# HXMS100N50LNA

**N-Channel Enhancement Mode Power MOSFET**

www.jshxm.com

### Features

- Uses MHCHXM advanced PerfectMOS technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g x R_{DS(on)}$ product(FOM)
- Excellent Low Ciss
- Qualified according to JEDEC criteria

### Applications

- Switching application
- Li-battery protection
- DC-DC

### Beneficts

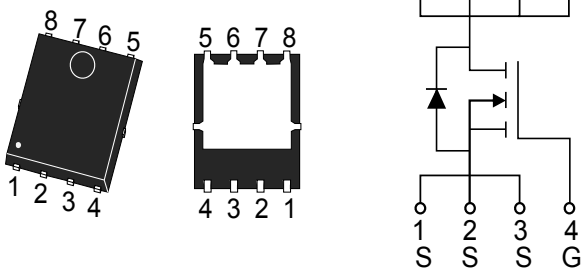
- High robustness and reliability
- Increases maximum current capability
- Low power loss, high power density
- Easy paralleling

### Product Summary

| | |
|---|---|
| $V_{DS}$ | 100V |
| $R_{DS(on).typ}$ | 4.5mΩ |
| $I_D$ | 130A |

RoHS Reach

PDFN5060-8L




### Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 100 | V |
| Continuous drain current<br>$T_C$ = 25°C (Silicon limit)<br>$T_C$ = 25°C (Package limit)<br>$T_C$ = 100°C (Silicon limit) | $I_D$ | <br>130<br>60<br>72 | A |
| Pulsed drain current ($T_C$ = 25°C, $t_p$ limited by $T_{jmax}$) | $I_{D\ pulse}$ | 240 | A |
| Avalanche energy, single pulse ($I_D$ = 35A, Rg=25Ω)[1] | $E_{AS}$ | 306 | mJ |
| Gate-Source voltage | $V_{GS}$ | ±20 | V |
| Power dissipation ($T_C$ = 25°C) | $P_{tot}$ | 105 | W |
| Operating junction and storage temperature | $T_j$ , $T_{stg}$ | -55...+150 | °C |
| Soldering temperature, wave soldering only allowed at leads (1.6mm from case for 10s) | Tsold | 260 | °C |

1.EAS is tested at starting Tj = 25℃, L = 0.5mH, IAS =35A, VGS = 10V.
2.Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial TJ =25°C.

## Thermal Resistance

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal resistance, junction – case. | $R_{thJC}$ | 1.20 | °C/W |
| Thermal resistance, junction – ambient(min. footprint) | $R_{thJA}$ | 54 | |

## Electrical Characteristic (at Tj = 25 °C, unless otherwise specified)

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| **Static Characteristic** | | | | | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | 105 | - | - | V | $V_{GS}$=0V, $I_D$=250μA |
| | | 105 | - | - | V | $V_{GS}$=0V, $I_D$=1mA |
| Gate threshold voltage | $V_{GS(th)}$ | 1.5 | 2.0 | 2.5 | V | $V_{DS}$=$V_{GS}$,$I_D$=250μA |
| Zero gate voltage drain current | $I_{DSS}$ | -<br>- | -<br>- | 1<br>100 | μA | $V_{DS}$=100V,$V_{GS}$=0V<br>$T_j$=25°C<br>$T_j$=125°C |
| Gate-source leakage current | $I_{GSS}$ | 0 | - | ±100 | nA | $V_{GS}$=±20V,$V_{DS}$=0V |
| Drain-source on-state resistance | $R_{DS(on)}$ | - | 4.5 | 5.0 | mΩ | VGS=10V, ID=40A |
| Transconductance | $g_{fs}$ | - | 141.0 | 282 | S | $V_{DS}$=5V, $I_D$=40A |
| **Dynamic Characteristic** | | | | | | |
| Input Capacitance | $C_{iss}$ | 2415 | 3623 | 5435 | pF | $V_{GS}$=0V, $V_{DS}$=50V, f=1MHz |
| Output Capacitance | $C_{oss}$ | 409 | 613 | 920 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | 9 | 18 | 36 | | |
| Gate Total Charge | $Q_G$ | 40 | 60.0 | 90 | nC | $V_{GS}$=10V, $V_{DS}$=50V, $I_D$=40A |
| Gate-Source charge | $Q_{gs}$ | 11 | 16.0 | 24 | | |
| Gate-Drain charge | $Q_{gd}$ | 6 | 11.0 | 22 | | |
| Turn-on delay time | $t_{d(on)}$ | 7 | 14.0 | 28 | ns | $V_{GS}$=10V, $V_{DD}$=50V, $R_{G\_ext}$=3Ω |
| Rise time | $t_r$ | 28 | 42.0 | 63 | | |
| Turn-off delay time | $t_{d(off)}$ | 31 | 46.0 | 69 | | |
| Fall time | $t_f$ | 13 | 19 | 29 | | |
| Gate resistance | $R_G$ | 0 | 2 | 10 | Ω | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz |

