

MSKSEMI 美森科

SEMICONDUCTOR



ESD



TVS



TSS



MOV



GDT



PLED

BSC093N04LSG-MS

Product specification

Description

The BSC093N04LSG-MS 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.

Features

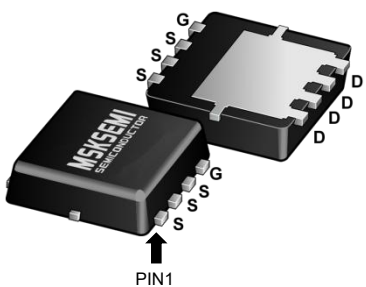
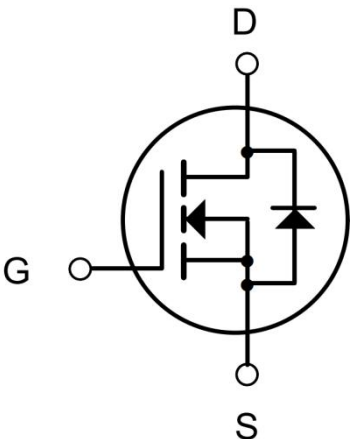

$V_{DS} = 40V$ $I_D = 50A$

$R_{DS(ON)} < 14m\Omega$ $V_{GS} = 10V$

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Reference News

| PACKAGE OUTLINE | N-Channel MOSFET | Marking |
|---|--|--|
|  <p>DFN5X6-8L</p> |  |  |

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---------------------------|---|------------|-------|
| V_{DS} | Drain- Source Voltage | 40 | V |
| V_{GS} | Gate- Source Voltage | ± 20 | V |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ ¹ | 50 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ ¹ | 38 | A |
| I_{DM} | Pulsed Drain Current ² | 160 | A |
| EAS | Single Pulse Avalanche Energy ³ | 50 | mJ |
| T_{STG} | Storage Temperature Range | -55 to 175 | °C |
| T_J | Operating Junction Temperature Range | -55 to 175 | °C |

Thermal Characteristic

| | | | |
|---|---------------|------|------|
| Thermal Resistance,Junction-to-Case ^(Note 2) | R θ JC | 1.76 | °C/W |
|---|---------------|------|------|

Electrical Characteristics (TA=25°C unless otherwise noted)

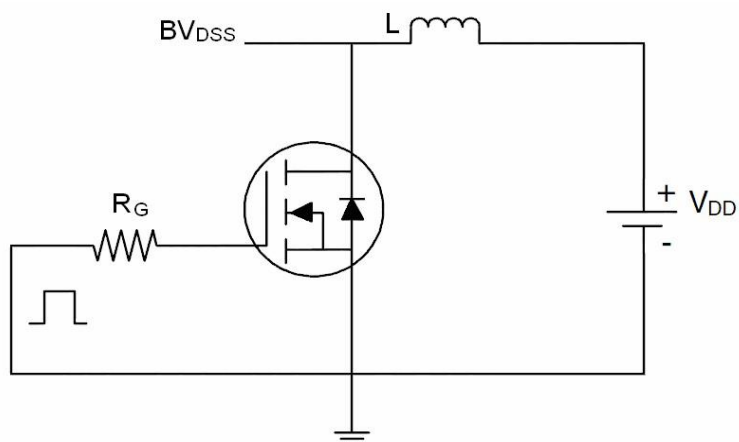
| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|--|---|--|------|------|------|-------|
| Off Characteristic | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 40 | - | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =40V, V _{GS} = 0V, | - | - | 1 | μA |
| I _{GSS} | Gate to Body Leakage Current | V _{DS} =0V, V _{GS} = ±20V | - | - | ±100 | μA |
| On Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.0 | 1.6 | 2.5 | V |
| R _{DS(on)} | Static Drain-Source on-Resistance | V _{GS} =10V, I _D =30A | - | 11 | 14 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =5V,I _D =20A | 30 | - | - | S |
| Dynamic Characteristics ^(Note 4) | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =25V, V _{GS} =0V, f=1.0MHz | - | 1540 | - | pF |
| C _{oss} | Output Capacitance | | - | 171 | - | pF |
| C _{rss} | Reverse Transfer Capacitance | | - | 115 | - | pF |
| Switching Characteristics ^(Note 4) | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =20V, I _D =20A,R _L =1Ω | - | 5 | - | ns |
| t _r | Turn-on Rise Time | | - | 24 | - | ns |
| t _{d(off)} | Turn-off Delay Time | | - | 38 | - | ns |
| t _f | Turn-off Fall Time | V _{GS} =10V, R _{GEN} =3Ω | - | 12 | - | ns |
| Q _g | Total Gate Charge | V _{DS} =30V, I _D =30A, V _{GS} =10V | - | 24 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 5.9 | - | nC |
| Q _{gd} | Gate-Drain Charge | | - | 3.6 | - | nC |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I _S | Drain Forward Current ^(Note 2) | | - | - | 48 | A |
| V _{SD} | Drain Forward Current ^(Note 3) | V _{GS} =0V, I _S =30A | - | - | 1.2 | V |
| t _{rr} | Reverse Recovery Time | T _J =25℃, IF=30A | - | 9 | - | ns |
| Q _{rr} | Reverse Recovery Charge | di/dt=100A/μs ^(Note 3) | - | 15 | - | nC |
| t _{on} | Forward Turn-On Time | Intrinsic turn-on time is negligible(turn-on is dominated br LS+LD | | | | |

