

WDM3E6N085LS-HAF

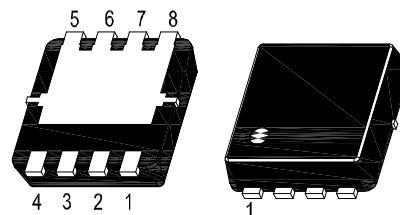
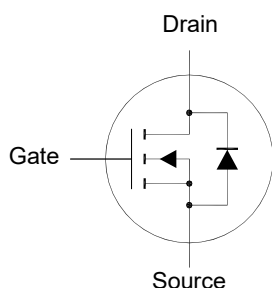
N-Channel Enhancement Mode MOSFET

Features

- Surface-mounted package
- Halogen and Antimony Free(HAF)
RoHS compliant

Applications

- Load switch
- PWM applications
- LCD TV CCFL inverter



1. Source 2. Source 3. Source 4. Gate
5. Drain 6. Drain 7. Drain 8. Drain
DFN3030 Plastic Package

Key Parameters

| Parameter | Value | Unit |
|------------------|-----------------------|------------|
| BV_{DSS} | 65 | V |
| $R_{DS(ON) Max}$ | 8.5 @ $V_{GS} = 10 V$ | m Ω |
| $V_{GS(th) typ}$ | 1.7 | V |
| $Q_g typ$ | 14 @ $V_{GS} = 10 V$ | nC |

Absolute Maximum Ratings(at $T_a = 25^\circ C$ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|--|----------------|---|------------|
| Drain-Source Voltage | V_{DS} | 65 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current | I_D | $T_c = 25^\circ C$ 30 $T_c = 100^\circ C$ | A |
| Peak Drain Current Pulsed ¹⁾ | I_{DM} | 160 | A |
| Power Dissipation | P_D | 41.7 | W |
| Avalanche Current | I_{AS} | 12 | A |
| Single Pulse Avalanche Energy ²⁾ | E_{AS} | 36 | mJ |
| Operating Junction and Storage Temperature Range | T_j, T_{stg} | - 55 to + 150 | $^\circ C$ |

Thermal Characteristics

| Parameter | Symbol | Max. | Unit |
|---|-----------------|------|--------------|
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 3 | $^\circ C/W$ |
| Thermal Resistance from Junction to Ambient ³⁾ | $R_{\theta JA}$ | 50 | $^\circ C/W$ |

¹⁾ Pulse Test: Pulse Width $\leq 100 \mu s$, Duty Cycle $\leq 2\%$, Repetitive rating, pulse width limited by $T_{J(MAX)}$.

²⁾ Limited by T_J max, starting $T_J = 25^\circ C$, $L = 0.5 mH$, $R_g = 25 \Omega$, $I_D = 12 A$, $V_{GS} = 10 V$.

³⁾ Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate in still air.

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Characteristics at $T_a = 25^\circ\text{C}$ unless otherwise specified