## Body Diode Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Body Diode Forward Voltage | $V_{SD}$ | - | 0.85 | 1.4 | V | $V_{GS}$=0V,$I_{SD}$=30A |
| Body Diode Reverse Recovery Time | $t_{rr}$ | 30 | 59 | 118 | ns | $I_F$=40A,dI/dt=100A/μs |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | 50 | 100 | 200 | nC | |

## Typical Performance Characteristics

Fig 1: Output Characteristics

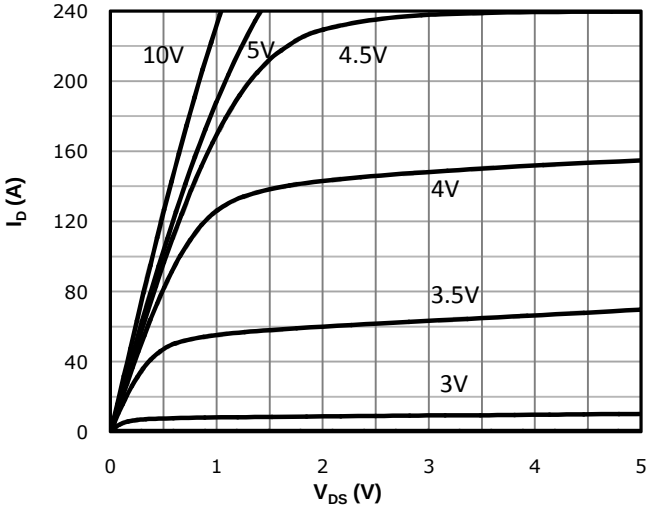



Fig 2: Transfer Characteristics

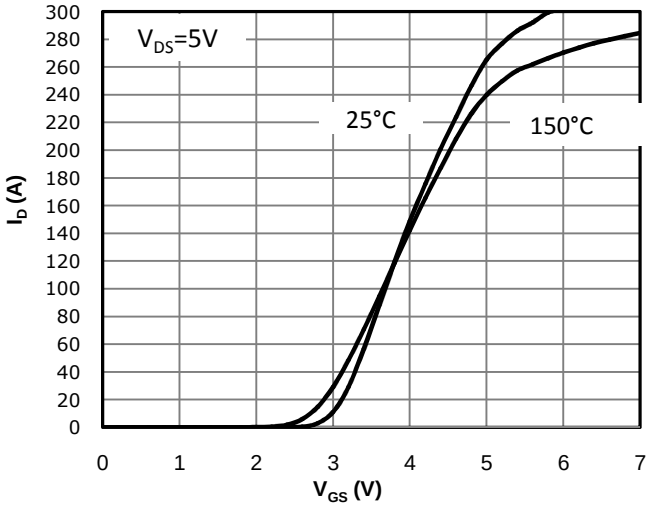



Fig 3: Rds(on) vs Drain Current and Gate Voltage

