

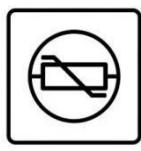
ESD



TVS



TSS



MOV



GDT



PLED

L2N7002KLT1G-MS

Product specification



Features

- 60V,0.3A, $R_{DS(ON)} = 2.2\Omega$ @ $V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- G-S ESD Protection Diode Embedded
- ESD protected up to 2KV

Application

- Motor Drive
- Power Tools
- LED Lighting

| BVDSS | RDSON | ID |
|-------|-------|------|
| 60V | 2.2Ω | 0.3A |

Reference News

| PACKAGE OUTLINE | Pin Configuration | Marking |
|-----------------|-------------------|---------|
| SOT-23 | | |

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

| Symbol | Parameter | Rating | Units |
|-----------|--|------------|-------|
| V_{DS} | Drain- Source Voltage | 60 | V |
| V_{GS} | Gate- Source Voltage | ± 20 | V |
| I_D | Drain Current – Continuous ($T_c=25^\circ C$) | 0.3 | A |
| | Drain Current – Continuous ($T_c=100^\circ C$) | 0.1 | A |
| I_{DM} | Drain Current – Pulsed ¹ | 0.8 | A |
| P_D | Power Dissipation ($T_c=25^\circ C$) | 0.35 | W |
| | Power Dissipation – Derate above 25°C | 0.003 | W/°C |
| T_{STG} | Storage Temperature Range | -50 to 150 | °C |
| T_J | Operating Junction Temperature Range | -50 to 150 | °C |

Thermal Characteristics

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|------|
| $R_{\theta JA}$ | Thermal Resistance Junction to ambient | --- | 357 | °C/W |

Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Off Characteristics

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------|--------------------------------|---|------|------|----------|---------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 60 | --- | --- | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=60V, V_{GS}=0V, T_J=25^{\circ}C$ | --- | --- | 1 | μA |
| | | $V_{DS}=48V, V_{GS}=0V, T_J=125^{\circ}C$ | --- | --- | 10 | μA |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS} \pm 20V, V_{DS}=0V$ | --- | --- | ± 10 | μA |

On Characteristics

| | | | | | | |
|--------------|-----------------------------------|-------------------------------|-----|-----|-----|----------|
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=10V, I_D=0.3A$ | --- | 2.2 | 2.8 | Ω |
| | | $V_{GS}=4.5V, I_D=0.2A$ | --- | 2.4 | 3.0 | Ω |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1 | 1.6 | 2.5 | V |
| g_{fs} | Forward Transconductance | $V_{DS}=10V, I_D=0.3A$ | --- | 0.5 | --- | S |

Dynamic and switching Characteristics

| | | | | | | |
|--------------|-------------------------------------|---|-----|------|-----|----|
| Q_g | Total Gate Charge ^{2, 3} | $V_{DS}=30V, V_{GS}=10V, I_D=1A$ | --- | 3.7 | 5.6 | nC |
| Q_{gs} | Gate-Source Charge ^{2, 3} | | --- | 0.9 | 1.4 | |
| Q_{gd} | Gate-Drain Charge ^{2, 3} | | --- | 0.4 | 0.6 | |
| $T_{d(on)}$ | Turn-On Delay Time ^{2, 3} | $V_{DD}=30V, V_{GS}=10V, R_G=6\Omega$ $I_D=0.2A$ | --- | 3 | 6 | ns |
| T_r | Rise Time ^{2, 3} | | --- | 5 | 10 | |
| $T_{d(off)}$ | Turn-Off Delay Time ^{2, 3} | | --- | 14 | 27 | |
| T_f | Fall Time ^{2, 3} | | --- | 9 | 17 | |
| C_{iss} | Input Capacitance | $V_{DS}=30V, V_{GS}=0V, F=1MHz$ | --- | 25.5 | 38 | pF |
| C_{oss} | Output Capacitance | | --- | 17 | 26 | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 7.8 | 12 | |

Drain-Source Diode Characteristics and Maximum Ratings

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|----------|---------------------------|--------------------------------------|------|------|------|------|
| I_s | Continuous Source Current | $V_G=V_D=0V$, Force Current | --- | --- | 0.3 | A |
| I_{SM} | Pulsed Source Current | | --- | --- | 1.2 | A |
| V_{SD} | Diode Forward Voltage | $V_{GS}=0V, I_s=1A, T_J=25^{\circ}C$ | --- | --- | 1 | V |
| t_{rr} | Reverse Recovery Time | | --- | 3.4 | --- | ns |
| Q_{rr} | Reverse Recovery Charge | $T_J=25^{\circ}C$ | --- | 0.7 | --- | nC |