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|--|--------------|--------|-----------|-----------|------------------|
| STATIC PARAMETERS | | | | | |
| Drain-Source Breakdown Voltage at $I_D = 250 \mu\text{A}$ | BV_{DSS} | 65 | - | - | V |
| Drain-Source Leakage Current at $V_{DS} = 52 \text{ V}$ | I_{DSS} | - | - | 1 | μA |
| Gate-Source Leakage Current at $V_{GS} = \pm 20 \text{ V}$ | I_{GSS} | - | - | ± 100 | nA |
| Gate-Source Threshold Voltage at $V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$ | $V_{GS(th)}$ | 1.2 | - | 2.5 | V |
| Drain-Source On-State Resistance at $V_{GS} = 10 \text{ V}, I_D = 10 \text{ A}$ at $V_{GS} = 4.5 \text{ V}, I_D = 8 \text{ A}$ | $R_{DS(on)}$ | - - | 7.5 12 | 8.5 16 | $\text{m}\Omega$ |
| DYNAMIC PARAMETERS | | | | | |
| Gate resistance at $V_{DS} = 0 \text{ V}, f = 1 \text{ MHz}$ | R_g | - | 2 | - | Ω |
| Forward Transconductance at $V_{DS} = 5 \text{ V}, I_D = 5 \text{ A}$ | g_{FS} | - | 13 | - | S |
| Input Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 30 \text{ V}, f = 1 \text{ MHz}$ | C_{iss} | - | 825 | - | pF |
| Output Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 30 \text{ V}, f = 1 \text{ MHz}$ | C_{oss} | - | 290 | - | pF |
| Reverse Transfer Capacitance at $V_{GS} = 0 \text{ V}, V_{DS} = 30 \text{ V}, f = 1 \text{ MHz}$ | C_{rss} | - | 15 | - | pF |
| Gate charge total at $V_{DS} = 30 \text{ V}, I_D = 10 \text{ A}, V_{GS} = 10 \text{ V}$ at $V_{DS} = 30 \text{ V}, I_D = 10 \text{ A}, V_{GS} = 4.5 \text{ V}$ | Q_g | - - | 14 7.2 | - - | nC |
| Gate to Source Charge at $V_{DS} = 30 \text{ V}, I_D = 10 \text{ A}, V_{GS} = 10 \text{ V}$ | Q_{gs} | - | 2.6 | - | nC |
| Gate to Drain Charge at $V_{DS} = 30 \text{ V}, I_D = 10 \text{ A}, V_{GS} = 10 \text{ V}$ | Q_{gd} | - | 2.8 | - | nC |
| Turn-On Delay Time at $V_{GS} = 10 \text{ V}, V_{DS} = 30 \text{ V}, R_G = 4.7 \Omega, I_D = 10 \text{ A}$ | $t_{d(on)}$ | - | 10 | - | ns |
| Turn-On Rise Time at $V_{GS} = 10 \text{ V}, V_{DS} = 30 \text{ V}, R_G = 4.7 \Omega, I_D = 10 \text{ A}$ | t_r | - | 16 | - | ns |
| Turn-Off Delay Time at $V_{GS} = 10 \text{ V}, V_{DS} = 30 \text{ V}, R_G = 4.7 \Omega, I_D = 10 \text{ A}$ | $t_{d(off)}$ | - | 9 | - | ns |
| Turn-Off Fall Time at $V_{GS} = 10 \text{ V}, V_{DS} = 30 \text{ V}, R_G = 4.7 \Omega, I_D = 10 \text{ A}$ | t_f | - | 2 | - | ns |
| Body-Diode PARAMETERS | | | | | |
| Drain-Source Diode Forward Voltage at $I_S = 1 \text{ A}, V_{GS} = 0 \text{ V}$ | V_{SD} | - | - | 1.2 | V |
| Body Diode Reverse Recovery Time at $I_S = 10 \text{ A}, di/dt = 100 \text{ A} / \mu\text{s}$ | t_{rr} | - | 17 | - | ns |
| Body Diode Reverse Recovery Charge at $I_S = 10 \text{ A}, di/dt = 100 \text{ A} / \mu\text{s}$ | Q_{rr} | - | 6.5 | - | nc |

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Electrical Characteristics Curves