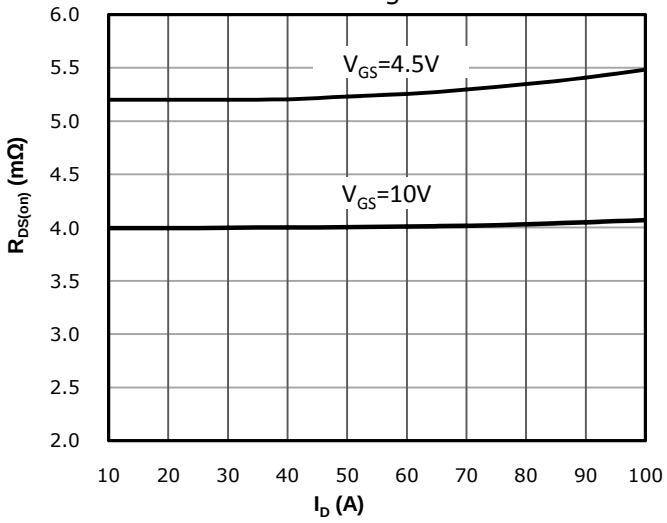



Fig 4: Rds(on) vs Gate Voltage

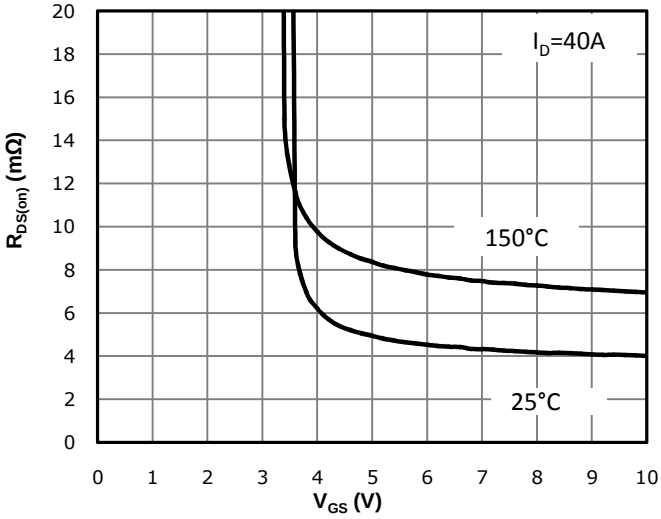



Fig 5: Rds(on) vs. Temperature

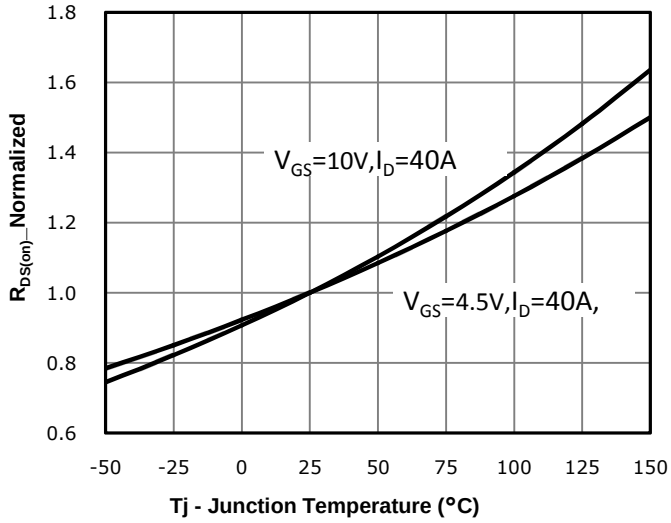



Fig 6: Vgs(th) vs. Temperature

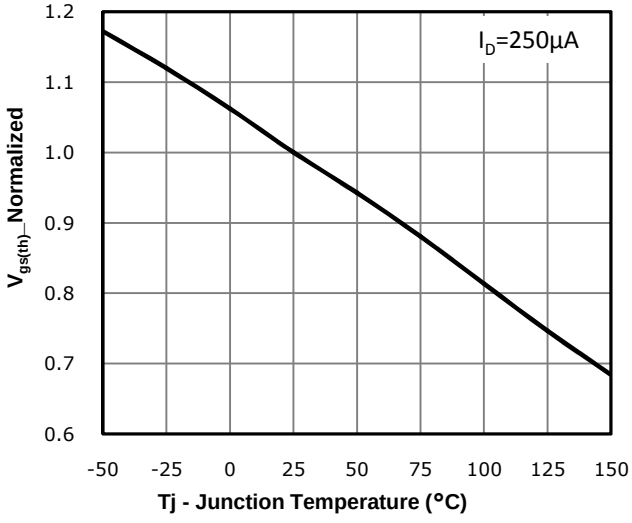


Fig 7: BVdss vs. Temperature

