

## Features

- -100V/-9A,  
 $R_{DS(ON)} = 255m\Omega(Typ.)@V_{GS} = -10V$   
 $R_{DS(ON)} = 270m\Omega(Typ.)@V_{GS} = -4.5V$
- Low  $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged

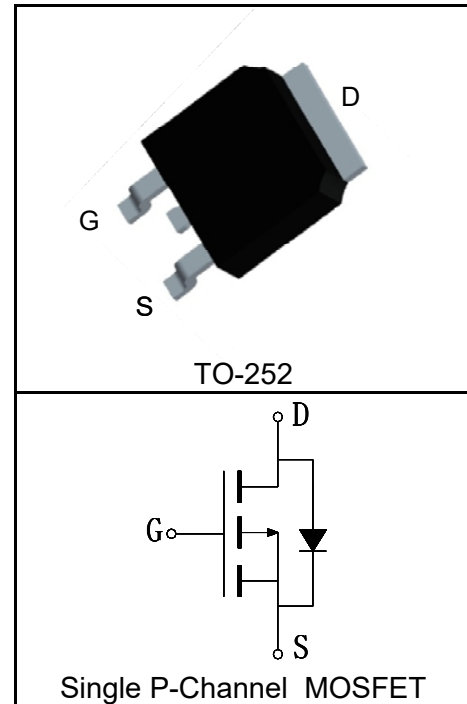
## Applications

- Power Switching Appliaction
- Load Switching



Halogen-Free

## Pin Description



## Absolute Maximum Ratings

| Symbol                                                                   | Parameter                                    | Rating                          | Unit               |
|--------------------------------------------------------------------------|----------------------------------------------|---------------------------------|--------------------|
| <b>Common Ratings</b> ( $T_C = 25^\circ\text{C}$ Unless Otherwise Noted) |                                              |                                 |                    |
| $V_{DSS}$                                                                | Drain-Source Voltage                         | -100                            | V                  |
| $V_{GSS}$                                                                | Gate-Source Voltage                          | $\pm 20$                        |                    |
| $T_J$                                                                    | Maximum Junction Temperature                 | 175                             | $^\circ\text{C}$   |
| $T_{STG}$                                                                | Storage Temperature Range                    | -55 to 175                      | $^\circ\text{C}$   |
| $I_S$                                                                    | Diode Continuous Forward Current             | $T_C = 25^\circ\text{C}$<br>-9  | A                  |
| <b>Mounted on Large Heat Sink</b>                                        |                                              |                                 |                    |
| $I_{DP}^{(1)}$                                                           | 300 $\mu\text{s}$ Pulse Drain Current Tested | $T_C = 25^\circ\text{C}$<br>-36 | A                  |
| $I_D^{(2)}$                                                              | Continuous Drain Current( $V_{GS} = -10V$ )  | $T_C = 25^\circ\text{C}$<br>-9  | A                  |
|                                                                          |                                              | $T_C = 100^\circ\text{C}$<br>-6 |                    |
| $P_D$                                                                    | Maximum Power Dissipation                    | $T_C = 25^\circ\text{C}$<br>42  | W                  |
|                                                                          |                                              | $T_C = 100^\circ\text{C}$<br>21 |                    |
| $R_{\theta JC}$                                                          | Thermal Resistance-Junction to Case          | 3.5                             | $^\circ\text{C/W}$ |
| $R_{\theta JA}^{(3)}$                                                    | Thermal Resistance-Junction to Ambient       | 100                             | $^\circ\text{C/W}$ |
| <b>Drain-Source Avalanche Ratings</b>                                    |                                              |                                 |                    |
| $E_{AS}^{(4)}$                                                           | Avalanche Energy, Single Pulsed              | 16                              | mJ                 |