Fig.1 Typical Output Characteristic

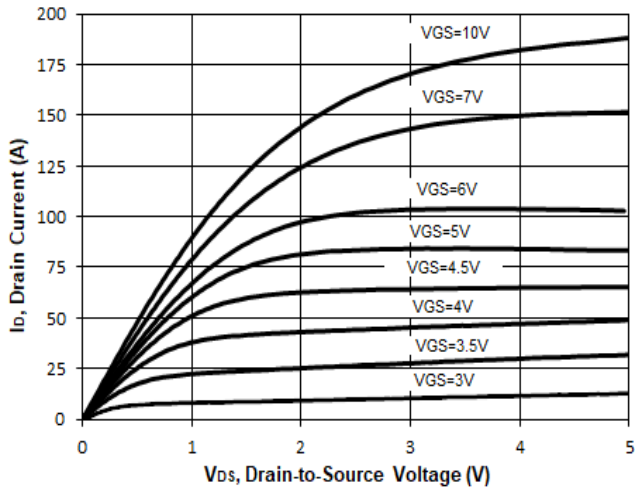


Fig.2 Typical Transfer Characteristic

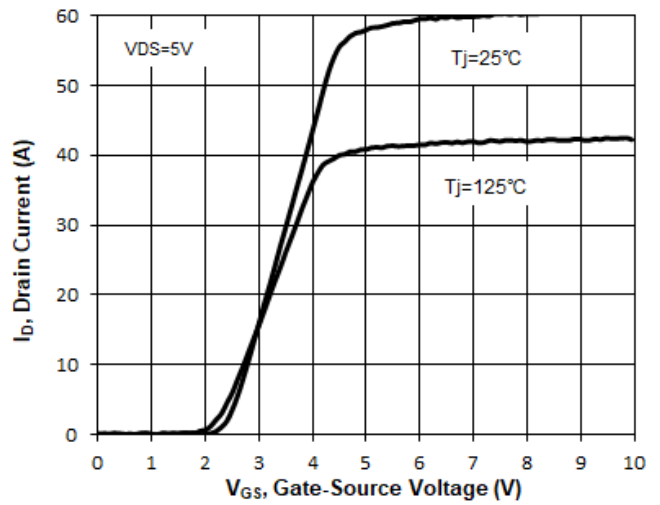


Fig.3 On Resistance vs. Gate-Source Voltage

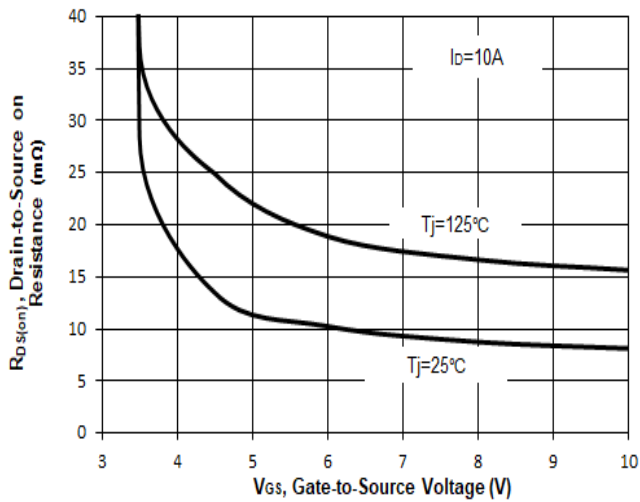


Fig.4 On Resistance vs. Tj