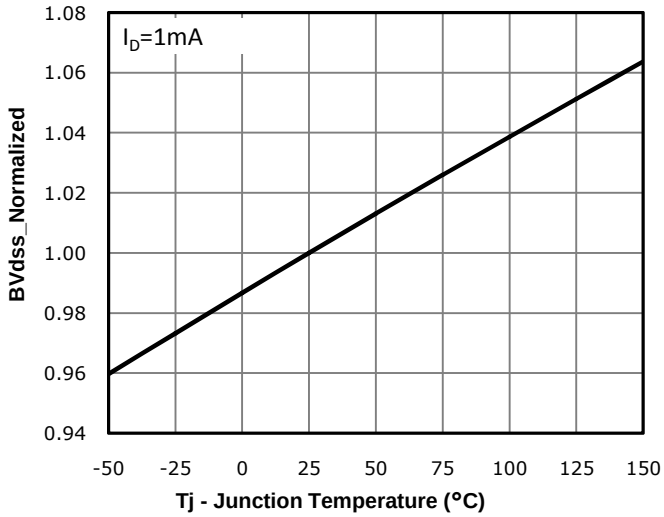



Fig 8: Capacitance Characteristics

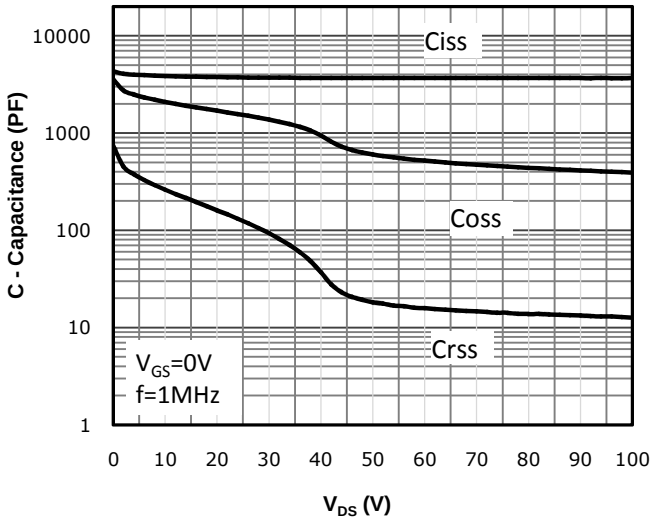



Fig 9: Gate Charge Characteristics

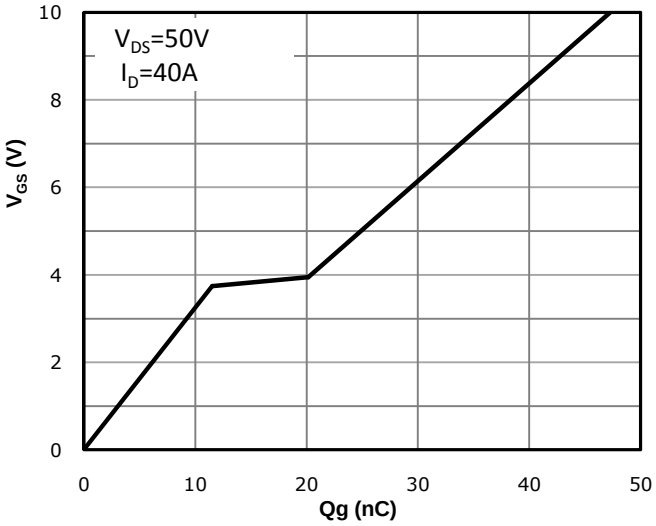



Fig 10: Body-diode Forward Characteristics

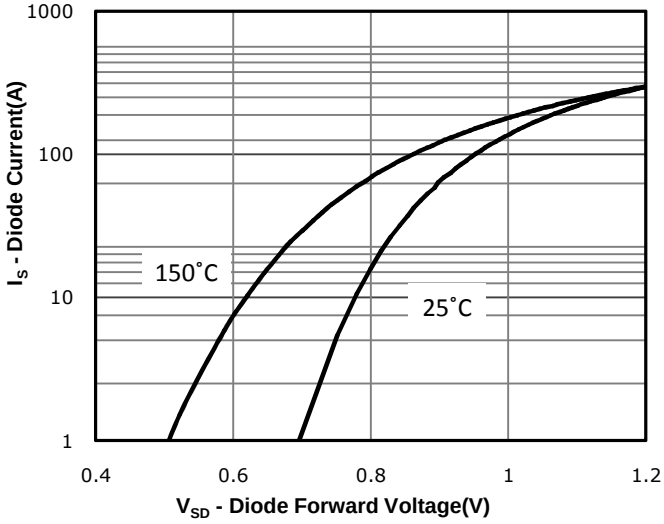



