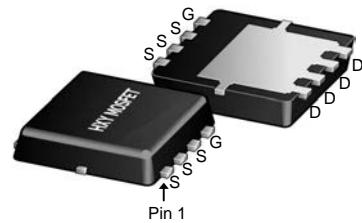




Description

The BSC080P03LSG uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

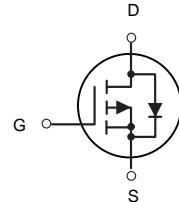


General Features

$V_{DS} = -30V$ $I_D = -70A$

$R_{DS(ON)} < 8.8\text{ m}\Omega$ $V_{GS} = -10V$

DFN5X6-8L



P-Channel MOSFET

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|--------------|-----------|------------|----------|
| BSC080P03LSG | DFN5X6-8L | HXY MOSFET | 5000 |

Absolute Maximum Ratings ($T_c=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|------------------------------|--------------------------------------------------|------------|---------------------------|
| V_{DS} | Drain-Source Voltage | -30 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_c=25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | -70 | A |
| $I_D @ T_c=75^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | -40 | A |
| I_{DM} | Pulsed Drain Current ² | -175 | A |
| EAS | Single Pulse Avalanche Energy ³ | 31 | mJ |
| $P_D @ T_c=25^\circ\text{C}$ | Total Power Dissipation ⁴ | 31.2 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ\text{C}$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 4 | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | 61 | $^\circ\text{C}/\text{W}$ |



Electrical Characteristics($T_J=25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------|------|------|-----------|------------------|
| Drain-Source Breakdown Voltage | $V_{(\text{BR})\text{DSS}}$ | $V_{\text{GS}} = 0\text{V}, I_{\text{D}} = -250\mu\text{A}$ | -30 | - | - | V |
| Gate-body Leakage current | I_{GSS} | $V_{\text{DS}} = 0\text{V}, V_{\text{GS}} = \pm 20\text{V}$ | - | - | ± 100 | nA |
| Zero Gate Voltage Drain Current $T_J=25^\circ\text{C}$ $T_J=55^\circ\text{C}$ | I_{DSS} | $V_{\text{DS}} = -24\text{V}, V_{\text{GS}} = 0\text{V}$ | - | - | -1 | μA |
| | | | - | - | -5 | |
| Gate-Threshold Voltage | $V_{\text{GS}(\text{th})}$ | $V_{\text{DS}} = V_{\text{GS}}, I_{\text{D}} = -250\mu\text{A}$ | -1.0 | -1.6 | -2.5 | V |
| Drain-Source On-Resistance ² | $R_{\text{DS}(\text{on})}$ | $V_{\text{GS}} = -10\text{V}, I_{\text{D}} = -12\text{A}$ | - | 6 | 8.8 | $\text{m}\Omega$ |
| | | $V_{\text{GS}} = -4.5\text{V}, I_{\text{D}} = -8\text{A}$ | - | 9 | 14 | |
| Forward Transconductance | g_{fs} | $V_{\text{DS}} = -5\text{V}, I_{\text{D}} = -20\text{A}$ | - | 28 | - | S |
| Input Capacitance | C_{iss} | $V_{\text{DS}} = -15\text{V}, V_{\text{GS}} = 0\text{V}, f = 1\text{MHz}$ | - | 4320 | - | pF |
| Output Capacitance | C_{oss} | | - | 529 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 487 | - | |
| Gate Resistance | R_g | $V_{\text{DS}} = 0\text{V}, V_{\text{GS}} = 0\text{V}, f = 1.0\text{MHz}$ | - | 4.0 | - | Ω |
| Total Gate Charge | Q_g | $V_{\text{GS}} = -10\text{V}, V_{\text{DS}} = -15\text{V}, I_{\text{D}} = -15\text{A}$ | - | 45 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 8.5 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 12.8 | - | |
| Turn-On Delay Time | $t_{\text{d}(\text{on})}$ | $V_{\text{GS}} = -10\text{V}, V_{\text{DD}} = -15\text{V}, R_g = 2.5\Omega, I_{\text{D}} = -15\text{A}$ | - | 18.9 | - | nS |
| Rise Time | t_r | | - | 15.7 | - | |
| Turn-Off Delay Time | $t_{\text{d}(\text{off})}$ | | - | 64.8 | - | |
| Fall Time | t_f | | - | 36.5 | - | |
| Diode Forward Voltage ² | V_{SD} | $I_{\text{S}} = 1\text{A}, V_{\text{GS}} = 0\text{V}$ | - | - | -1 | V |
| Continuous Source Current ^{1,5} | I_{S} | $V_{\text{G}} = V_{\text{D}} = 0\text{V}$, Force Current | - | - | -70 | A |

