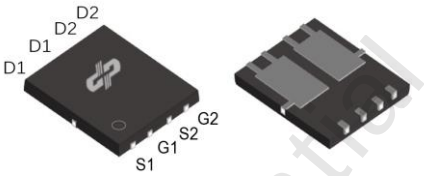
# DP120N10FGLB

*DPMOS N-MOSFET 100V, 10.8mΩ, 38A*

## Product Summary

| Part # | $V_{DS}$ | $R_{DS(on).typ}$ (@$V_{GS}$=10V) | $R_{DS(on).typ}$ (@$V_{GS}$=4.5V) | $I_D$ |
|---|---|---|---|---|
| DP120N10FGLB | 100V | 10.8mΩ | 13.6mΩ | 38A |

DFN 5x6-8

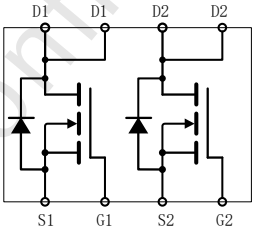



## Features

- Uses advanced MOSFET-DPMOS2 technology
- Extremely low on-resistance $R_{DS(on)}$
- Excellent $Q_g$x$R_{DS(on)}$ product(FOM)
- Qualified according to JEDEC criteria

## Applications

- Motor control and drive
- Battery management
- UPS (Uninterrupible Power Supplies)




100% Avalanche Tested

100% Rg Tested

## Package Marking and Ordering Information

| Part # | Marking | Package | Packing |
|---|---|---|---|
| DP120N10FGLB | 120N10FGLB | DFN 5x6-8 | Tape/Reel |

Halogen-Free

## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 100 | V |
| Continuous drain current<br>$T_C$ = 25°C<br>$T_C$ = 100°C | $I_D$ | <br>38<br>25 | A |
| Pulsed drain current ($T_C$ = 25°C, $t_p$ limited by $T_{jmax}$) | $I_{D\ pulse}$ | 152 | A |
| Avalanche energy, single pulse (L=0.5mH, Rg=25Ω)[1] | $E_{AS}$ | 56 | mJ |
| Gate-Source voltage | $V_{GS}$ | ±20 | V |
| Power dissipation ($T_C$ = 25°C) | $P_{tot}$ | 36 | W |
| Operating junction and storage temperature | $T_j$ , $T_{stg}$ | -55...+150 | °C |

[1].EAS is tested at starting Tj = 25℃, VGS = 10V.

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## Thermal Resistance

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal resistance, junction – case. | $R_{thJC}$ | 3.5 | °C/W |
| Thermal resistance, junction – ambient(min. footprint) | $R_{thJA}$ | 62 | |

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

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| **Static Characteristic** | | | | | | |
| Drain-source breakdown voltage | $BV_{DSS}$ | 100 | - | - | V | $V_{GS}$=0V, $I_D$=250uA |
| Gate threshold voltage | $V_{GS(th)}$ | 1.2 | 1.8 | 2.2 | V | $V_{DS}$=$V_{GS}$,$I_D$=250uA |
| 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 | $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$=±20V,$V_{DS}$=0V |
| Drain-source on-state resistance | $R_{DS(on)}$ | -<br>- | 10.8<br>13.6 | 13.0<br>17.0 | mΩ | VGS=10V, ID=20A<br>VGS=4.5V, ID=16A |
| Gate resistance | $R_g$ | - | 1 | 5 | Ω | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz |
| Transconductance[2] | $g_{fs}$ | - | 58 | - | S | $V_{DS}$=5V,$I_D$=50A |
| **Dynamic Characteristic[2]** | | | | | | |
| Input Capacitance | $C_{iss}$ | - | 1412 | - | pF | $V_{GS}$=0V, $V_{DS}$=50V, f=1MHz |
| Output Capacitance | $C_{oss}$ | - | 514 | - | | |
| Reverse Transfer Capacitance | $C_{rss}$ | - | 15 | - | | |
| Gate Total Charge | $Q_g$ | - | 21 | - | nC | $V_{GS}$=10V, $V_{DS}$=50V, $I_D$=25A, f=1MHz |
| Gate-Source charge | $Q_{gs}$ | - | 4.7 | - | | |
| Gate-Drain charge | $Q_{gd}$ | - | 3.3 | - | | |
| Turn-on delay time | $t_{d(on)}$ | - | 5 | - | ns | $V_{GS}$=10V, $V_{DD}$=50V, $R_{G_ext}$=2.7Ω |
| Rise time | $t_r$ | - | 28 | - | | |
| Turn-off delay time | $t_{d(off)}$ | - | 17 | - | | |
| Fall time | $t_f$ | - | 9 | - | | |

