

Features

- 20V/12A,
 $R_{DS(ON)} = 7.5m\Omega(Typ.)@V_{GS}=10V$
 $R_{DS(ON)} = 8m\Omega(Typ.)@V_{GS}=4.5V$
 $R_{DS(ON)} = 10m\Omega(Typ.)@V_{GS}=2.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged

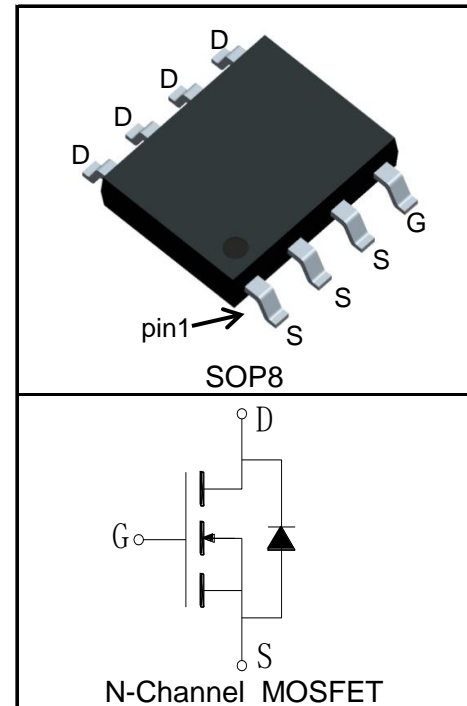
Applications

- Power Management
- Battery Protection



Halogen-Free

Pin Description



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit | |
|--|--|------------------------|--------------------|---|
| Common Ratings ($T_A=25^\circ\text{C}$ Unless Otherwise Noted) | | | | |
| V_{DSS} | Drain-Source Voltage | 20 | V | |
| V_{GSS} | Gate-Source Voltage | ± 12 | | |
| T_J | Maximum Junction Temperature | 150 | $^\circ\text{C}$ | |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ\text{C}$ | |
| I_S | Diode Continuous Forward Current | $T_A=25^\circ\text{C}$ | 2.9 | A |
| Mounted on Large Heat Sink | | | | |
| $I_{DP}^{①}$ | 300 μs Pulse Drain Current Tested | $T_A=25^\circ\text{C}$ | 48 | A |
| $I_D^{②}$ | Continuous Drain Current($V_{GS}=4.5V$) | $T_A=25^\circ\text{C}$ | 12 | A |
| | | $T_A=70^\circ\text{C}$ | 9.6 | |
| P_D | Maximum Power Dissipation | $T_A=25^\circ\text{C}$ | 2.5 | W |
| | | $T_A=70^\circ\text{C}$ | 1.6 | |
| $R_{\theta JC}$ | Thermal Resistance-Junction to Case | - | $^\circ\text{C/W}$ | |
| $R_{\theta JA}^{③}$ | Thermal Resistance-Junction to Ambient | 50 | $^\circ\text{C/W}$ | |
| Drain-Source Avalanche Ratings | | | | |
| $E_{AS}^{④}$ | Avalanche Energy, Single Pulsed | 45 | mJ | |