Note :

- 1.The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2.The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- 3.The EAS data shows Max. rating . The test condition is $V_{\text{DD}} = -25\text{V}, V_{\text{GS}} = -10\text{V}, L = 0.1\text{mH}, I_{\text{AS}} = -25\text{A}$
- 4.The power dissipation is limited by 150°C junction temperature
- 5.The data is theoretically the same as I_{D} and I_{DM} , in real applications , should be limited by total power dissipation.



Typical Electrical And Thermal Characteristics (Curves)

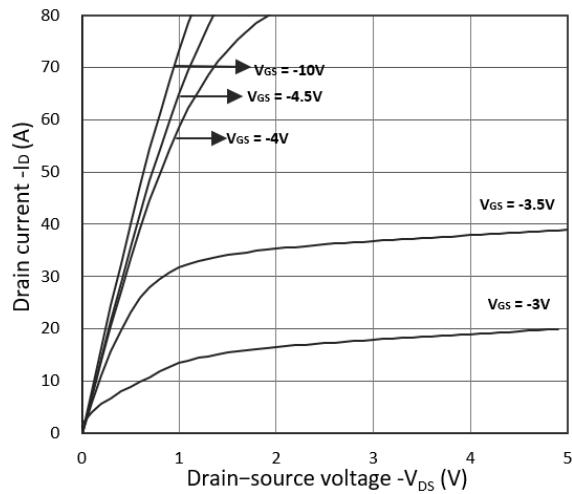


Figure 1. Output Characteristics

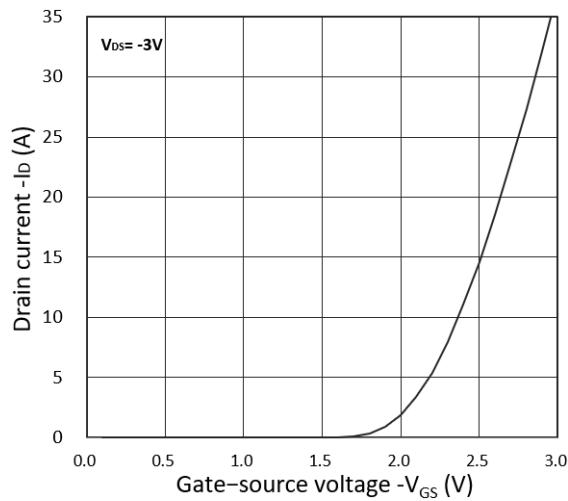


Figure 2. Transfer Characteristics

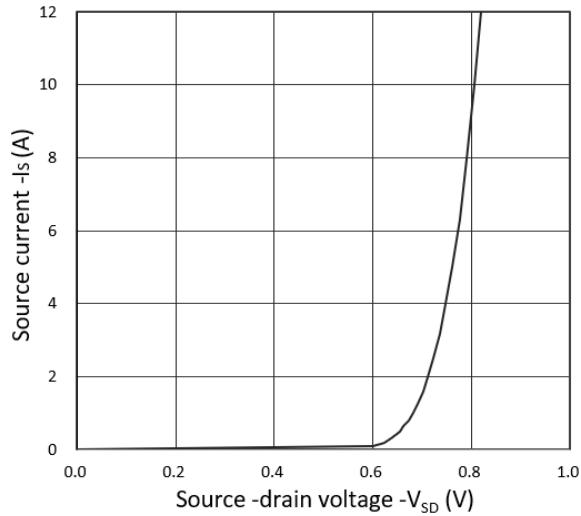


Figure 3. Forward Characteristics of Reverse

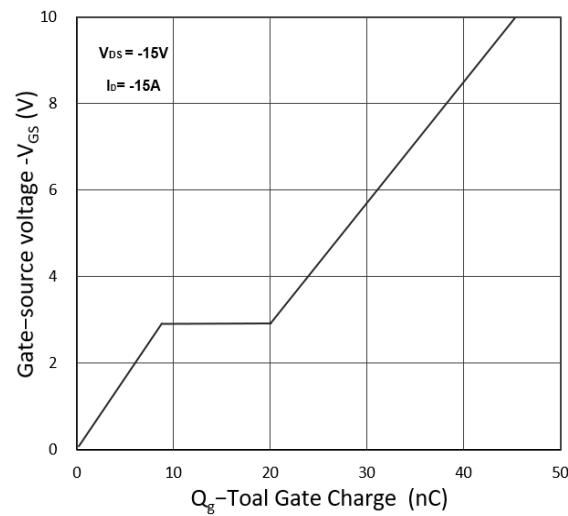


Figure 4. Gate Charge Characteristics