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## Body Diode Characteristic

| Parameter | Symbol | Value | | | Unit | Test Condition |
|---|---|---|---|---|---|---|
| | | min. | typ. | max. | | |
| Body Diode Forward Voltage | $V_{SD}$ | - | 0.9 | 1.2 | V | $V_{GS}$=0V,$I_{SD}$=40A |
| Diode continuous forward current | $I_s$ | - | - | 38 | A | TC = 25°C |
| Diode pluse current | $I_{s\ pluse}$ | - | - | 152 | A | TC = 25°C |
| Body Diode Reverse Recovery Time[2] | $t_{rr}$ | - | 43 | - | ns | $I_F$=50A, dI/dt=50A/μs |
| Body Diode Reverse Recovery Charge[2] | $Q_{rr}$ | - | 51 | - | nC | |

[2]. Defined by design. Not subject to production test

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## Typical Performance Characteristics

Fig 1: Output Characteristics

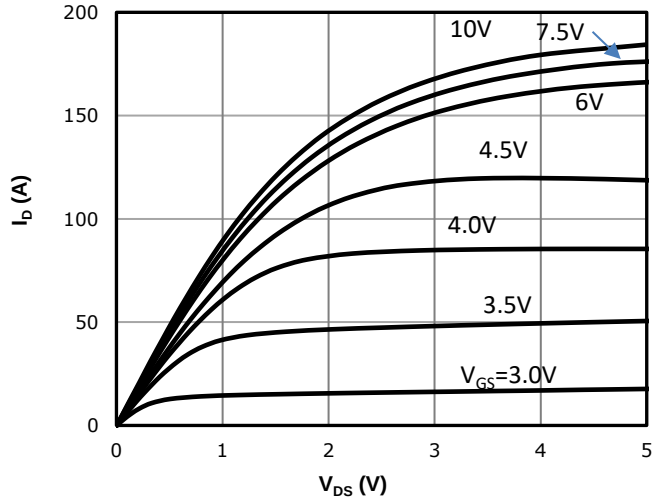



Fig 2: Transfer Characteristics

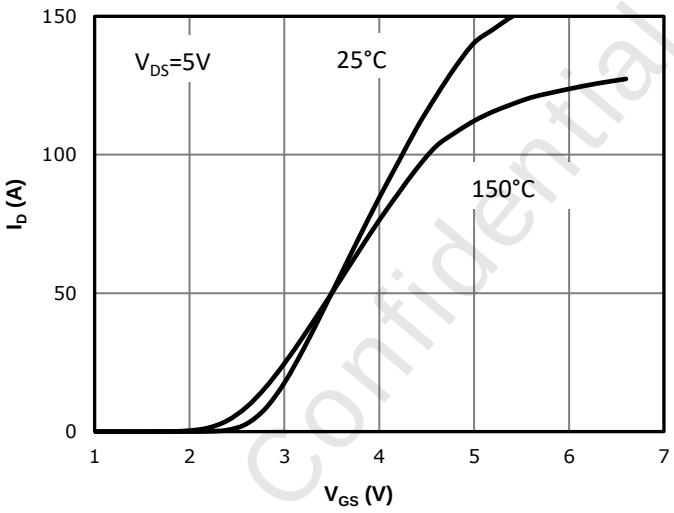



Fig 3: Rds(on) vs Drain Current and Gate Voltage

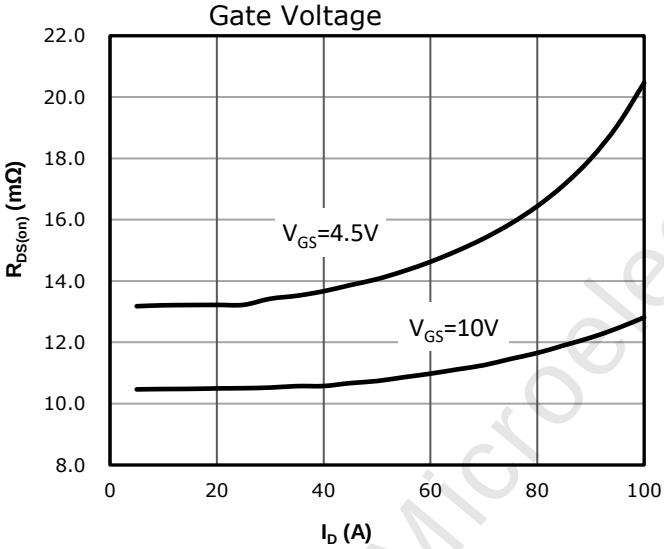



Fig 4: Rds(on) vs Gate Voltage

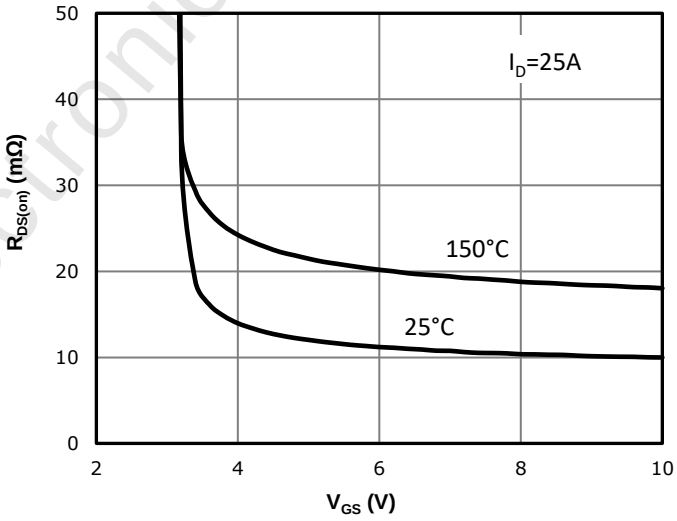



Fig 5: Rds(on) vs. Temperature

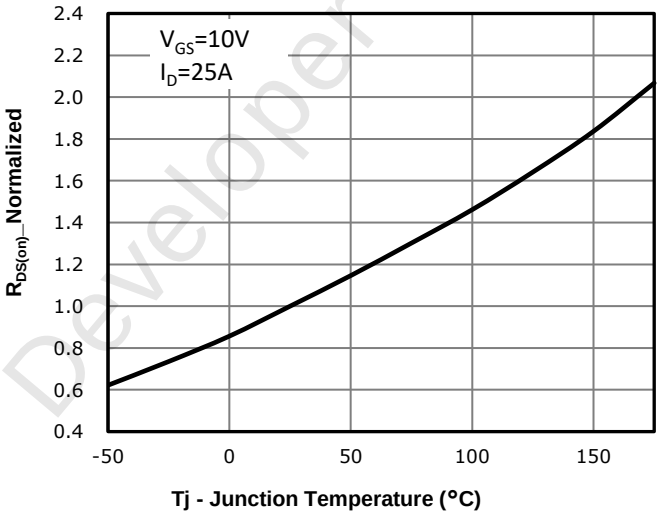
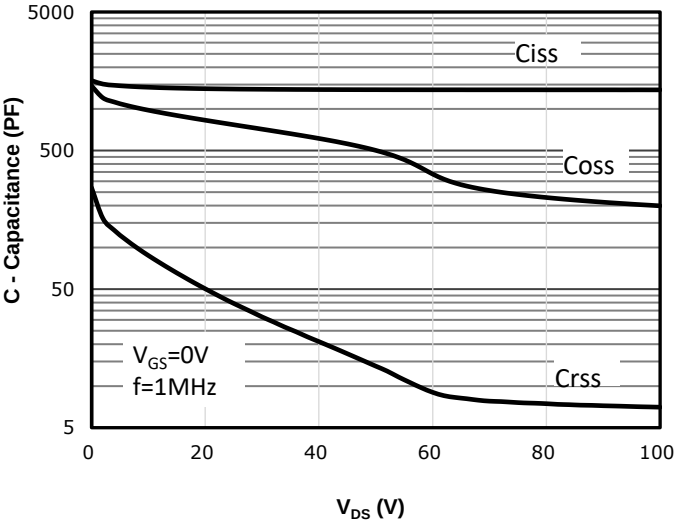