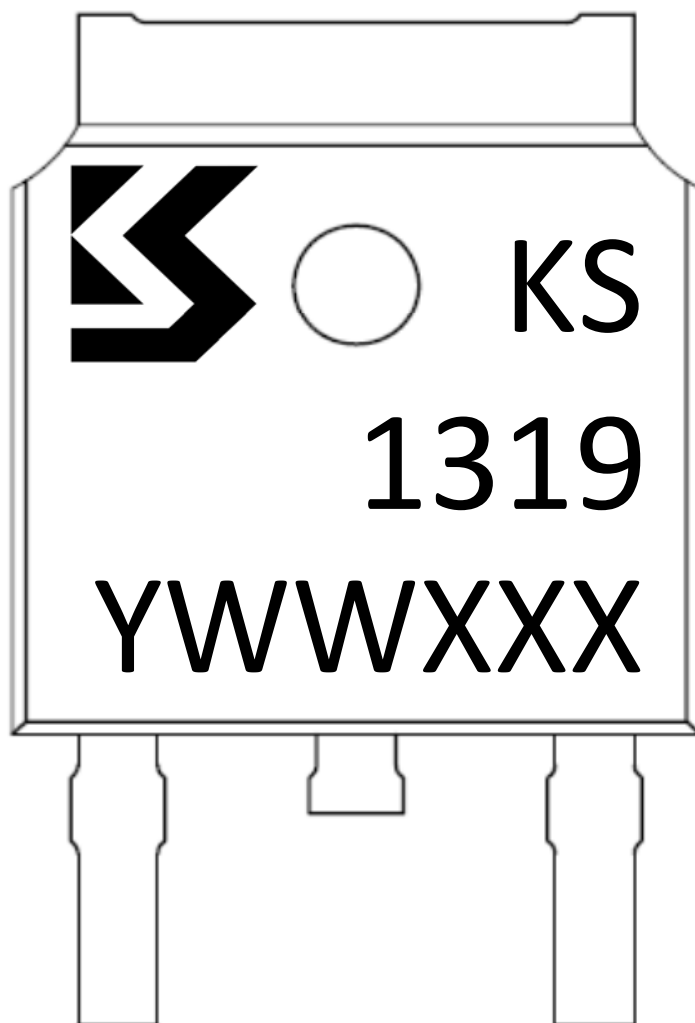
**Electrical Characteristics** ( $T_C=25^{\circ}\text{C}$  Unless Otherwise Noted)

| Symbol                                   | Parameter                        | Test Condition                                                                             | KS1319DA              |       |      | Unit |
|------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|-----------------------|-------|------|------|
|                                          |                                  |                                                                                            | Min.                  | Typ.  | Max. |      |
| Static Characteristics                   |                                  |                                                                                            |                       |       |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA                                               | -100                  |       |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V                                                |                       |       | -1   | μA   |
|                                          |                                  |                                                                                            | T <sub>J</sub> =125°C |       |      |      |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA                                 | -1.3                  | -1.8  | -2.4 | V    |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                 |                       |       | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>⑤</sup>         | Drain-Source On-state Resistance | V <sub>GS</sub> =-10V, I <sub>DS</sub> =-4A                                                |                       | 255   | 300  | mΩ   |
|                                          |                                  | V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-3A                                               |                       | 270   | 320  | mΩ   |
| Diode Characteristics                    |                                  |                                                                                            |                       |       |      |      |
| V <sub>SD</sub> <sup>⑤</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =-4A, V <sub>GS</sub> =0V                                                  |                       | -0.85 | -1.2 | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =-4A, dI <sub>SD</sub> /dt=-100A/μs                                        |                       | 29    |      | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                            |                       | 34    |      | nC   |
| Dynamic Characteristics <sup>⑥</sup>     |                                  |                                                                                            |                       |       |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                           |                       | 5     |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =-50V,<br>Frequency=1.0MHz                         |                       | 930   |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                            |                       | 40    |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                            |                       | 20    |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =-50V, I <sub>DS</sub> =-4A,<br>V <sub>GEN</sub> =-10V, R <sub>G</sub> =3Ω |                       | 10    |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                            |                       | 6     |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                            |                       | 33    |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                            |                       | 9     |      |      |
| Gate Charge Characteristics <sup>⑥</sup> |                                  |                                                                                            |                       |       |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =-50V, V <sub>GS</sub> =-10V,<br>I <sub>DS</sub> =-4A                      |                       | 18    |      | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                            |                       | 4.5   |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                            |                       | 5.2   |      |      |

- 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  $T_{Jmax}, I_{AS} = -8A, L=0.5\text{mH}, V_{DD} = -48V, R_G = 25\Omega$ , Starting  $T_J = 25^{\circ}\text{C}$ .
  - 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 |
|----------|---------|-----------|----------|-----------|------------|
| KS1319DA | TO-252  | Tape&Reel | 2500     | 13"       | 16mm       |

