

Features

- N-Channel, 5V Logic Level Control
- Enhancement mode
- Fast Switching
- High Effective
- Pb-free lead plating; RoHS compliant; Hg-Free

| | | |
|--|-----|------------|
| V_{DS} | 100 | V |
| $R_{DS(on),TYP} @ V_{GS}=10\text{ V}$ | 153 | m Ω |
| $R_{DS(on),TYP} @ V_{GS}=4.5\text{ V}$ | 162 | m Ω |
| I_D | 2.2 | A |



| Part ID | Package Type | Marking | Tape and reel information |
|-------------|--------------|---------|---------------------------|
| VSH160N10MS | SOT23-6L | VS09 | 3000pcs/reel |

SOT23-6L

Drain Pin1,2,5,6
Gate Pin3

Source Pin4

Maximum ratings, at $T_j=25\text{ }^\circ\text{C}$, unless otherwise specified

| Symbol | Parameter | Rating | Unit |
|---------------|--|--------------------------------|------------------|
| $V_{(BR)DSS}$ | Drain-Source breakdown voltage | 100 | V |
| I_S | Diode continuous forward current | $T_C=25^\circ\text{C}$ 1.0 | A |
| I_D | Continuous drain current @ $V_{GS}=10\text{V}$ | $T_C=25^\circ\text{C}$ 2.2 | A |
| | | $T_C=100^\circ\text{C}$ 1.4 | A |
| I_{DM} | Pulse drain current tested ① | $T_C=25^\circ\text{C}$ 8.8 | A |
| P_D | Maximum power dissipation | $T_C=25^\circ\text{C}$ 1.25 | W |
| V_{GS} | Gate-Source voltage | ± 20 | V |
| T_{STG} | Storage temperature range | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Symbol | Parameter | Typical | Unit |
|-----------------|--|---------|--------------------|
| $R_{\theta JL}$ | Thermal Resistance-Junction to Lead | 60 | $^\circ\text{C/W}$ |
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient | 100 | $^\circ\text{C/W}$ |

Typical Electrical Characteristics

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|------|------|------|------|
| Static Electrical Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250μA | 100 | -- | -- | V |
| I _{DSS} | Zero Gate Voltage Drain Current(Tc=25°C) | V _{DS} =100V, V _{GS} =0V | -- | -- | 1 | μA |
| | Zero Gate Voltage Drain Current(Tc=125°C) | V _{DS} =100V, V _{GS} =0V | -- | -- | 100 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±20V, V _{DS} =0V | -- | -- | ±100 | nA |
| V _{GS(TH)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.3 | 1.7 | 2.4 | V |
| R _{DS(ON)} | Drain-Source On-State Resistance② | V _{GS} =10V, I _D =3A | -- | 153 | 168 | mΩ |
| R _{DS(ON)} | Drain-Source On-State Resistance② | V _{GS} =4.5V, I _D =2A | -- | 162 | 180 | mΩ |
| Dynamic Electrical Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =30V, V _{GS} =0V, f=1MHz | 200 | 280 | 350 | pF |
| C _{oss} | Output Capacitance | | -- | 30 | 80 | pF |
| C _{rss} | Reverse Transfer Capacitance | | -- | 20 | 70 | pF |
| R _g | Gate Resistance | f=1MHz | -- | 6.3 | -- | Ω |
| Q _g | Total Gate Charge | V _{DS} =50V, I _D =3A, V _{GS} =10V | -- | 7 | -- | nC |
| Q _{gs} | Gate-Source Charge | | -- | 1.6 | -- | nC |
| Q _{gd} | Gate-Drain Charge | | -- | 2 | -- | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =50V, I _D =3A, R _G =3Ω, V _{GS} =10V | -- | 7 | -- | nS |
| t _r | Turn-on Rise Time | | -- | 4.5 | -- | nS |
| t _{d(off)} | Turn-Off Delay Time | | -- | 18 | -- | nS |
| t _f | Turn-Off Fall Time | | -- | 4.5 | -- | nS |
| Source- Drain Diode Characteristics @ T_J = 25°C (unless otherwise stated) | | | | | | |
| V _{SD} | Forward on voltage | I _{SD} =3A, V _{GS} =0V | -- | 0.8 | 1.2 | V |
| t _{rr} | Reverse Recovery Time | T _J =25°C, I _{sd} =3A, V _{GS} =0V | -- | 16 | -- | nS |
| Q _{rr} | Reverse Recovery Charge | di/dt=500A/μs | | 54 | | nC |

NOTE:

- ① Repetitive rating; pulse width limited by max. junction temperature.
 ② Pulse width ≤ 300μs; duty cycle ≤ 2%.