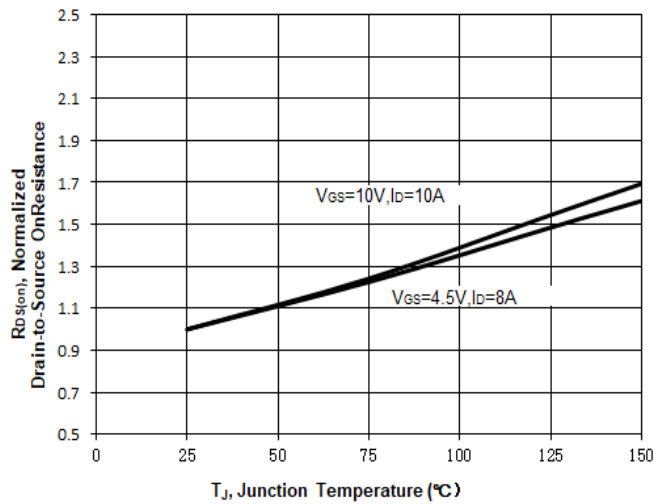


Fig.5 On Resistance vs. Drain Current

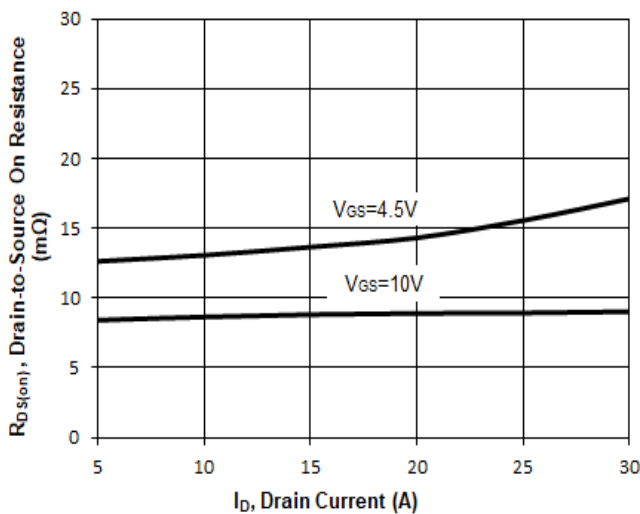
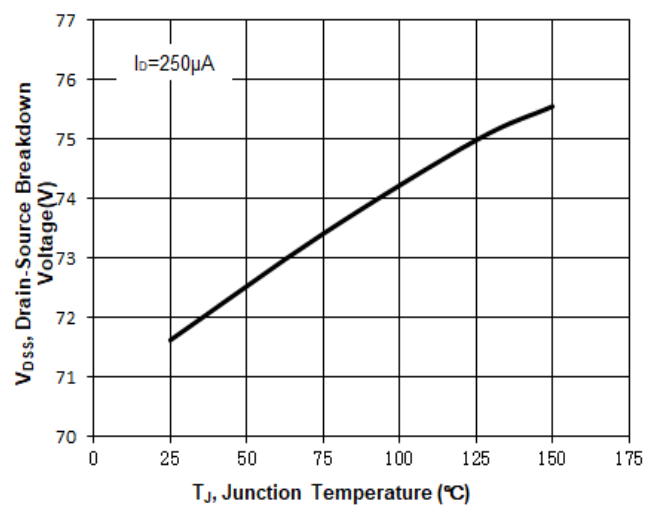


Fig.6 Drain-Source Breakdown Voltage vs. Tj



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Electrical Characteristics Curves