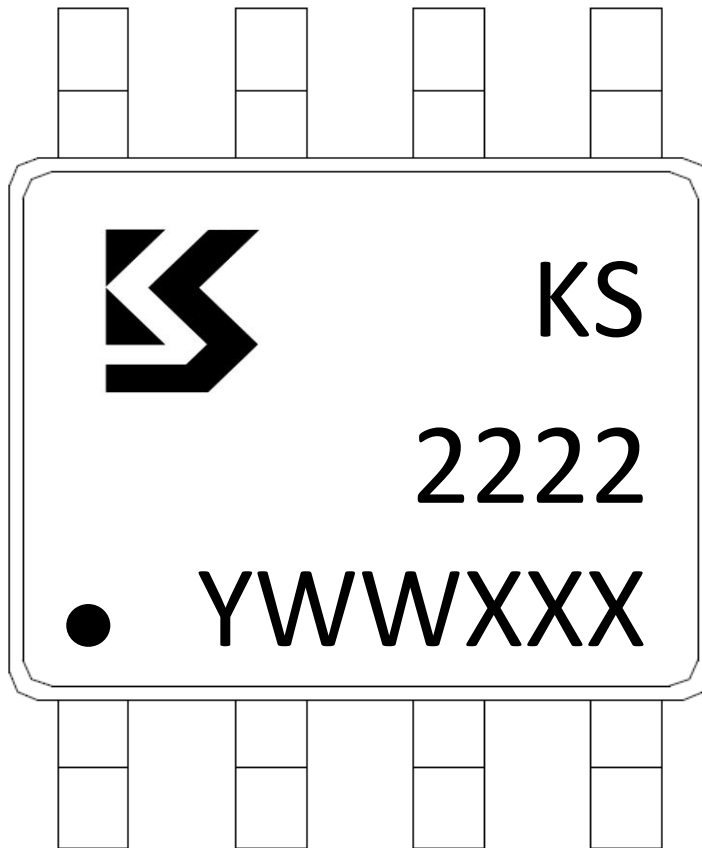
Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | KS2222HB | | | Unit |
|--|----------------------------------|--|----------|------|-----------|-----------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=250\mu A$ | 20 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=20V, V_{GS}=0V$ | | | 1 | μA |
| | | $T_J=125^\circ\text{C}$ | | | 30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 0.4 | 0.7 | 1 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 12V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^{(5)}$ | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=10A$ | | 7.5 | 9 | $m\Omega$ |
| | | $V_{GS}=4.5V, I_{DS}=8A$ | | 8 | 11 | $m\Omega$ |
| | | $V_{GS}=2.5V, I_{DS}=4A$ | | 10 | 15 | $m\Omega$ |
| Diode Characteristics | | | | | | |
| $V_{SD}^{(5)}$ | Diode Forward Voltage | $I_{SD}=10A, V_{GS}=0V$ | | 0.85 | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=10A, dI_{SD}/dt=100A/\mu s$ | | 10 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 21 | | nC |
| Dynamic Characteristics⁽⁶⁾ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | | 2.3 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=10V,$ Frequency=1.0MHz | | 1250 | | pF |
| C_{oss} | Output Capacitance | | | 215 | | |
| C_{riss} | Reverse Transfer Capacitance | | | 170 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=10V, I_{DS}=10A,$ $V_{GEN}=4.5V, R_G=3\Omega$ | | 3 | | ns |
| t_r | Turn-on Rise Time | | | 6 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 11 | | |
| t_f | Turn-off Fall Time | | | 8 | | |
| Gate Charge Characteristics⁽⁶⁾ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=10V, V_{GS}=4.5V,$ $I_{DS}=10A$ | | 16 | | nC |
| Q_{gs} | Gate-Source Charge | | | 7 | | |
| Q_{gd} | Gate-Drain Charge | | | 6 | | |

- Notes:
- ① Pulse width limited by safe operating area.
 - ② Calculated continuous current based on maximum allowable junction temperature.
 - ③ When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 - ④ Limited by T_{Jmax} , starting $T_J = 25^\circ\text{C}$, $L = 0.1\text{mH}$, $R_G = 25\Omega$, $I_{AS} = 30A$, $V_{GS} = 10V$.
 - ⑤ Pulse test; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 - ⑥ Guaranteed by design, not subject to production testing.