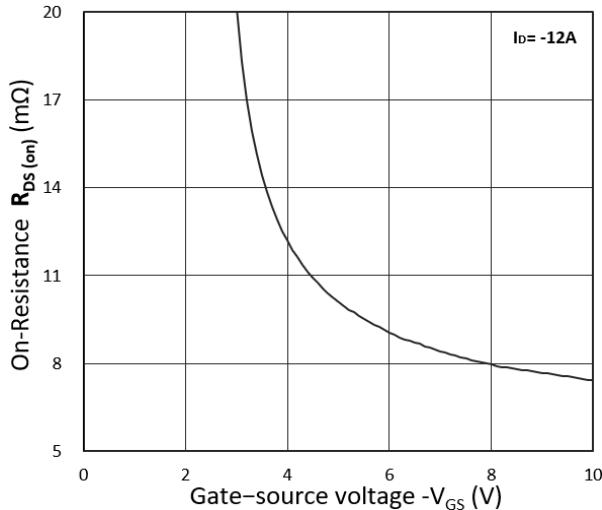


Figure 5. $R_{DS(on)}$ vs. V_{GS}

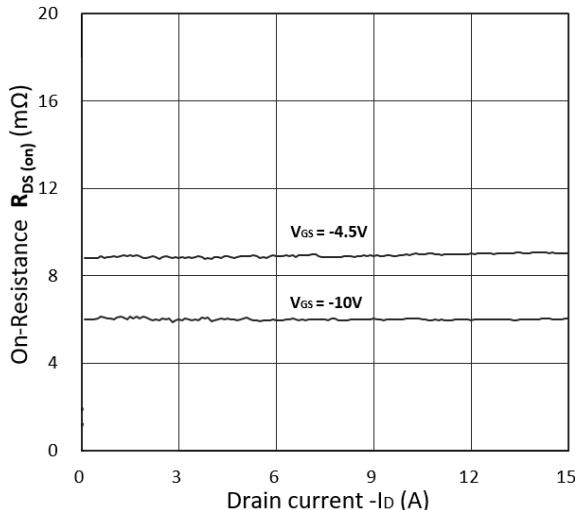


Figure 6. $R_{DS(on)}$ vs. I_D

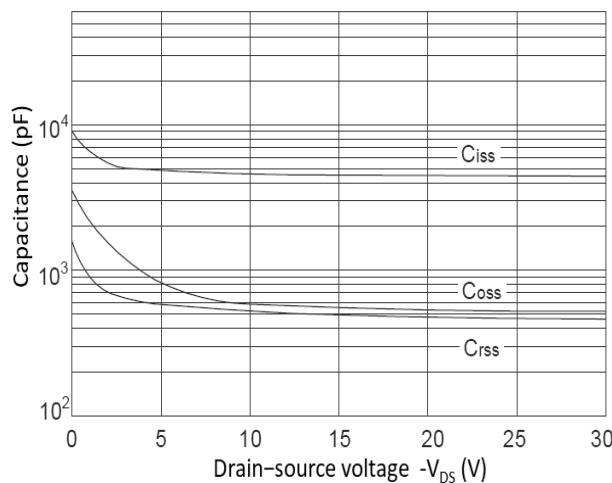


Figure 7. Capacitance Characteristics

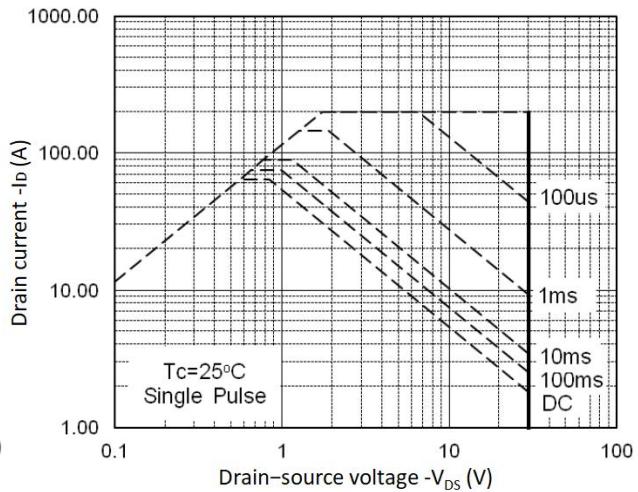


Figure 8. Safe Operating Area

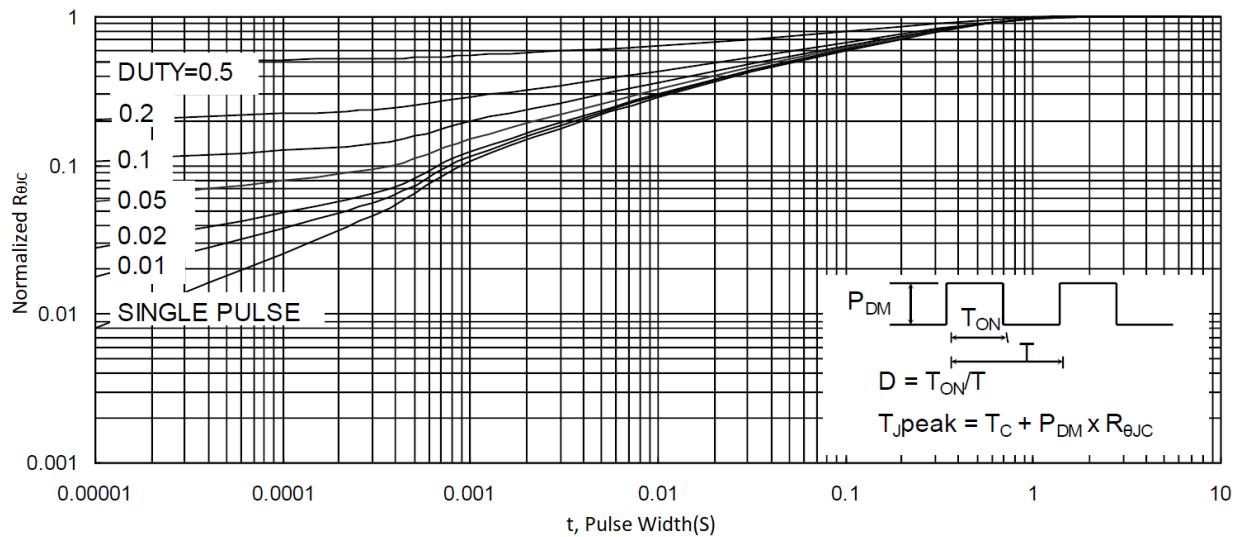


Figure 9. Normalized Maximum Transient Thermal Impedance