Fig.7 Gate Threshold Voltage vs. Tj

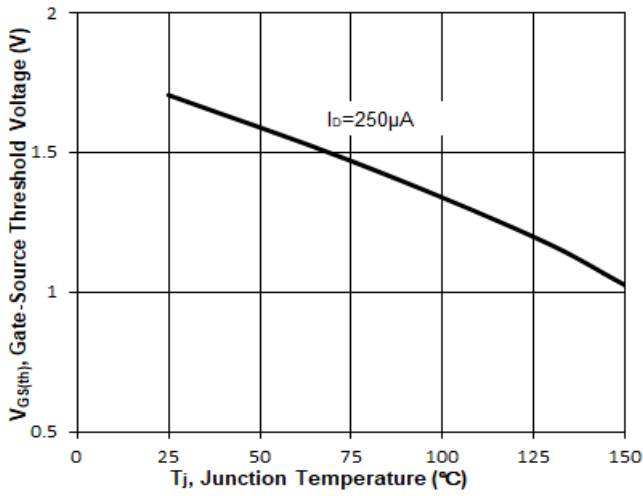


Fig 8. Typical Forward Characteristic

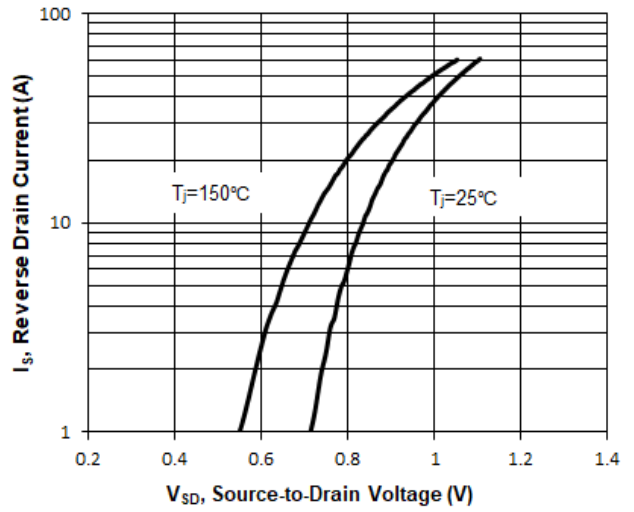


Fig 9. Capacitance Characteristic

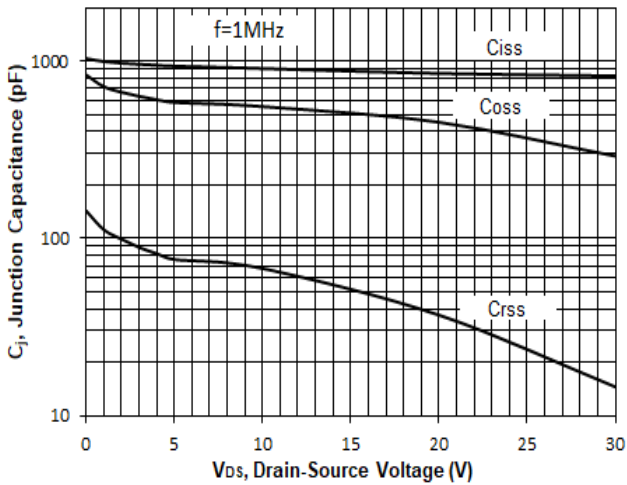


Fig 10. Gate Charge

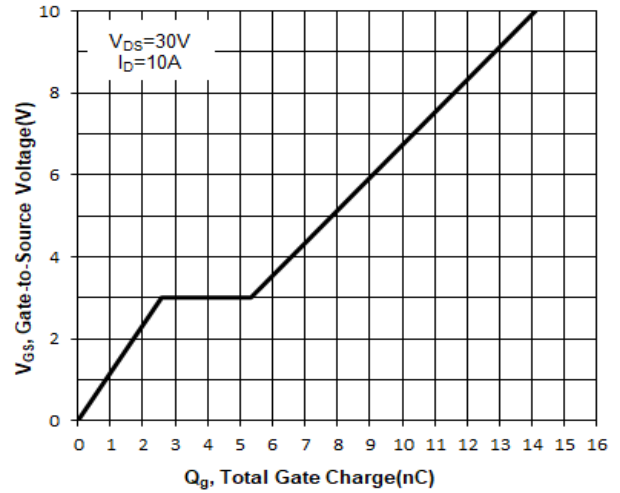
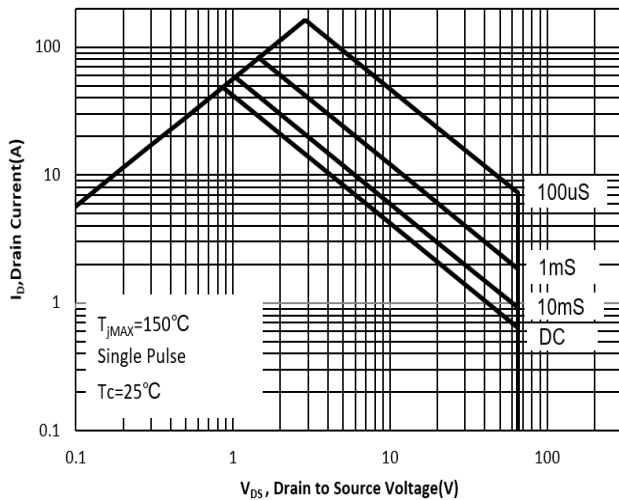


Fig 11. Safe Operation Area



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Electrical Characteristics Curves

Fig.12 Normalized Maximum Transient Thermal Impedance($Z_{\theta JA}$)