Fig 6: Capacitance Characteristics




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Fig 7: Gate Charge Characteristics

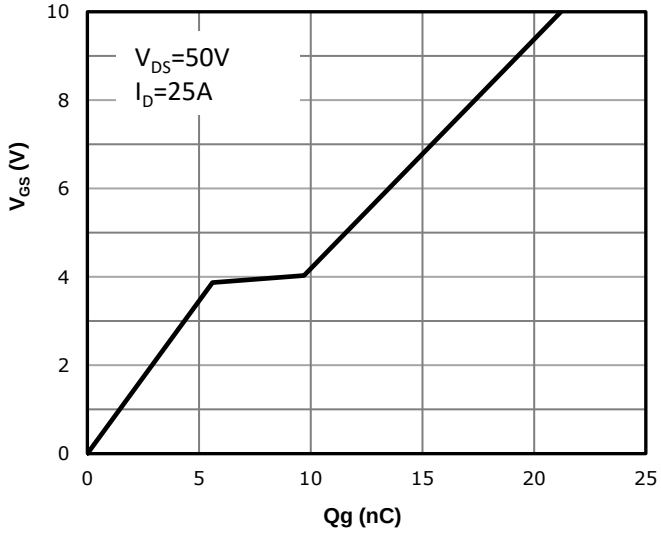



Fig 8: Body-diode Forward Characteristics

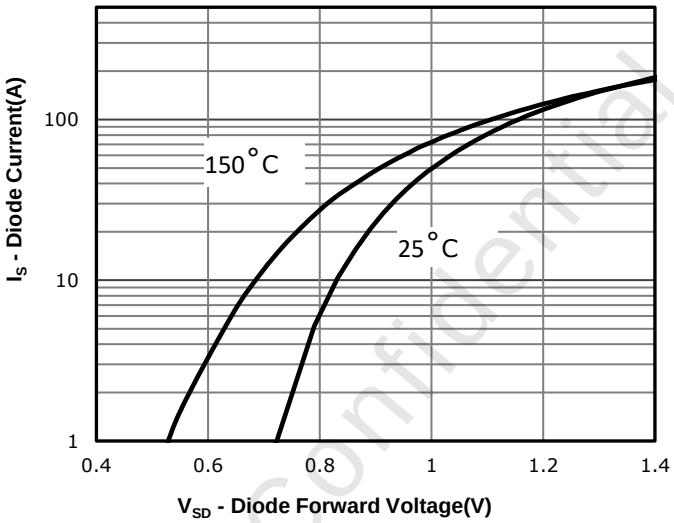