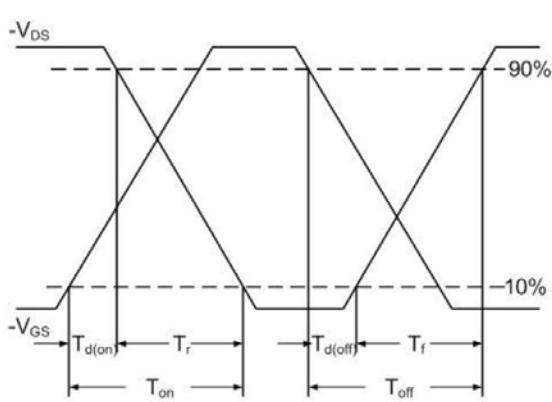


Figure 10. Switching Time Waveform

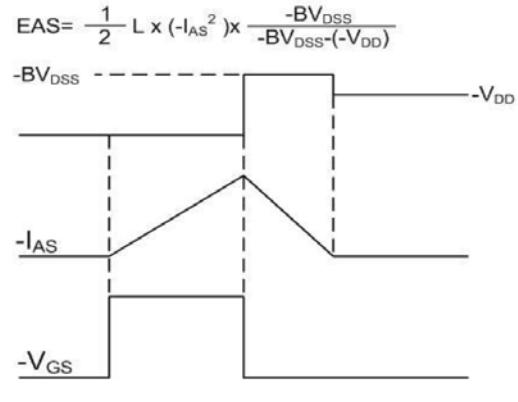


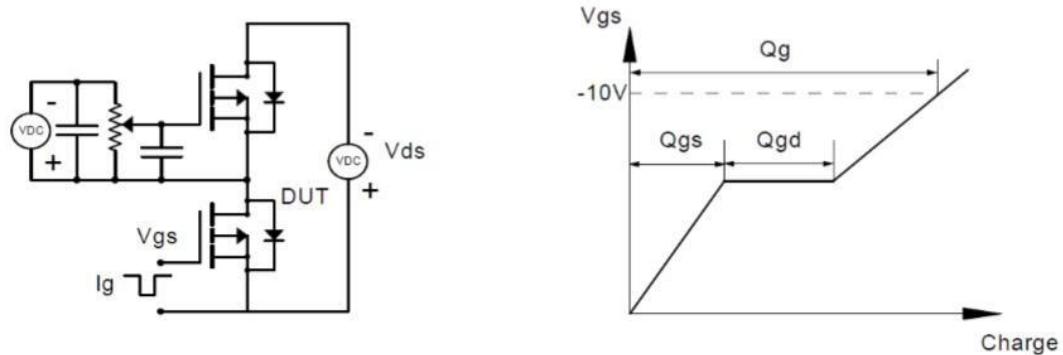
Figure 11. Unclamped Inductive Switching

Waveform

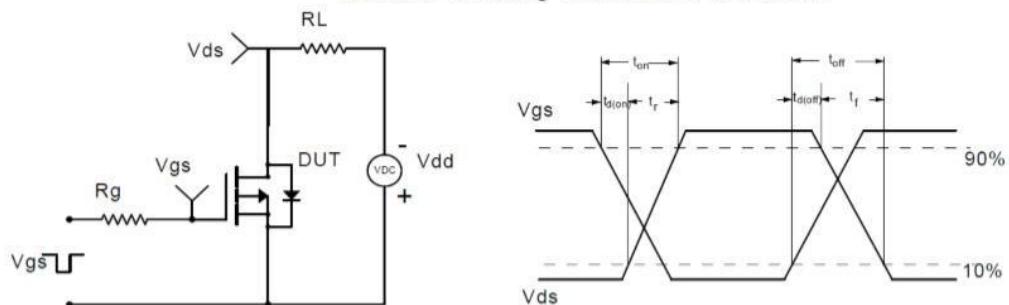


Test Circuit

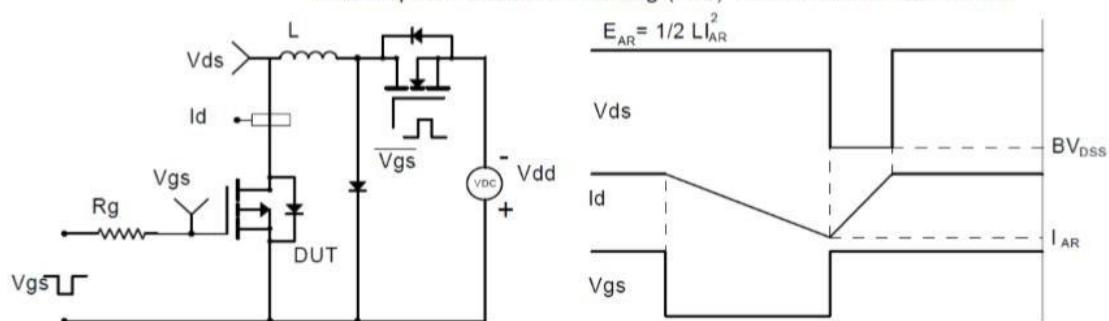
Gate Charge Test Circuit & Waveform



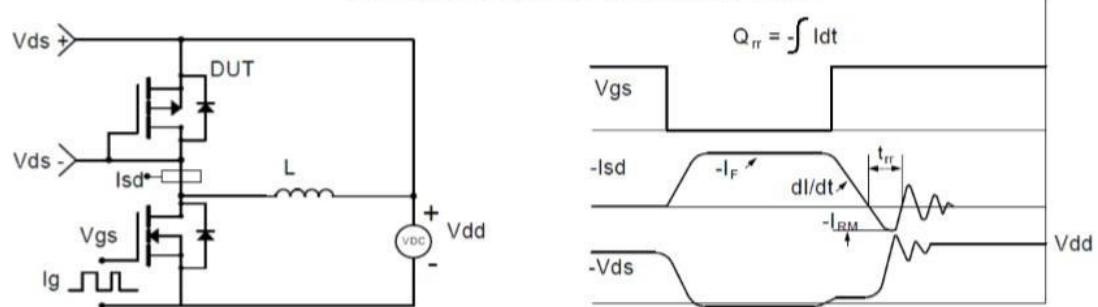
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