Notes:

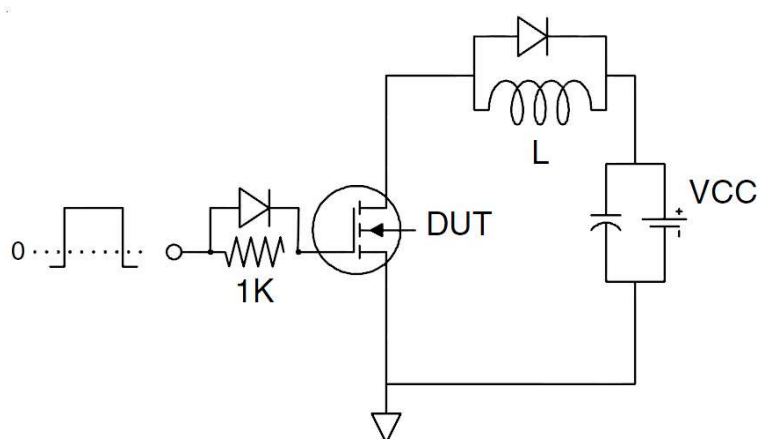
1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t≤10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle≤2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25°C, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25Ω

Test circuit

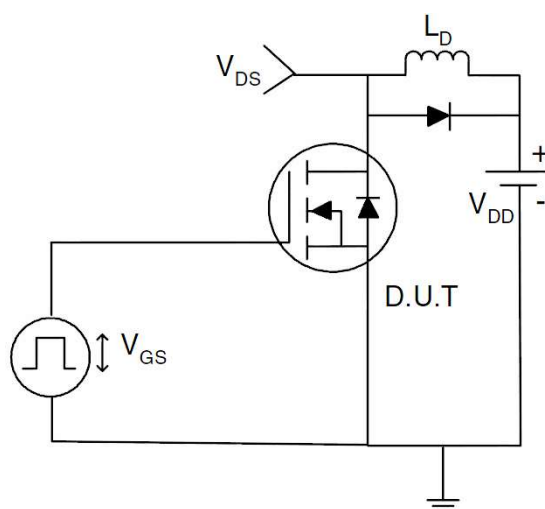