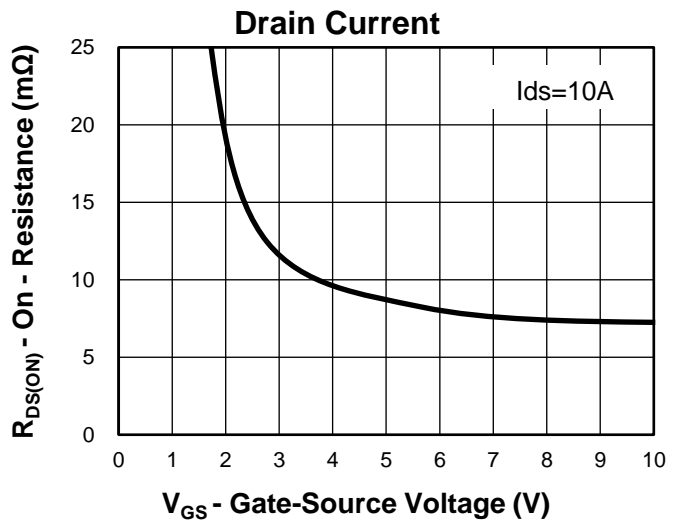
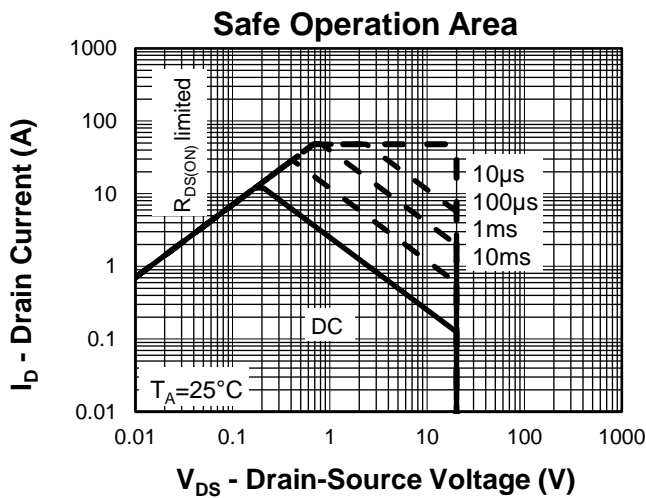
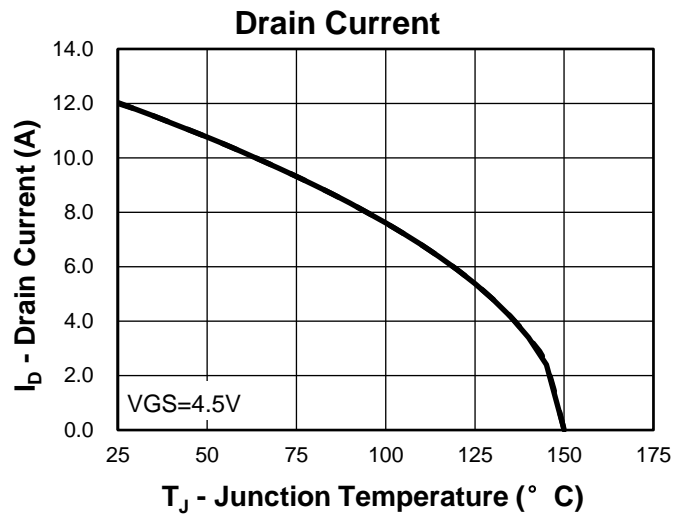
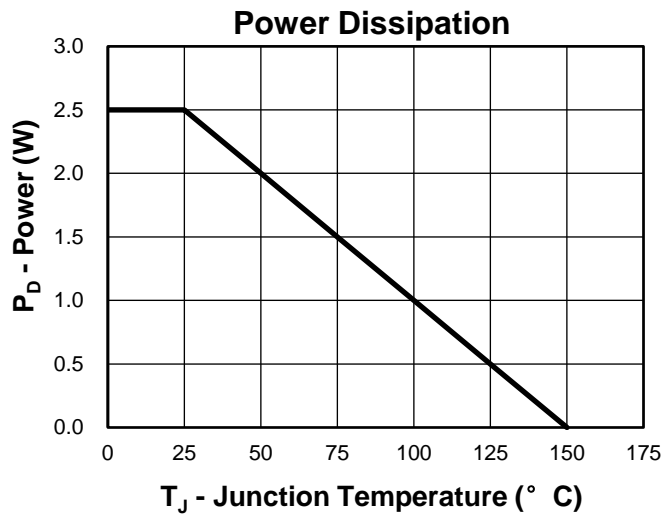
Ordering and Marking Information

| Device | Package | Packaging | Quantity | Reel Size | Tape width |
|----------|---------|-----------|----------|-----------|------------|
| KS2222HB | SOP8 | Tape&Reel | 3000 | 13" | 12mm |