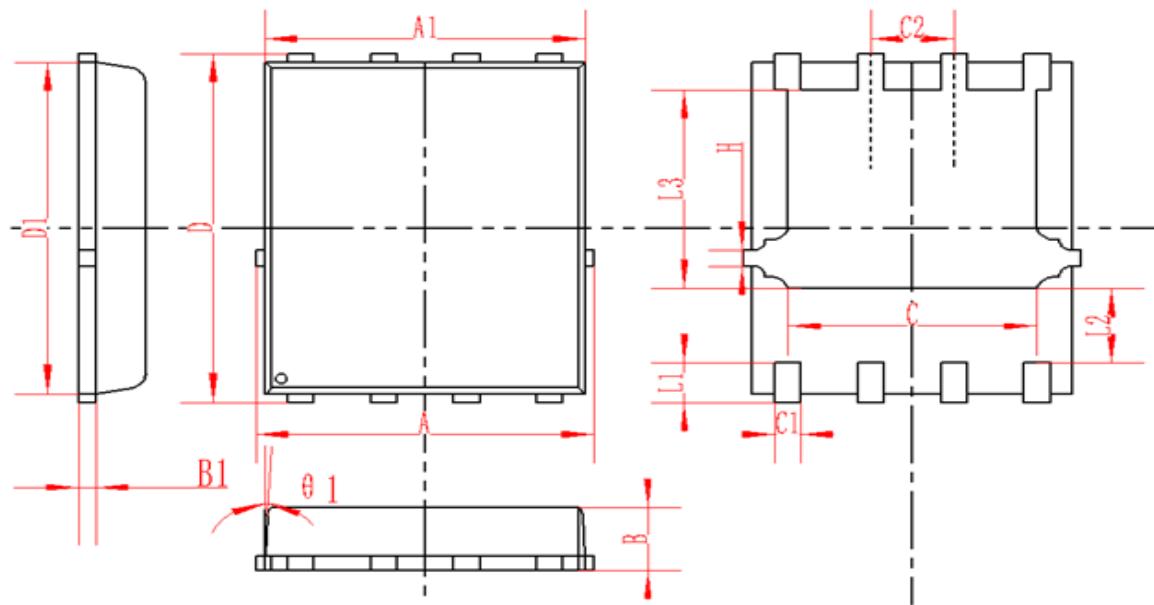


Diode Recovery Test Circuit & Waveforms





DFN5X6-8L Package Information



| SYMBOL | MM | | | INCH | | |
|--------|----------|------|-------|----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.95 | 5 | 5.05 | 0.195 | 0.197 | 0.199 |
| A1 | 4.82 | 4.9 | 4.98 | 0.190 | 0.193 | 0.196 |
| D | 5.98 | 6 | 6.02 | 0.235 | 0.236 | 0.237 |
| D1 | 5.67 | 5.75 | 5.83 | 0.223 | 0.226 | 0.230 |
| B | 0.9 | 0.95 | 1 | 0.035 | 0.037 | 0.039 |
| B1 | 0.254REF | | | 0.010REF | | |
| C | 3.95 | 4 | 4.05 | 0.156 | 0.157 | 0.159 |
| C1 | 0.35 | 0.4 | 0.45 | 0.014 | 0.016 | 0.018 |
| C2 | 1.27TYP | | | 0.5TYP | | |
| θ1 | 8° | 10° | 12° | 8° | 10° | 12° |
| L1 | 0.63 | 0.64 | 0.65 | 0.025 | 0.025 | 0.026 |
| L2 | 1.2 | 1.3 | 1.4 | 0.047 | 0.051 | 0.055 |
| L3 | 3.415 | 3.42 | 3.425 | 0.134 | 0.135 | 0.135 |
| H | 0.24 | 0.25 | 0.26 | 0.009 | 0.010 | 0.010 |



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