1) E_{AS} test Circuits



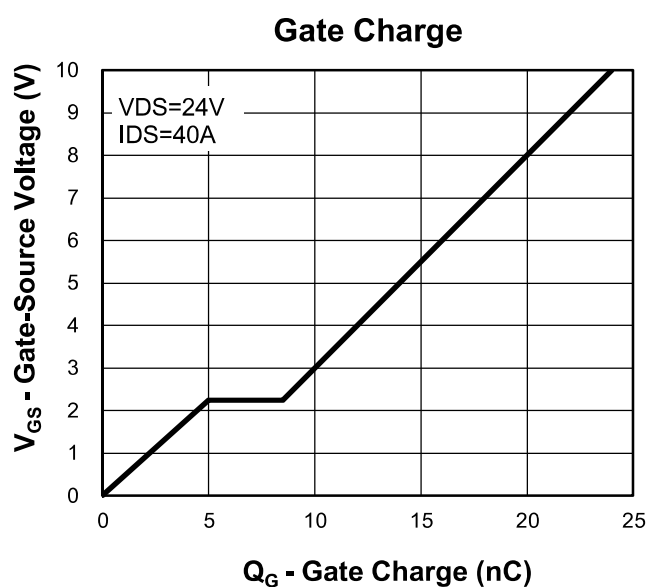
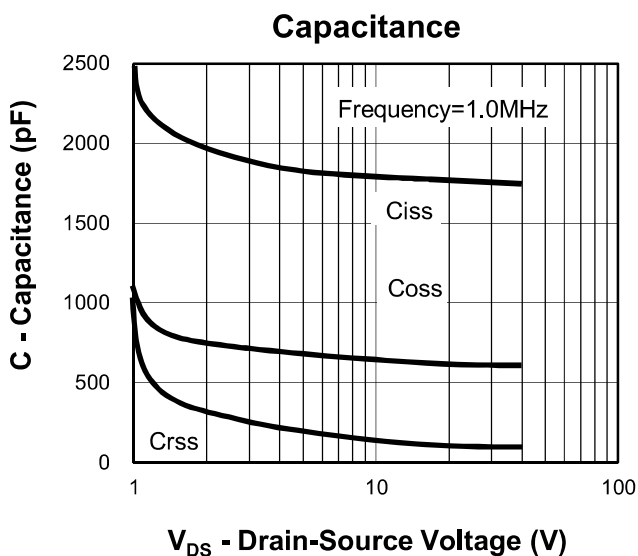
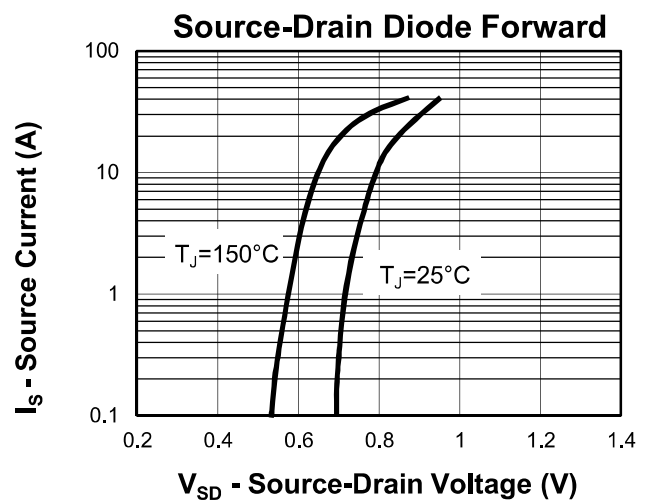
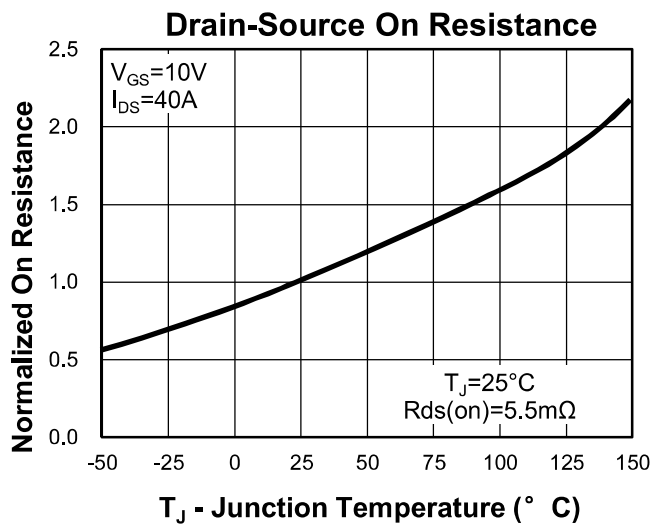
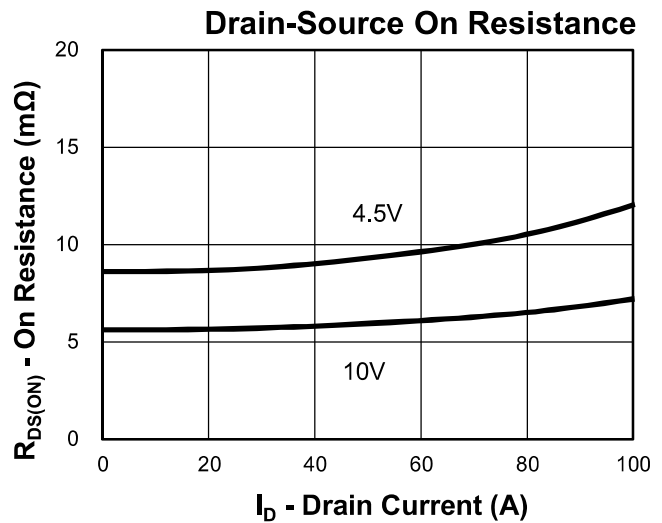
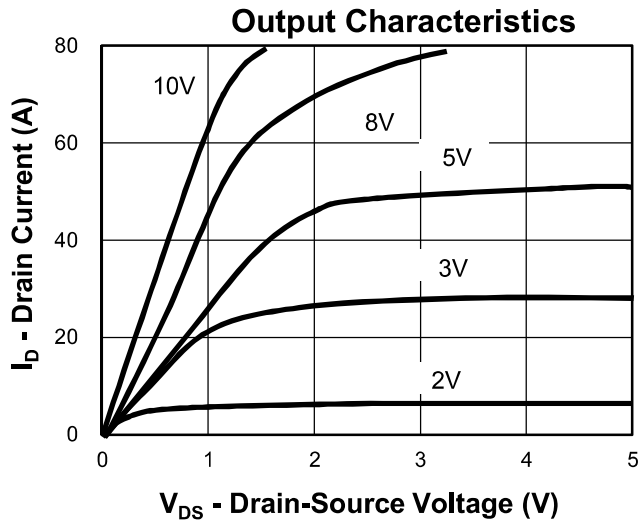
2) Gate charge test Circuit