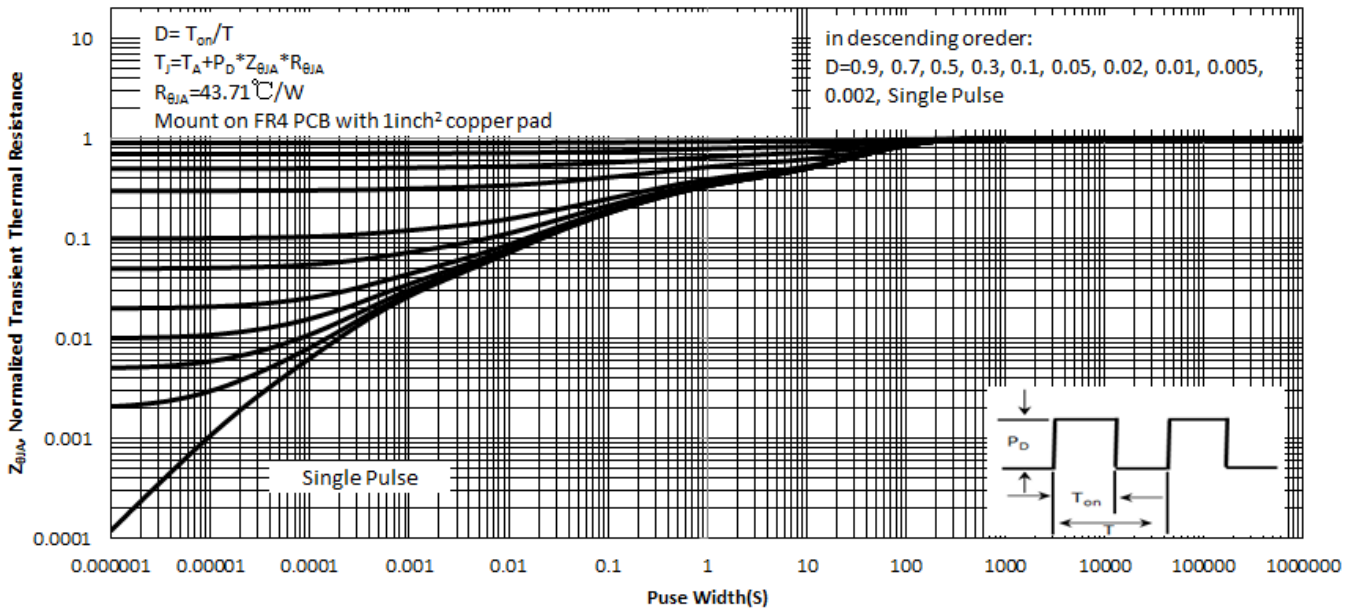
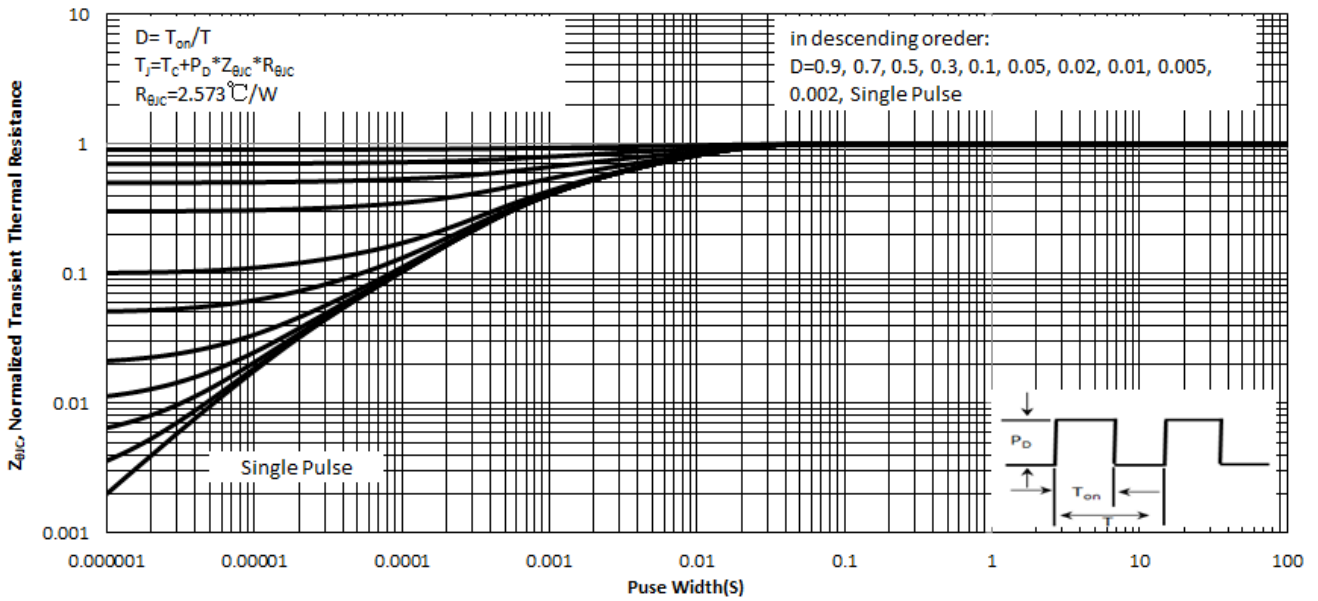