Fig 11: Power Dissipation

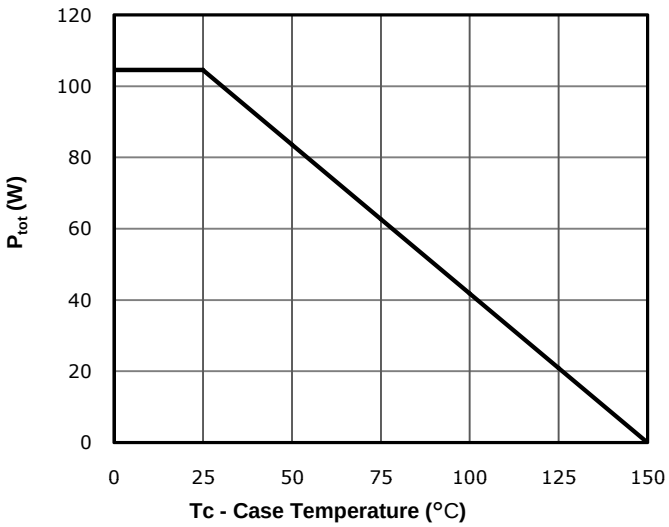



Fig 12: Drain Current Derating

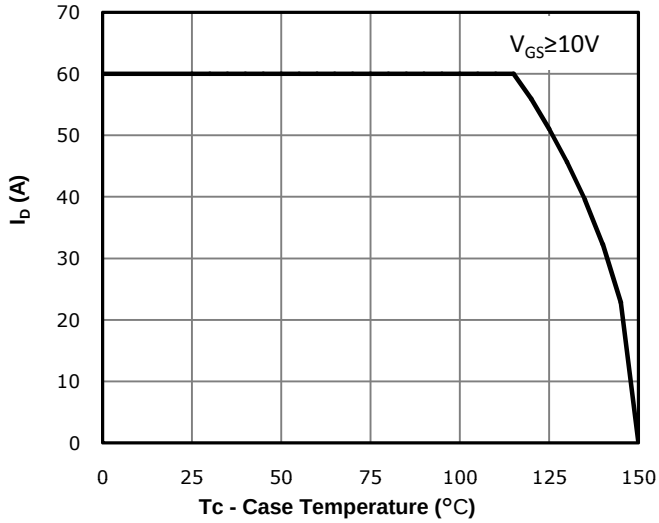


Fig 13: Safe Operating Area

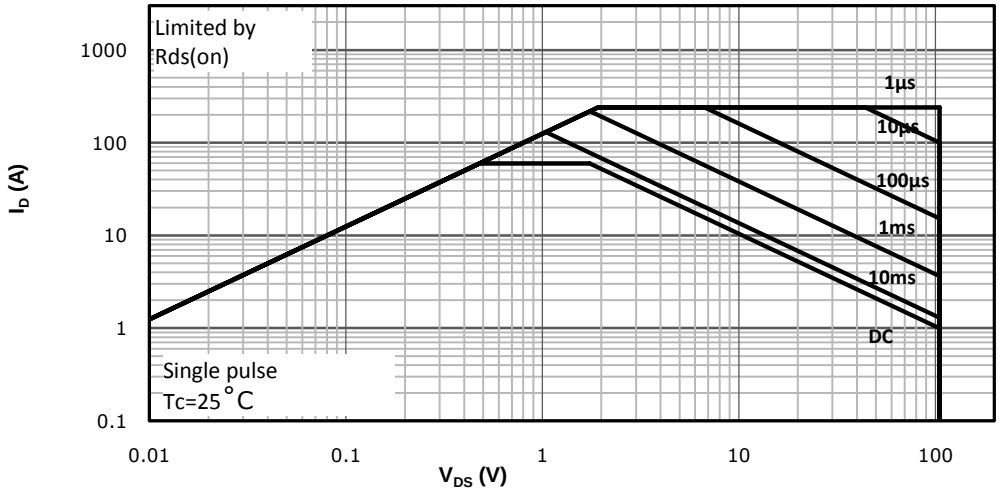
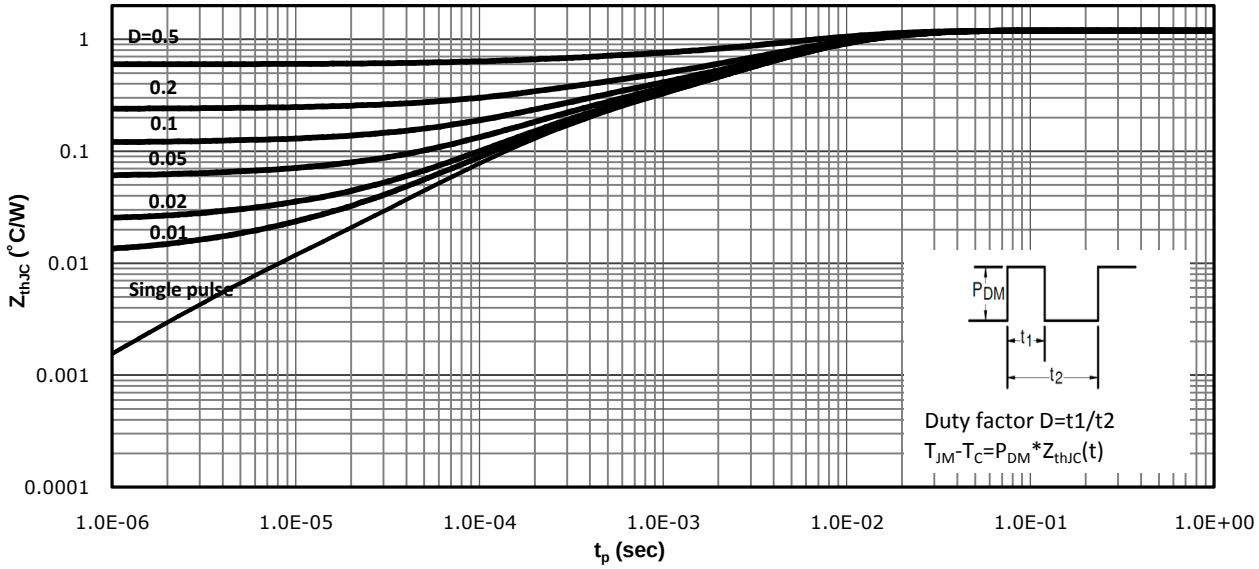
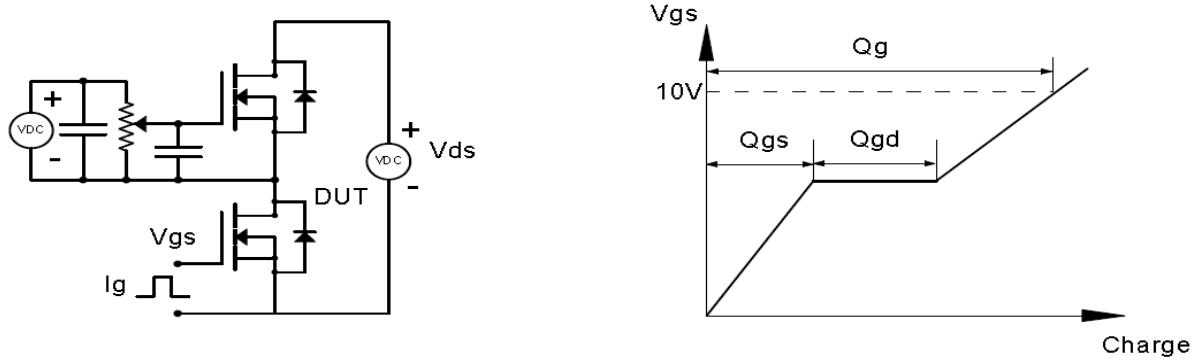