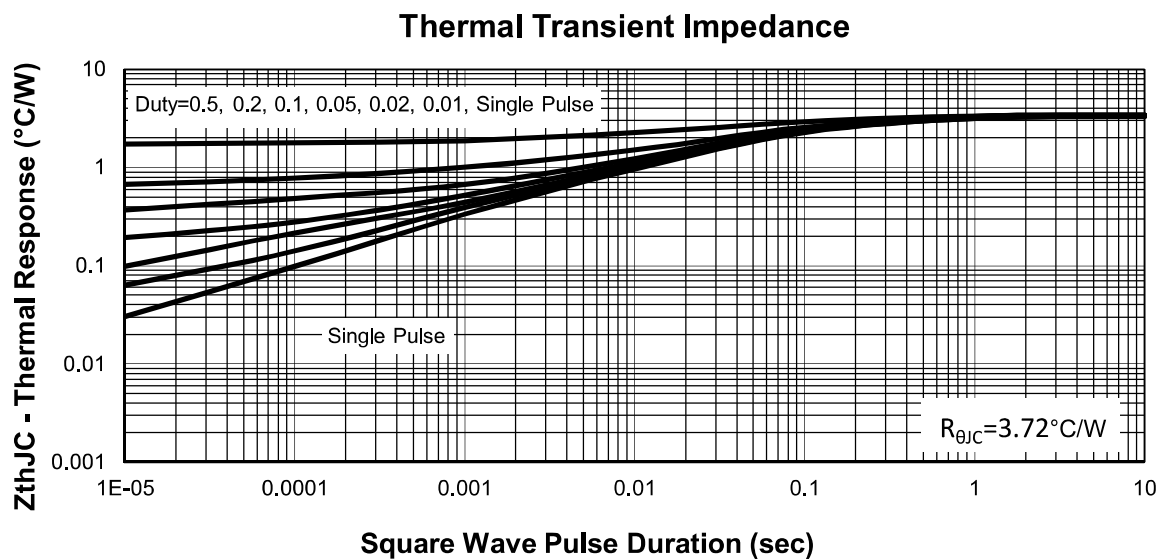
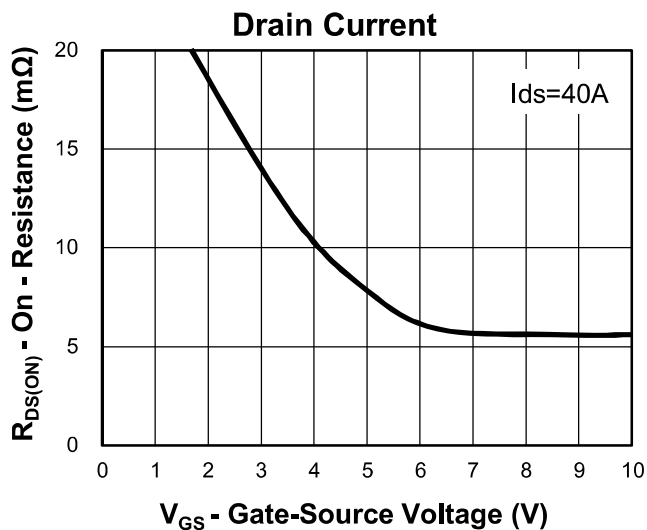
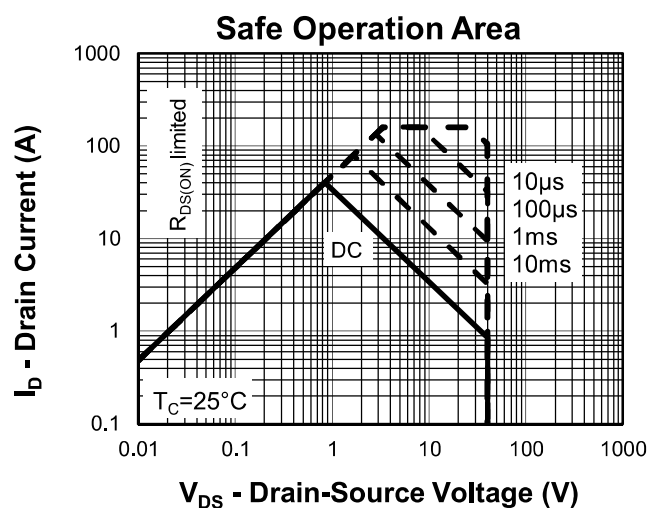