Typical Characteristics

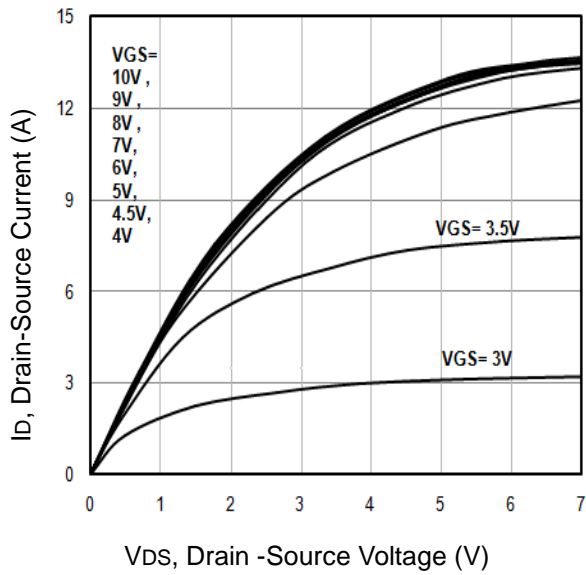


Fig1. Typical Output Characteristics

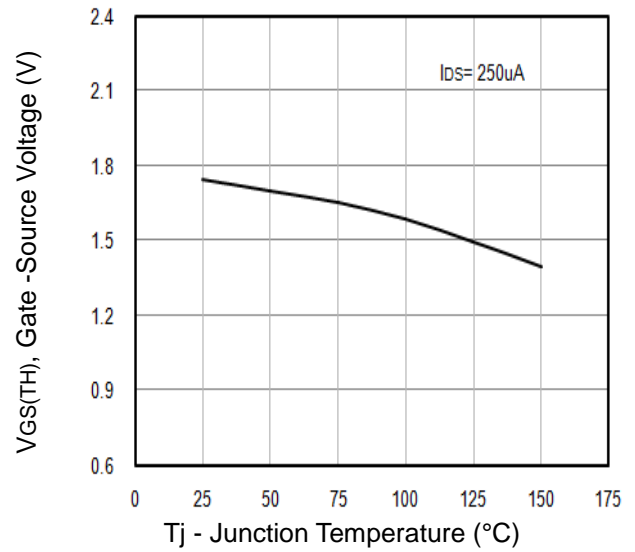


Fig2. Threshold Voltage Vs. Temperature

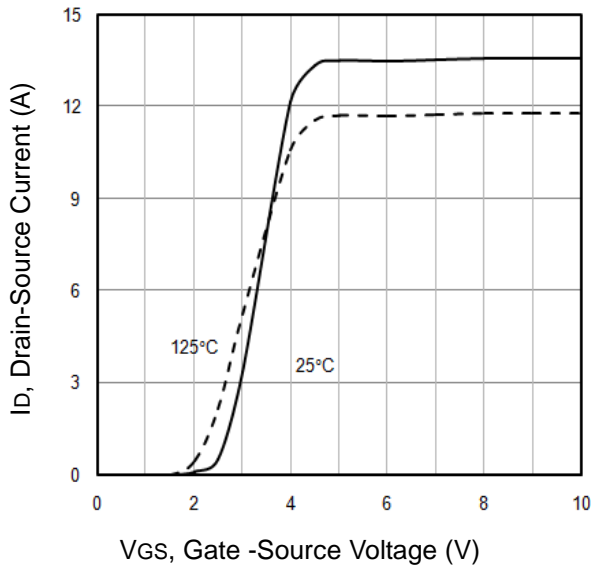


Fig3. Typical Transfer Characteristics

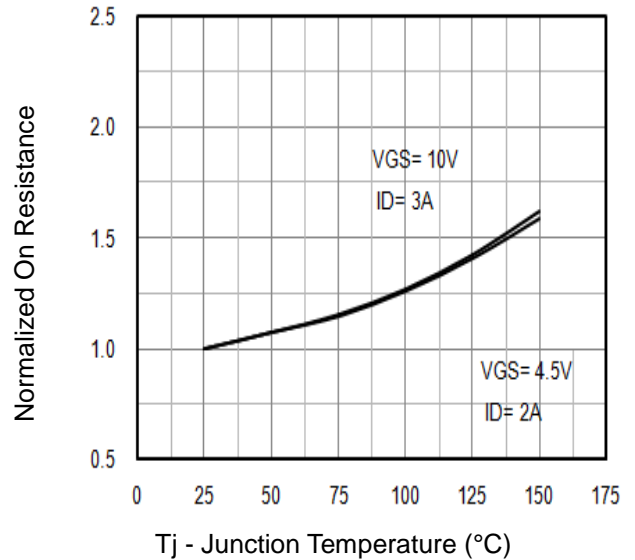


Fig4. Normalized On-Resistance Vs. Temperature

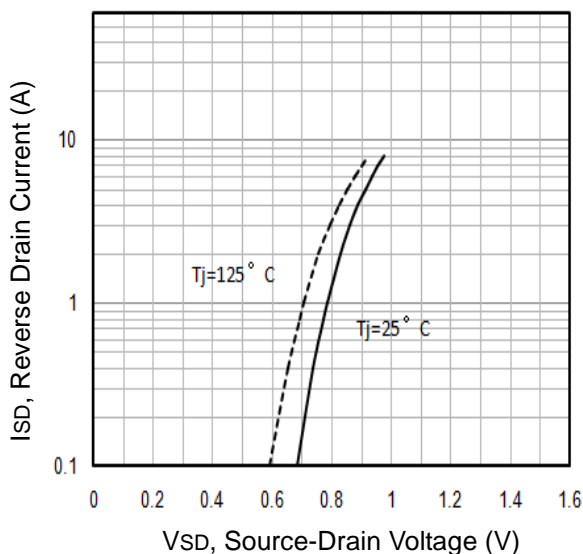


Fig5. Typical Source-Drain Diode Forward Voltage

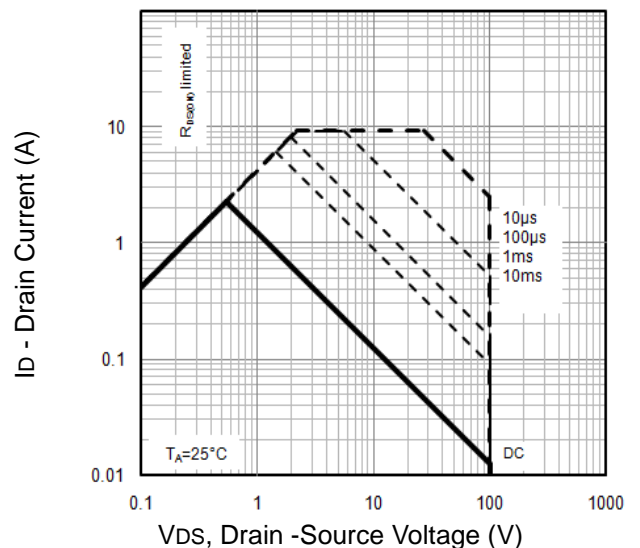


Fig6. Maximum Safe Operating Area