Fig 14: Max. Transient Thermal Impedance

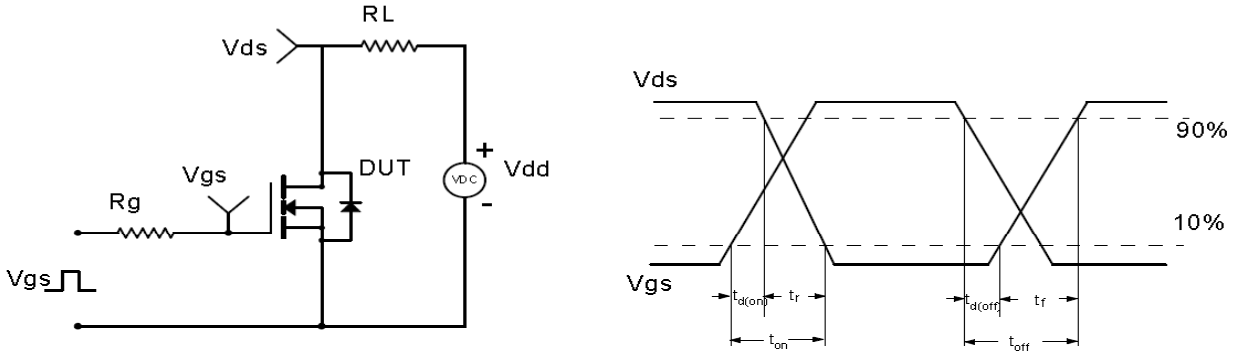


## Test Circuit & Waveform

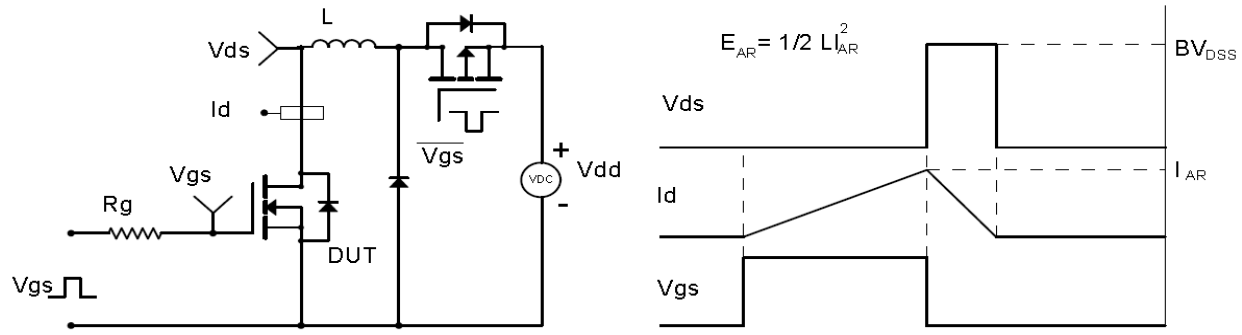
Gate Charge Test Circuit & Waveform



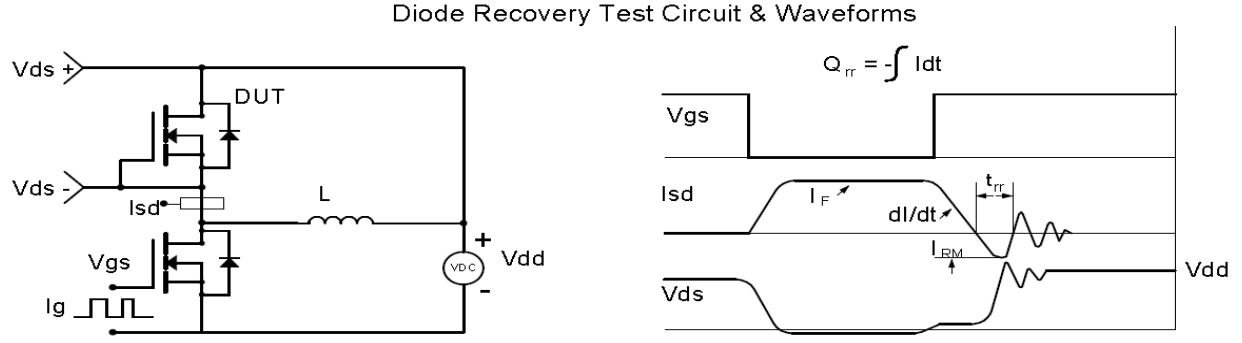

Resistive Switching Test Circuit & Waveforms



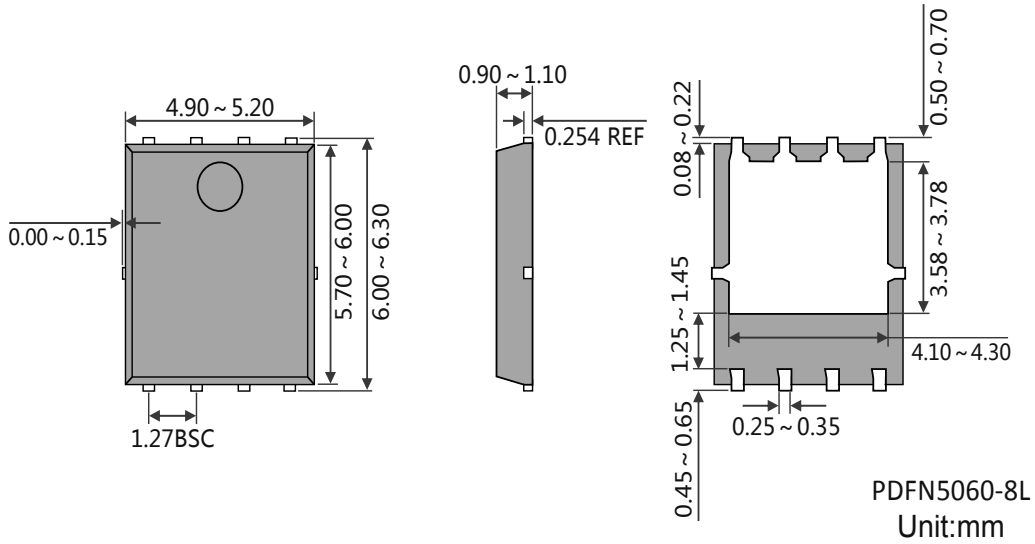

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms




Diode Recovery Test Circuit & Waveforms

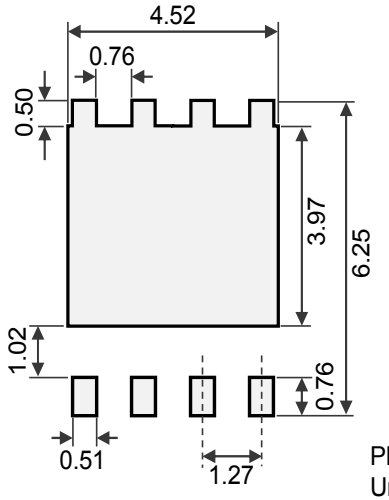


## Package Outline Dimensions



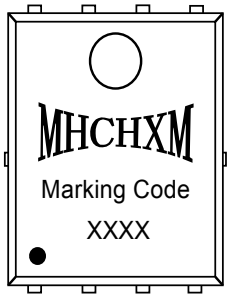

PDFN5060-8L
Unit:mm

## Suggested Solder Pad Layout




PDFN5060-8L
Unnoted Tolerance: ±0.05
Unit:mm

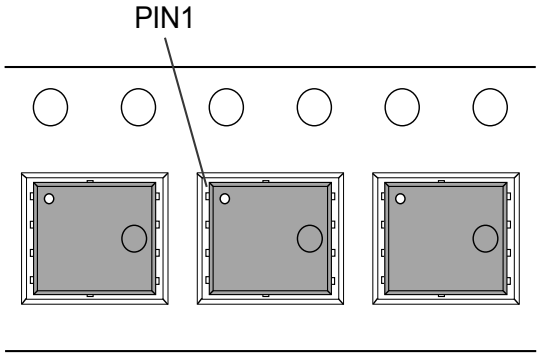