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

ELECTRICAL CHARACTERISTICS CURVE

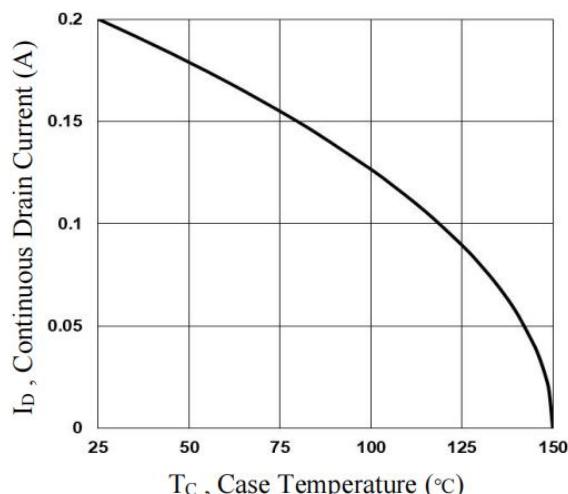


Fig.1 Continuous Drain Current vs. T_c

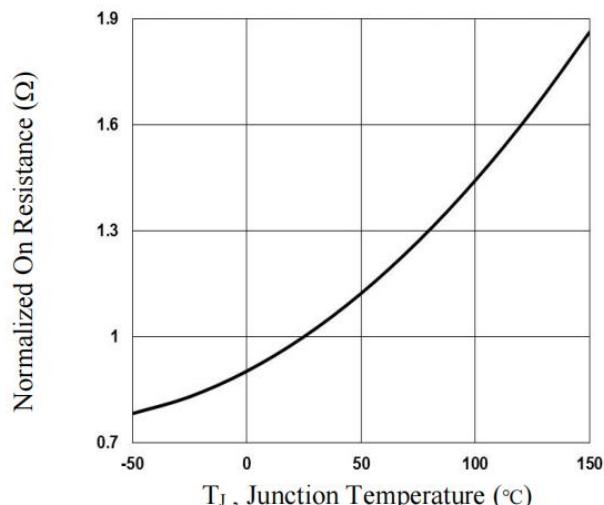


Fig.2 Normalized RDS(on) vs. T_j

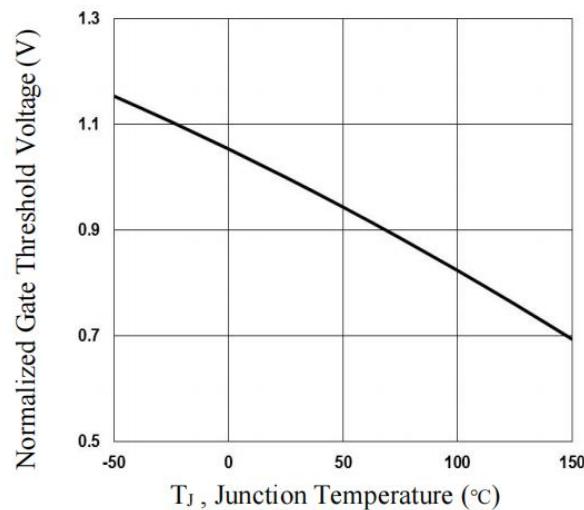


Fig.3 Normalized V_{th} vs. T_j

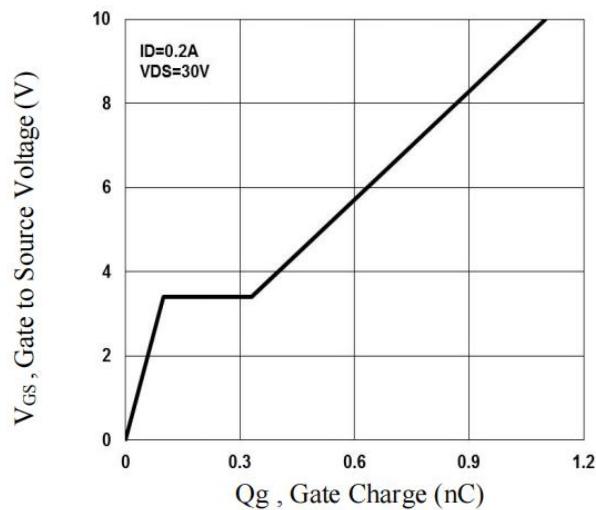


Fig.4 Gate Charge Waveform

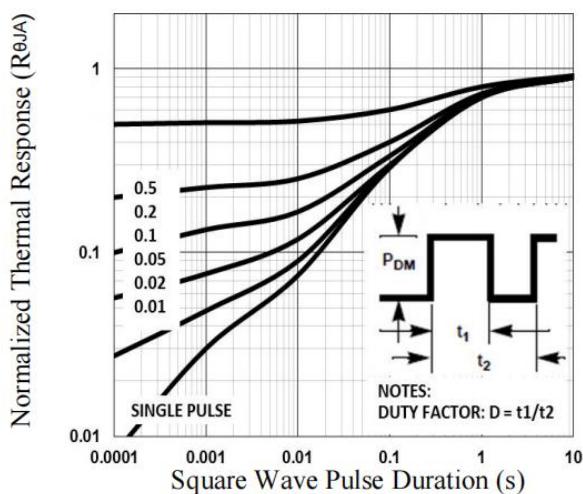


Fig.5 Normalized Transient Impedance