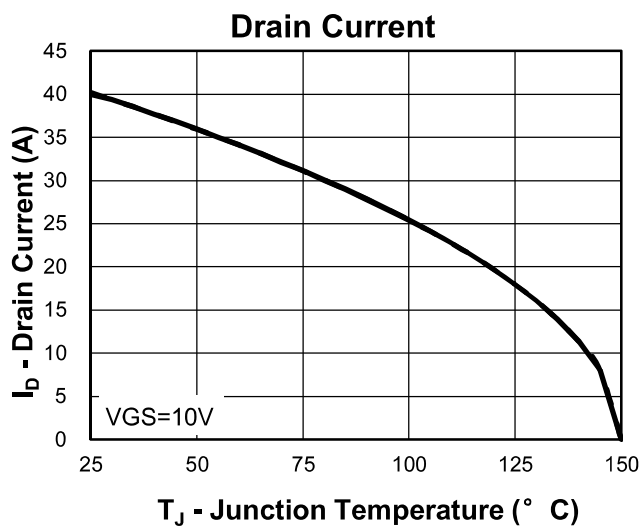
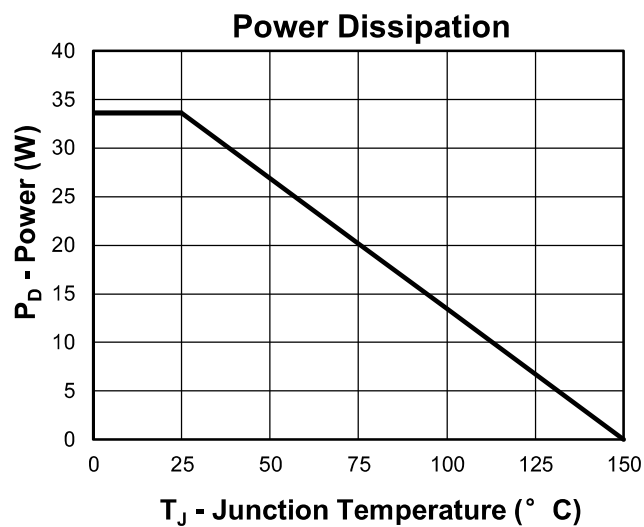
3) Switch Time Test Circuit