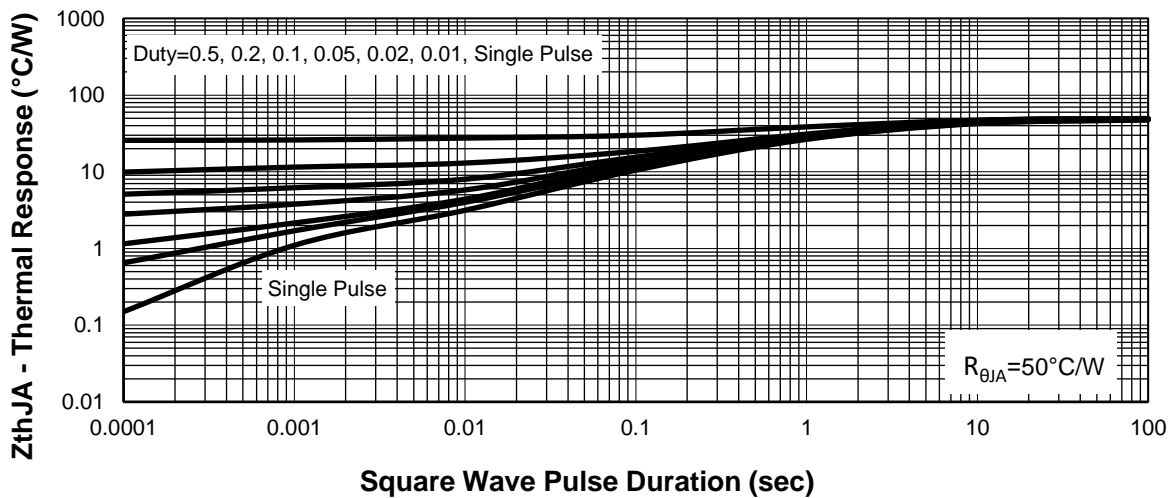


Y =Year,2017-A,2018-B,etc.
 WW =Week.
 XXX =Lot number.