Typical Characteristics

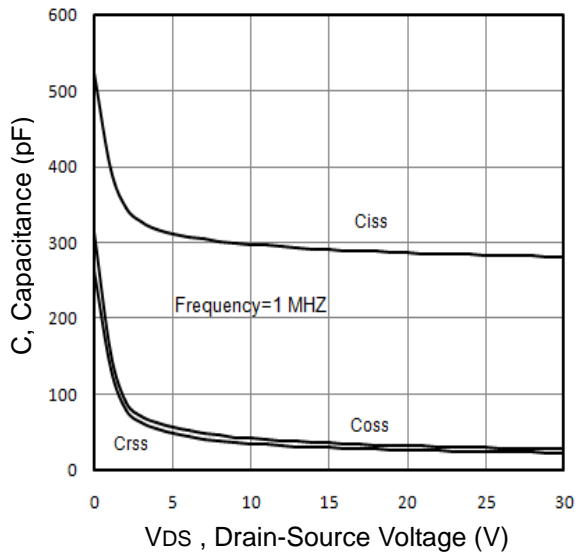


Fig7. Typical Capacitance Vs.Drain-Source Voltage

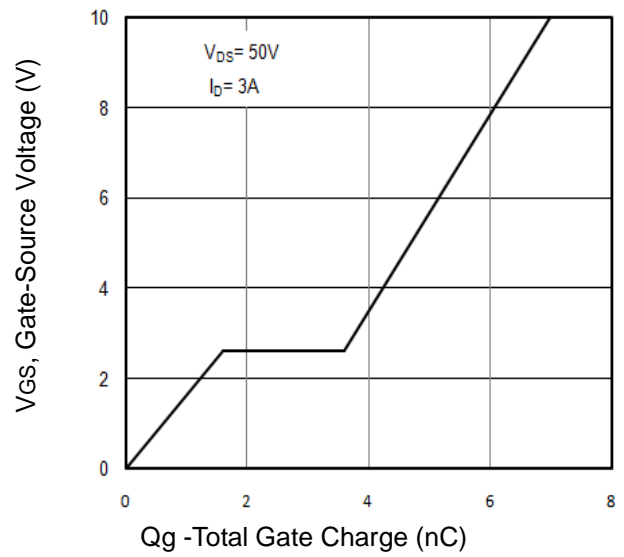


Fig8. Typical Gate Charge Vs.Gate-Source Voltage

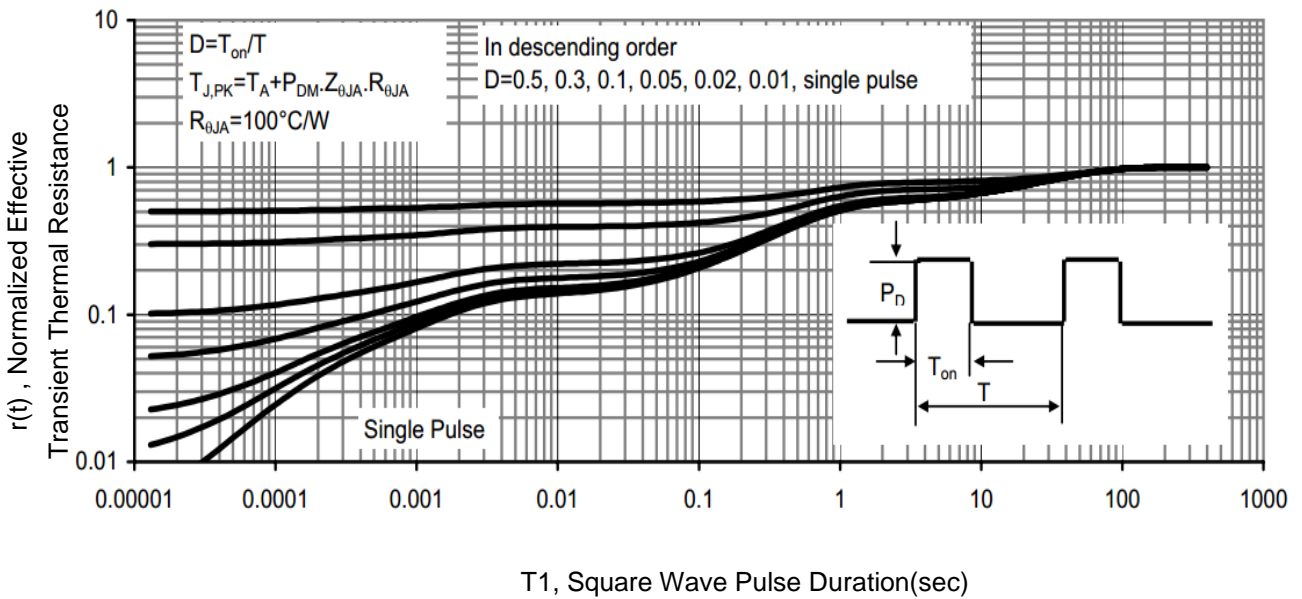


Fig9. T1, Transient Thermal Response Curve

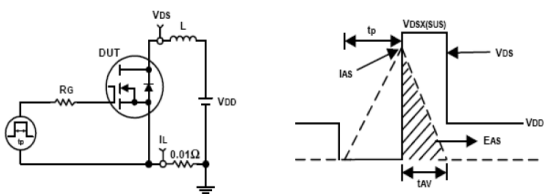


Fig10. Unclamped Inductive Test Circuit and waveforms

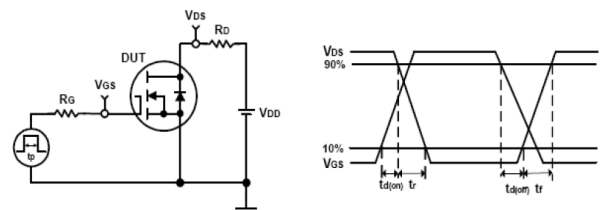
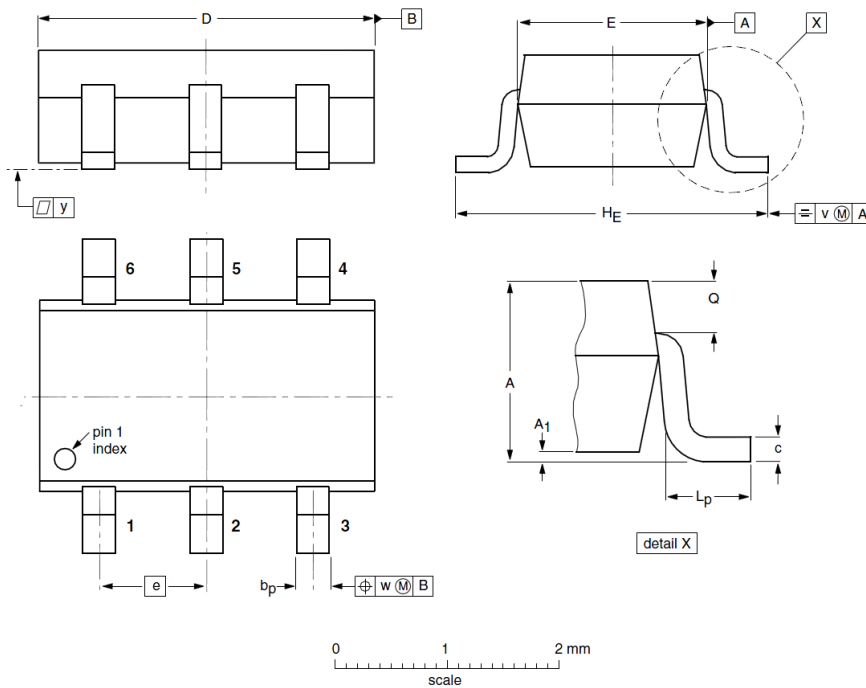


Fig11. Switching Time Test Circuit and waveforms