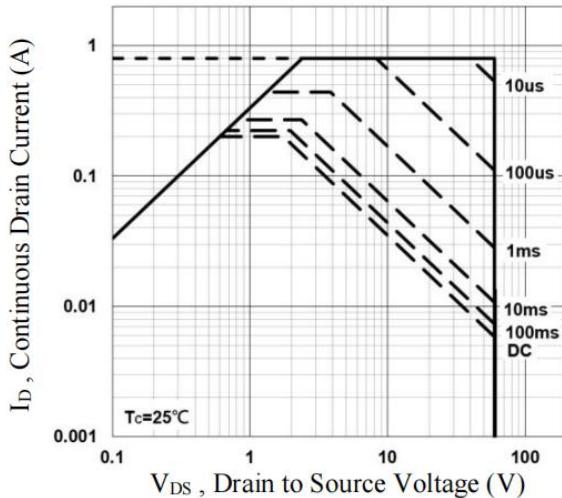
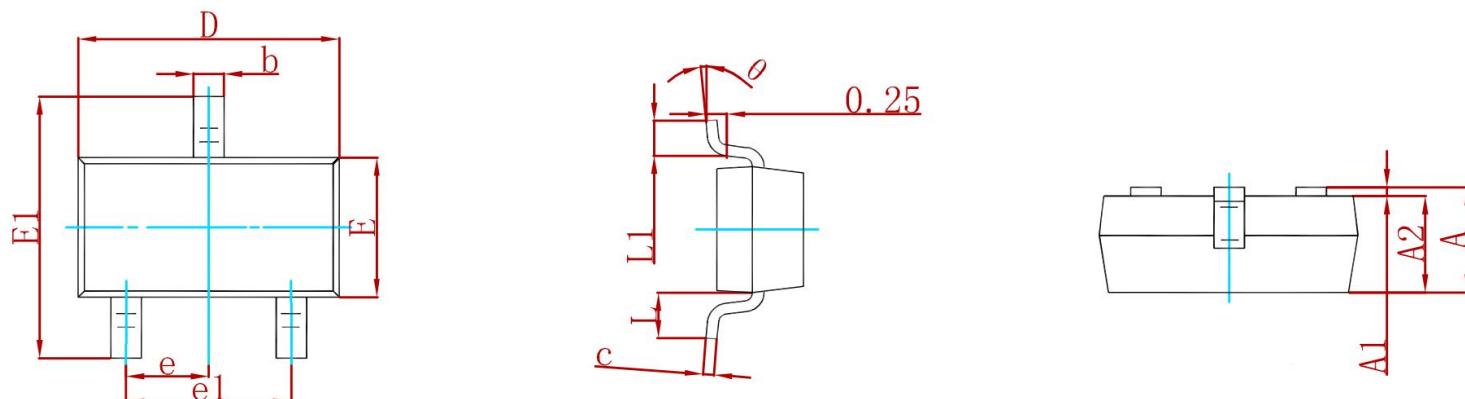
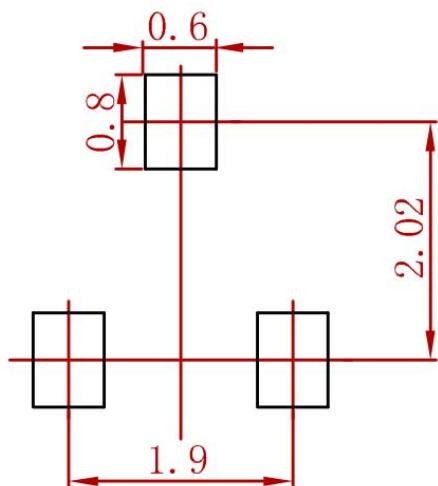


Fig.6 Maximum Safe Operation Area

PACKAGE MECHANICAL DATA


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

Suggested Pad Layout

Note:

1. Controlling dimension:in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

REEL SPECIFICATION

| P/N | PKG | QTY |
|-----------------|--------|------|
| L2N7002KLT1G-MS | SOT-23 | 3000 |

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