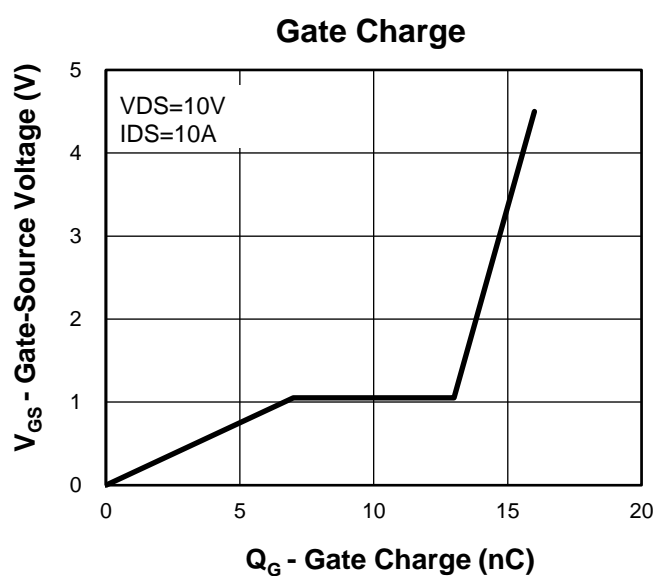
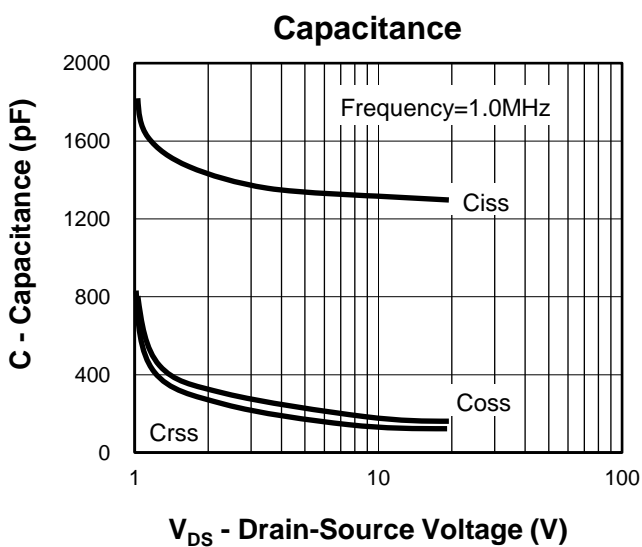
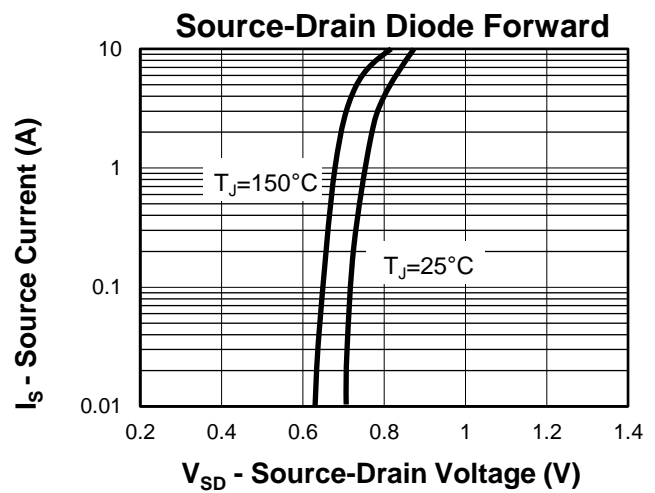
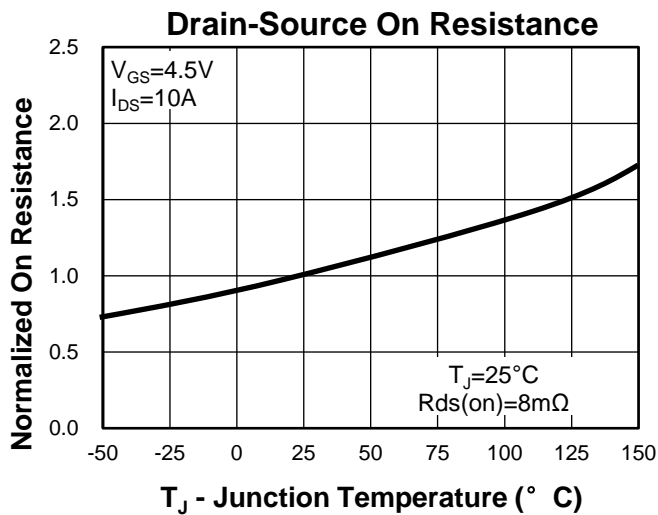
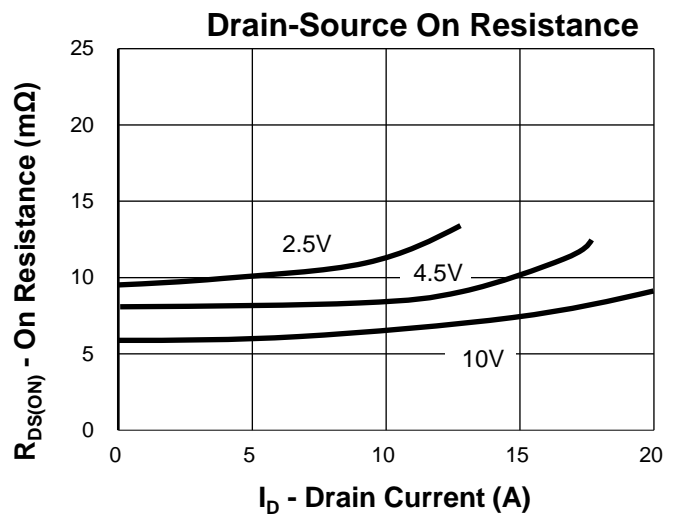
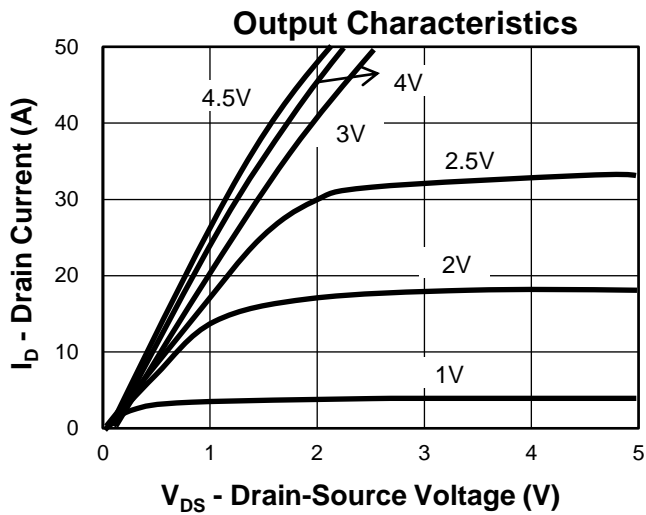
Typical Characteristics