SOT23-6L Package Outline



| Label | Dimensions (unit: mm) | | |
|----------------|-----------------------|------|------|
| | Min | Typ | Max |
| A | 0.90 | 1.07 | 1.45 |
| b _p | 0.30 | 0.35 | 0.40 |
| D | 2.70 | 2.92 | 3.10 |
| e | -- | 0.95 | -- |
| L _p | 0.30 | 0.45 | 0.60 |
| v | -- | 0.20 | -- |
| y | -- | 0.10 | |
| A ₁ | 0.01 | 0.05 | 0.15 |
| c | 0.10 | 0.15 | 0.22 |
| E | 1.30 | 1.55 | 1.70 |
| H _E | 2.50 | 2.80 | 3.00 |
| Q | 0.23 | 0.29 | 0.33 |
| w | -- | 0.20 | -- |

Notes:

1. Follow JEDEC MS-012.
2. Dimension "D" does NOT include mold flash, protrusions or gate burrs. Mold flash, protrusions or gate burrs shall not exceed 0.15mm per side.
3. Dimension "E" does NOT include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.25mm per side.
4. Dimension "b_p" does NOT include dambar protrusion. Allowable dambar protrusion shall be 0.1mm total in excess of "b_p" dimension at maximum material condition. The dambar cannot be located on the lower radius of the foot.

Customer Service

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