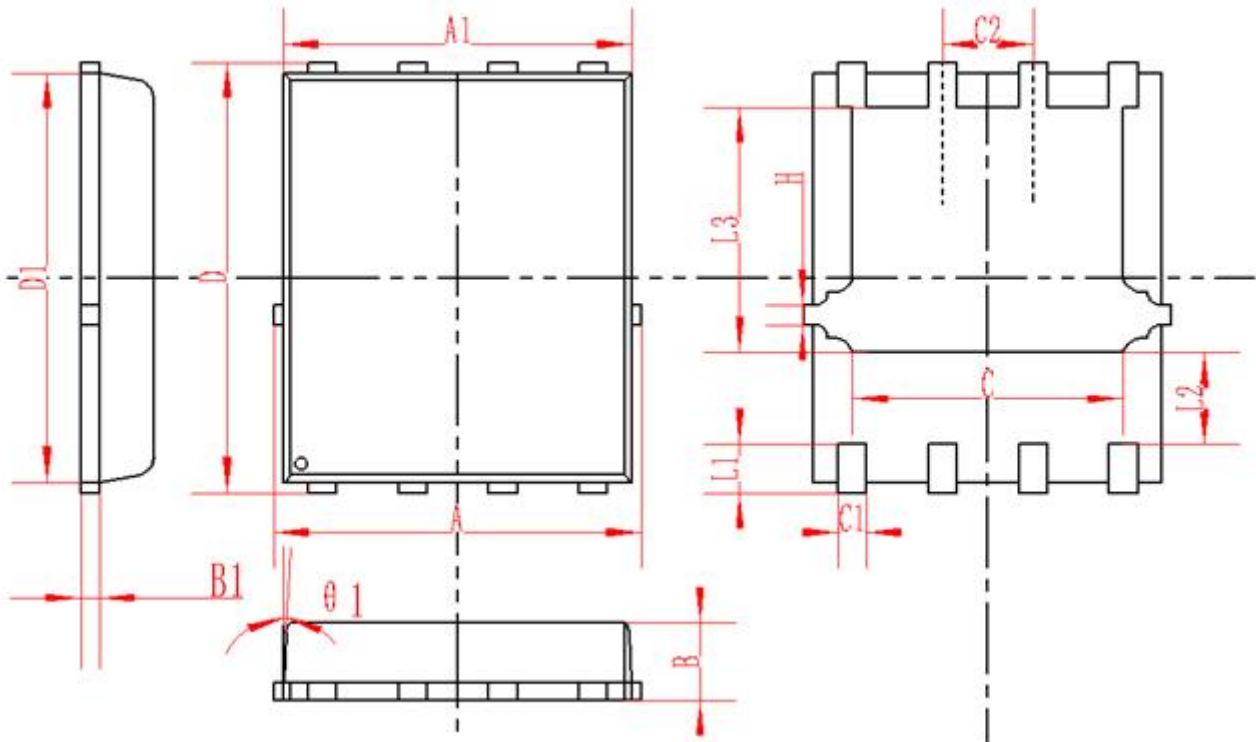
Typical Characteristics



Typical Characteristics



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 |

REEL SPECIFICATION

| P/N | PKG | QTY |
|-----------------|-----------|------|
| BSC093N04LSG-MS | DFN5X6-8L | 5000 |

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