Fig 9: Power Dissipation

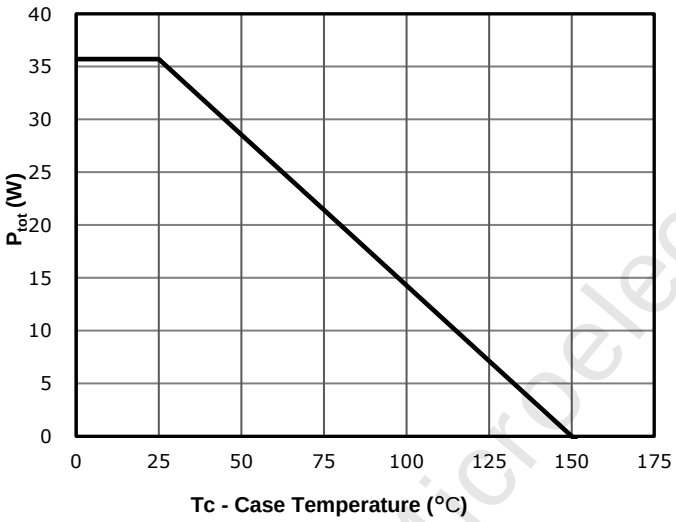



Fig 10: Drain Current Derating

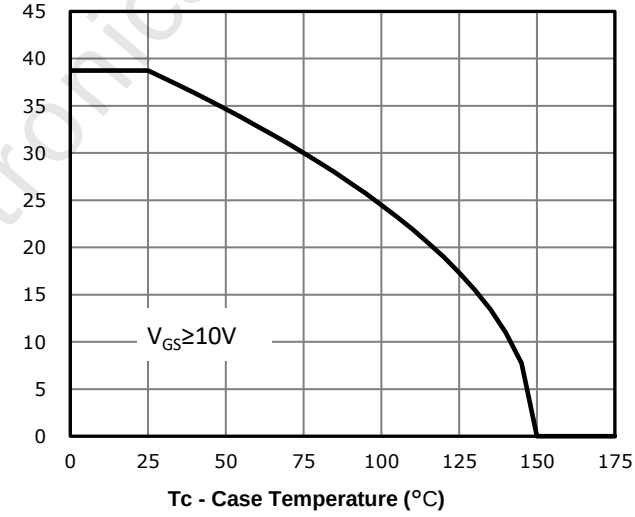
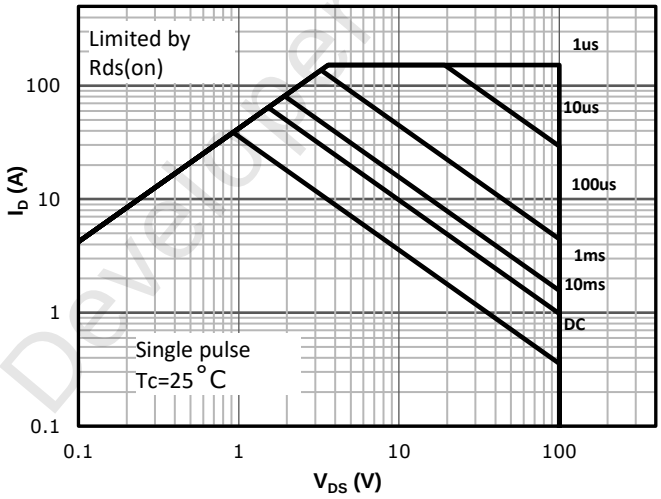
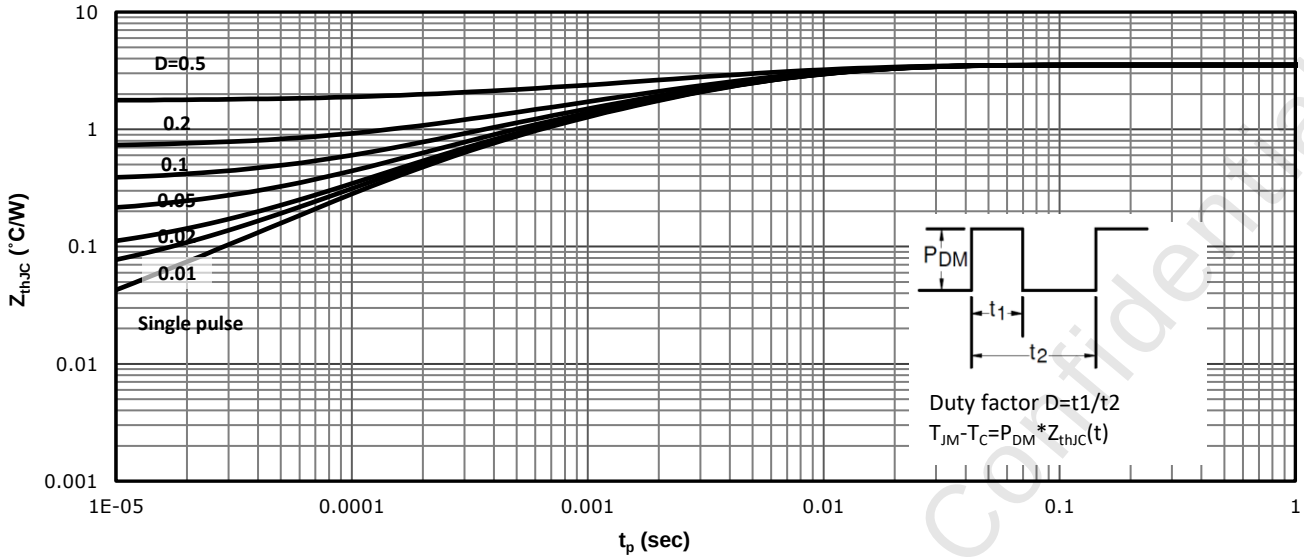