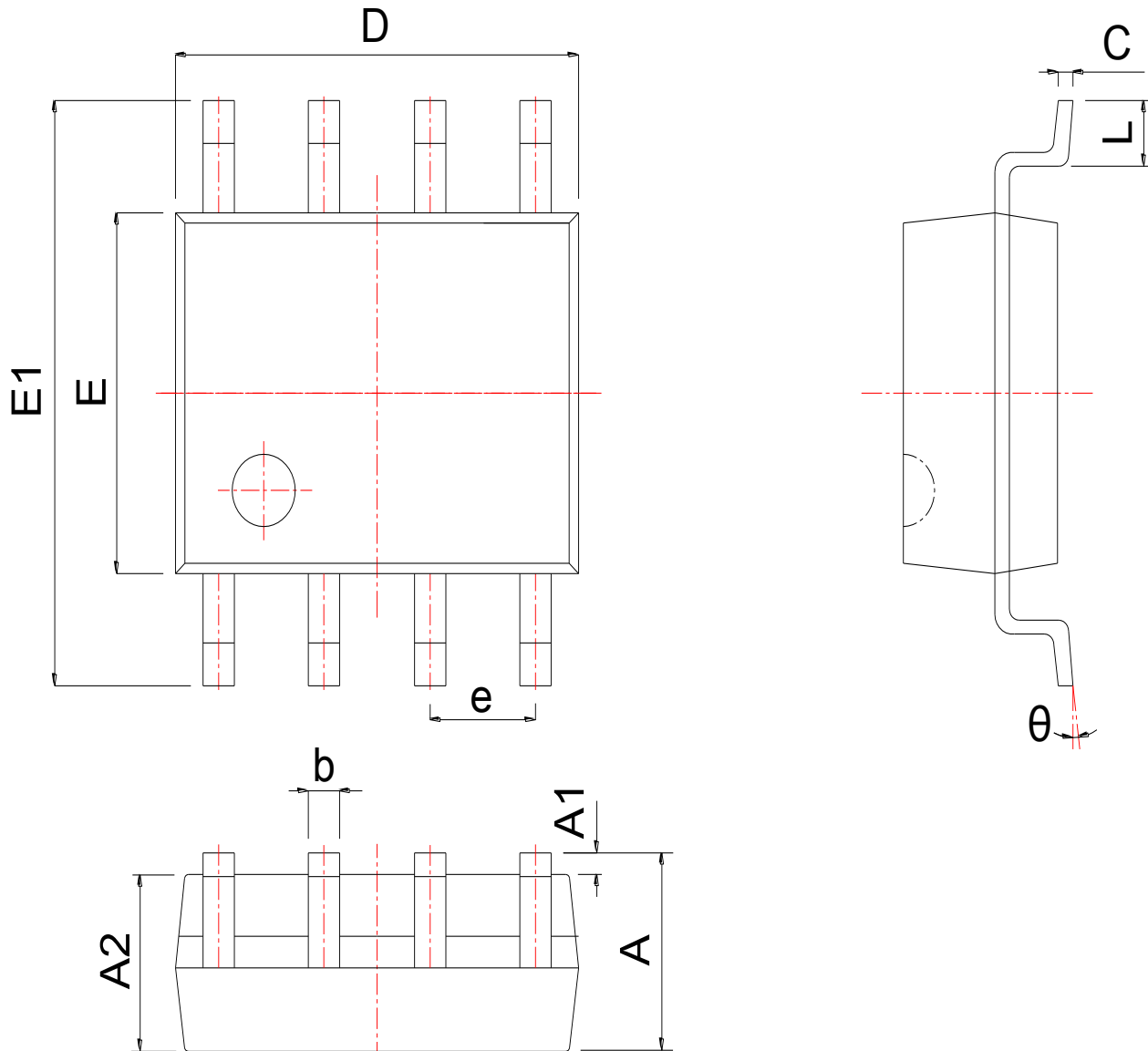


Thermal Transient Impedance



Typical Characteristics



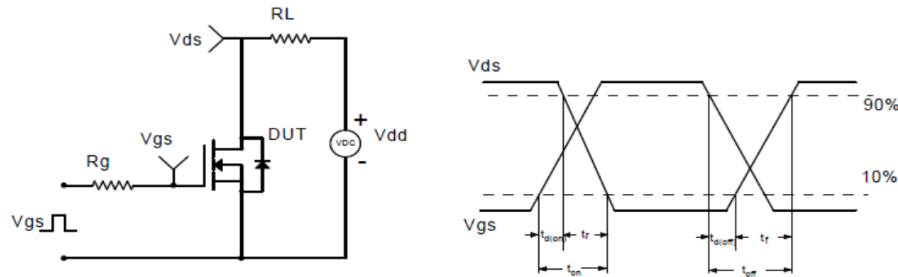
Package Information
SOP8


| SYMBOL | MM | | | INCH | | |
|--------|-----------|-------|-------|-----------|-------|-------|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.300 | 1.525 | 1.750 | 0.051 | 0.060 | 0.069 |
| A1 | 0.050 | 0.150 | 0.250 | 0.002 | 0.006 | 0.010 |
| A2 | 1.350 | 1.450 | 1.550 | 0.053 | 0.057 | 0.061 |
| b | 0.330 | 0.420 | 0.510 | 0.013 | 0.017 | 0.020 |
| c | 0.170 | 0.210 | 0.250 | 0.007 | 0.008 | 0.010 |
