2 | 1.5 | 1.8 | 0.059 | 0.071 |
| θ | 0 | 8 | 0 | 8 |
| h | 0 | 0.3 | 0 | 0.012 |
| V | 5.25 | 5.85 | 0.207 | 0.230 |

## 10 Attentions

- ROUM 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 Roma 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.

## 11 Appendix

Revision history:

| Date | REV. | Description | Page |
|---|---|---|---|
| 2017.05.15 | 1.0 | Original | |