Fig.13 Normalized Maximum Transient Thermal Impedance($Z_{\theta JC}$)



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Test Circuits

Fig.1-1 Switching times test circuit

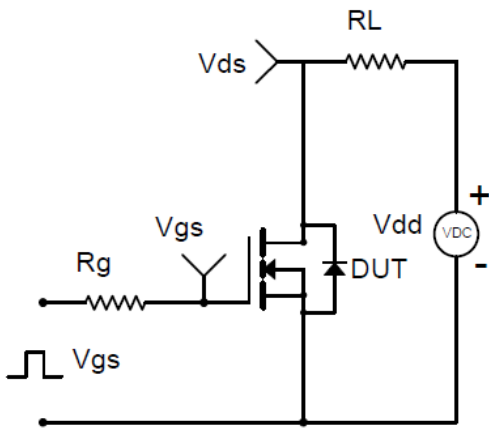


Fig.1-2 Switching Waveform

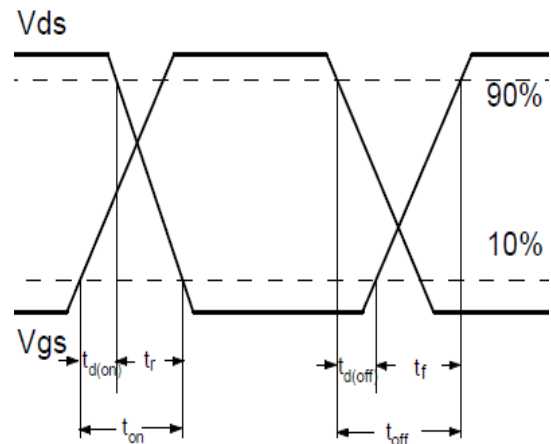


Fig.2-1 Gate charge test circuit

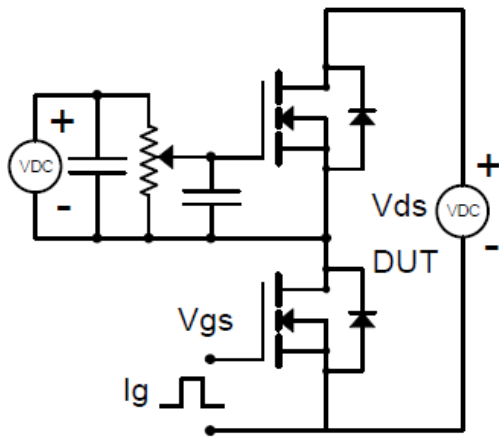


Fig.2-2 Gate charge waveform

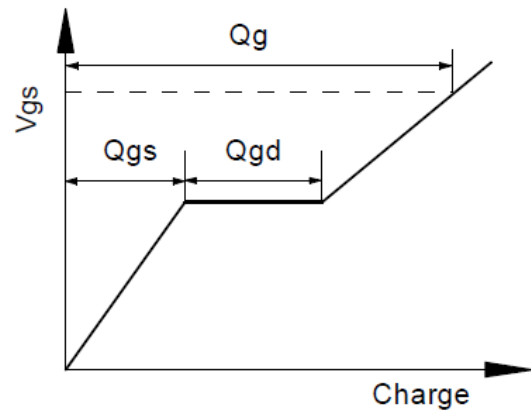


Fig.3-1 Avalanche test circuit

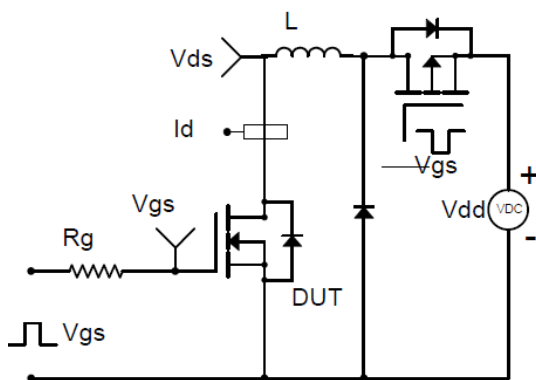
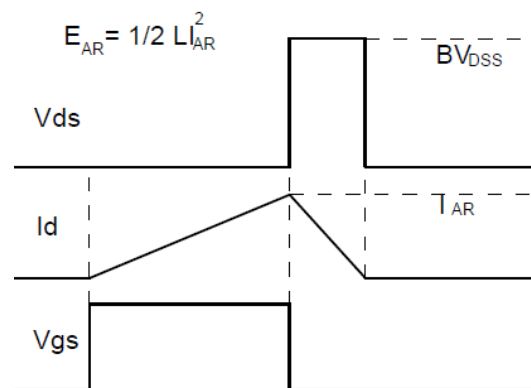


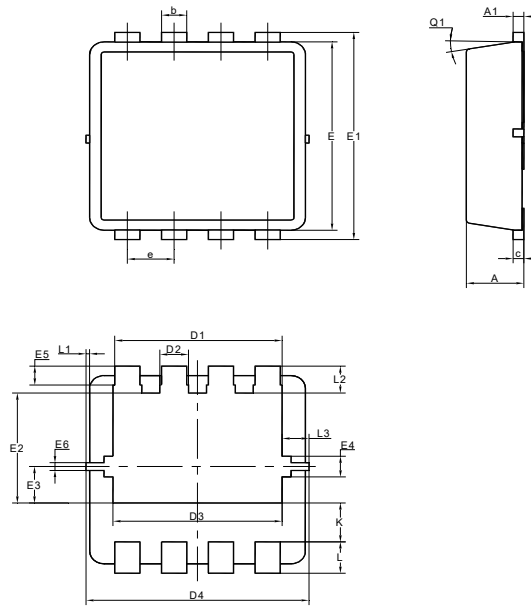
Fig.3-2 Avalanche waveform



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Package Outline Dimensions (Units: mm)

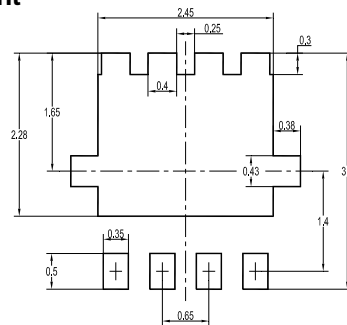
DFN3030



| UNIT | A | A1 | b | c | D | D1 | D2 | D3 | D4 | E | E1 | E2 | E3 |
|------|-----|------|------|------|-----|------|-----|-----|-----|-----|-----|------|------|