## Marking Information




**"MHCHXM"** = Product Logo
**"Marking Code"** = The Following
**"XXXX"** = Date Code Marking

| Marking Code | Part Number |
|---|---|
| S100N50LNA | HXMS100N50LNA |

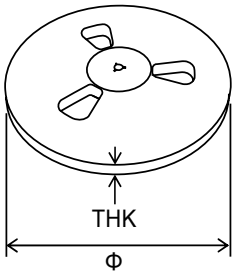
## The Orientation Of The Product In The Carrier Tape



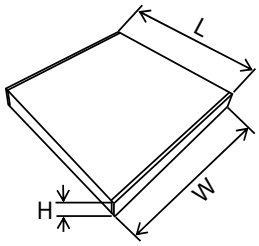

## Packing Information

| Packaging | Part Number | Quantity(pcs) | Size(mm) |
|---|---|---|---|
| Reel | Reel | 5000 | Φ330×THK15 |
| | Inner Box | 10000 | L355×W335×H48 |
| | Outer Box | 80000 | L415×W375×H360 |

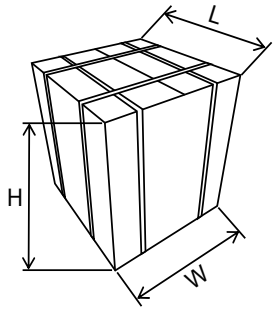
Packaging:Reel




Reel




Reel Inner Box




Reel Outer Box

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