Fig 11: Safe Operating Area




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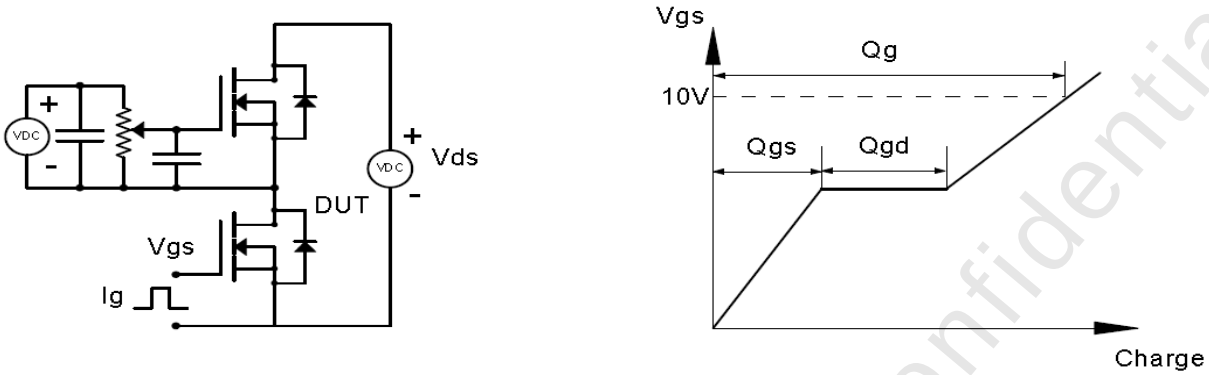
Fig 12: Max. Transient Thermal Impedance