| D | 4.700 | 4.900 | 5.100 | 0.185 | 0.193 | 0.201 |
| E | 3.800 | 3.900 | 4.000 | 0.150 | 0.154 | 0.157 |
| E1 | 5.800 | 6.000 | 6.200 | 0.228 | 0.236 | 0.244 |
| e | 1.270 BSC | | | 0.050 BSC | | |
| L | 0.400 | 0.835 | 1.270 | 0.016 | 0.033 | 0.050 |
| θ | 0° | | 8° | 0° | | 8° |

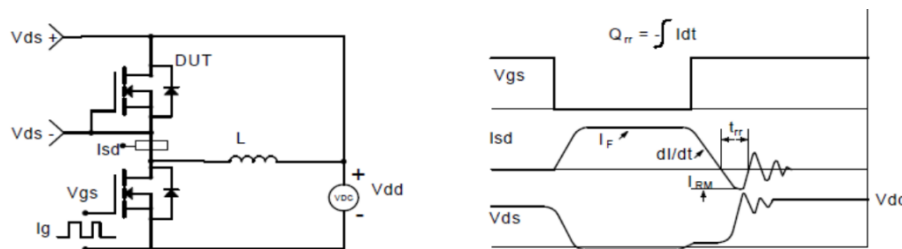
Avalanche Test Circuit and Waveforms



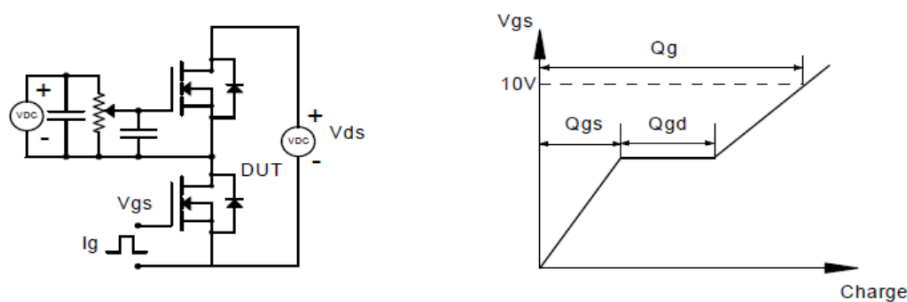
Switching Time Test Circuit and Waveforms



Diode Recovery Test Circuit and Waveforms



Gate Charge Test Circuit and Waveform



Customer Service

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