| mm | 0.9 | 0.05 | 0.35 | 0.25 | 3.1 | 2.45 | 0.5 | 2.7 | 3.2 | 3.1 | 3.3 | 1.85 | 0.68 |
| | 0.7 | 0 | 0.24 | 0.1 | 2.9 | 2.25 | 0.3 | 2.5 | 3 | 2.9 | 3.1 | 1.65 | 0.48 |

| UNIT | E4 | E5 | E6 | e | K | L | L1 | L2 | L3 | θ1 |
|------|------|-----|-------|-----|------|-----|-----|------|-------|-----|
| mm | 0.43 | 0.4 | 0.175 | 0.7 | 0.72 | 0.5 | 0.1 | 0.53 | 0.475 | 12° |
| | 0.23 | 0.2 | 0.075 | 0.6 | 0.52 | 0.3 | 0 | 0.33 | 0.275 | 0° |

Recommended Soldering Footprint

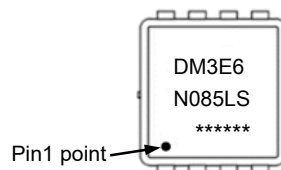


Packing information

| Package | Tape Width (mm) | Pitch | | Reel Size | | Per Reel Packing Quantity |
|---------|-----------------|---------|---------------|-----------|------|---------------------------|
| | | mm | inch | mm | inch | |
| DFN3030 | 12 | 8 ± 0.1 | 0.315 ± 0.004 | 330 | 13 | 5,000 |

Marking information

" DM3E6N085LS " = Part No.
 " ***** " = Date Code Marking
 Font type: Arial



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