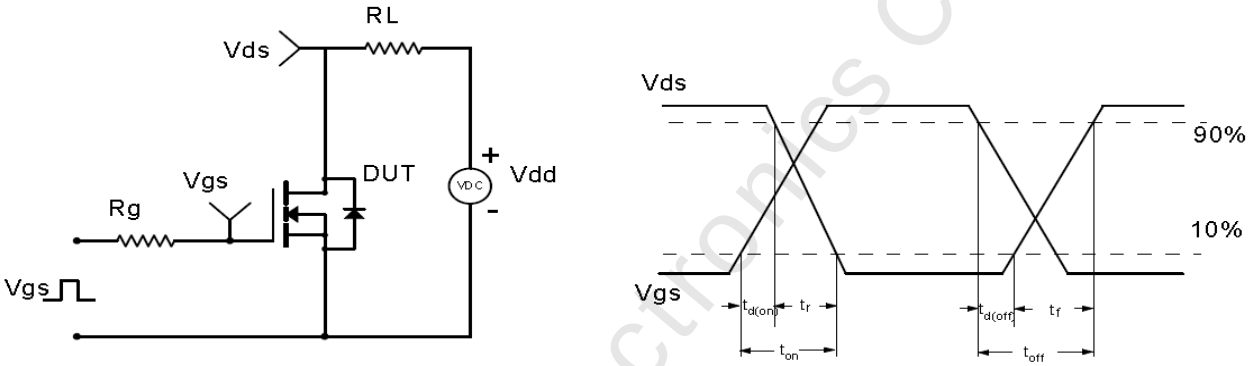

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## Test Circuit & Waveform

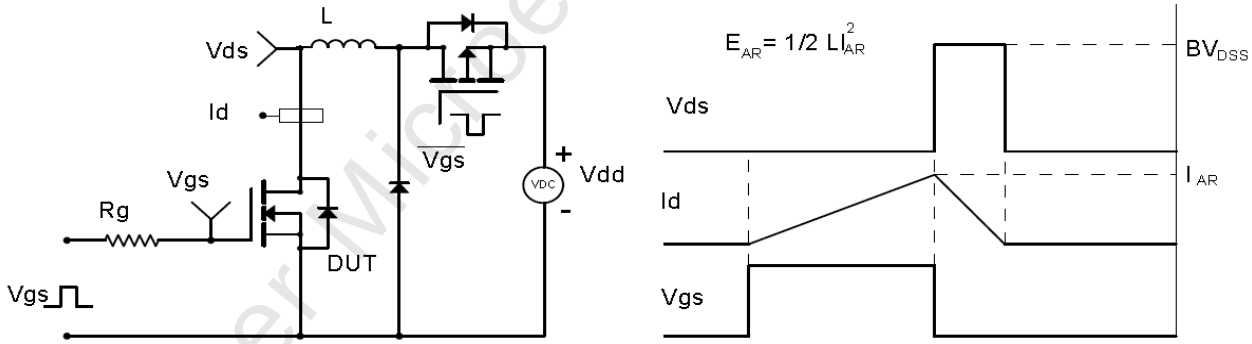
### Gate Charge Test Circuit & Waveform



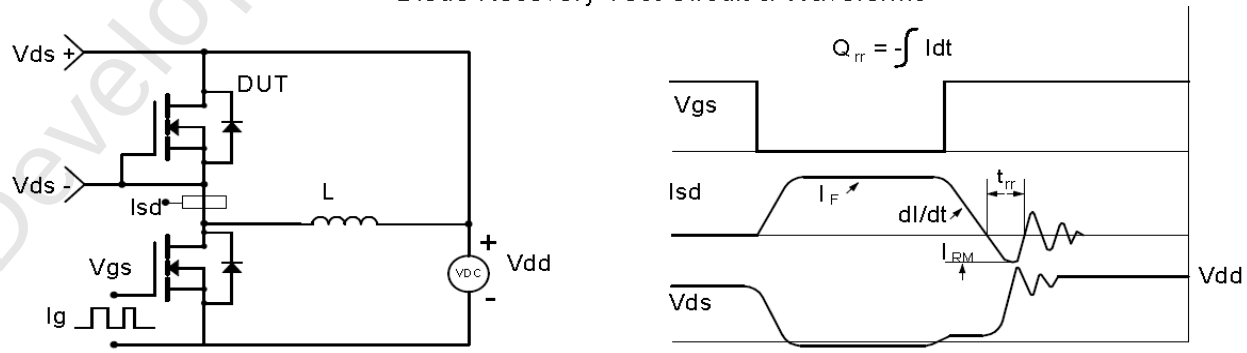

### Resistive Switching Test Circuit & Waveforms




### Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

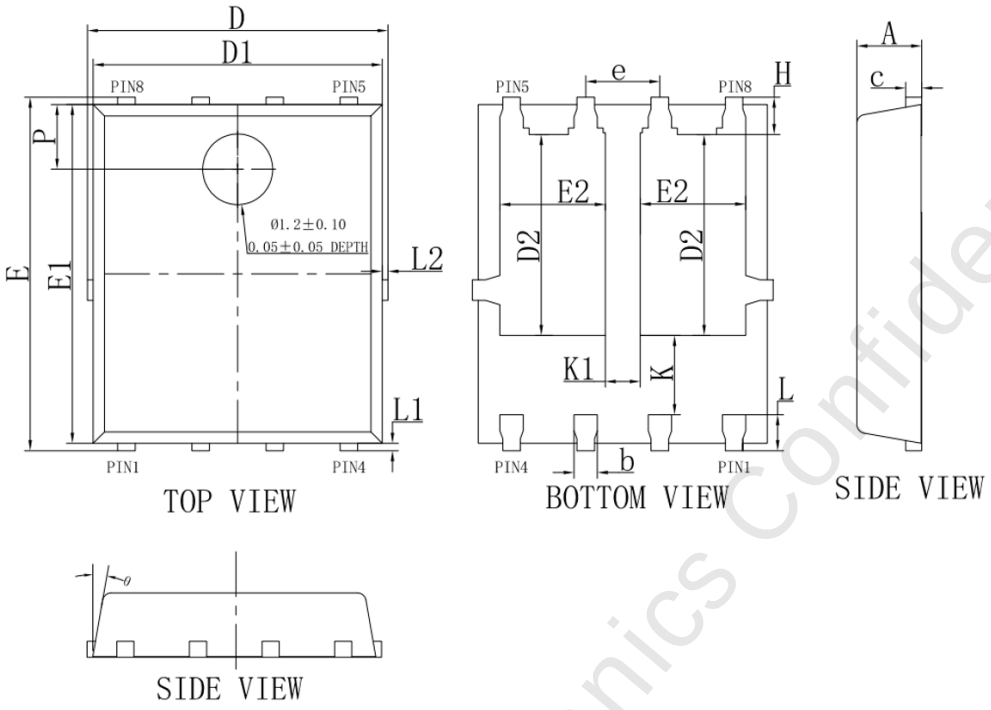



### Diode Recovery Test Circuit & Waveforms




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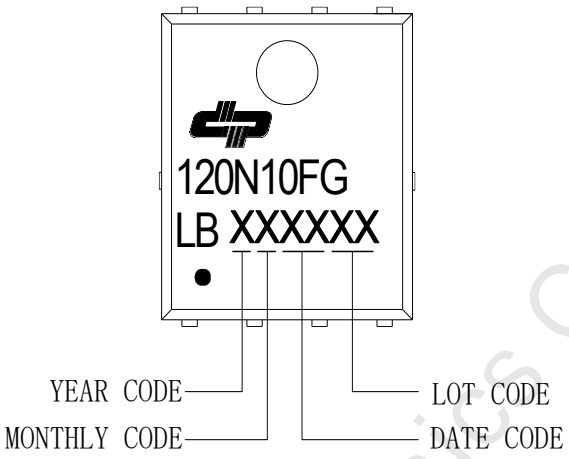
## Package Outline: DFN 5x6




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 1.00 | 1.20 | 0.039 | 0.047 |
| D | - | 5.10 | - | 0.201 |
| D1 | 4.90 | 5.00 | 0.193 | 0.197 |
| D2 | 3.31 | 3.51 | 0.130 | 0.138 |
| E | 5.90 | 6.10 | 0.232 | 0.240 |
| E1 | 5.70 | 5.80 | 0.224 | 0.228 |
| E2 | 1.71 | 1.91 | 0.067 | 0.075 |
| H | 0.51 | 0.71 | 0.020 | 0.028 |
| b | 0.35 | 0.45 | 0.014 | 0.018 |
| c | 0.21 | 0.34 | 0.008 | 0.013 |
| e | 1.17 | 1.37 | 0.046 | 0.054 |
| K | 1.25 | 1.45 | 0.049 | 0.057 |
| K1 | 0.50 | 0.70 | 0.020 | 0.028 |
| L2 | 0.51 | 0.71 | 0.020 | 0.028 |
| L1 | 0.06 | 0.20 | 0.002 | 0.008 |
| L2 | - | 0.15 | - | 0.006 |
| P | 1.00 | 1.20 | 0.039 | 0.047 |
| θ | 8° | 12° | - | - |

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## Part Marking Information




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## Revision History

| Revison | Major changes |
|---|---|
| 1.00 | Release for formal version |

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