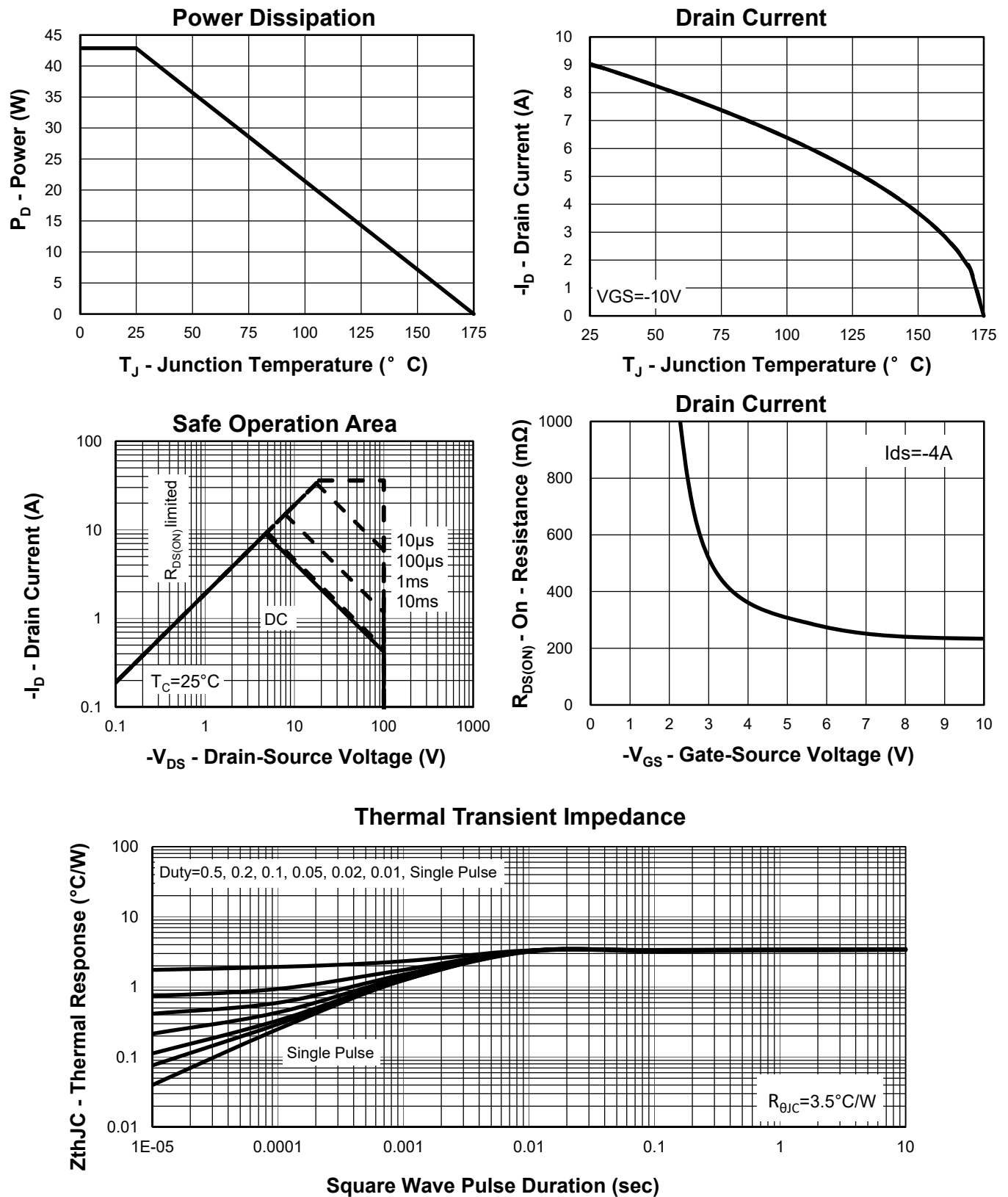


Y       =Year,2017-A,2018-B,etc.

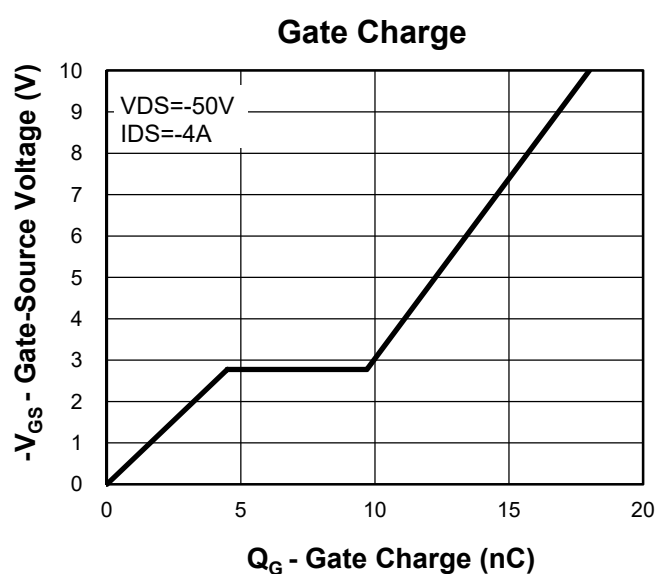
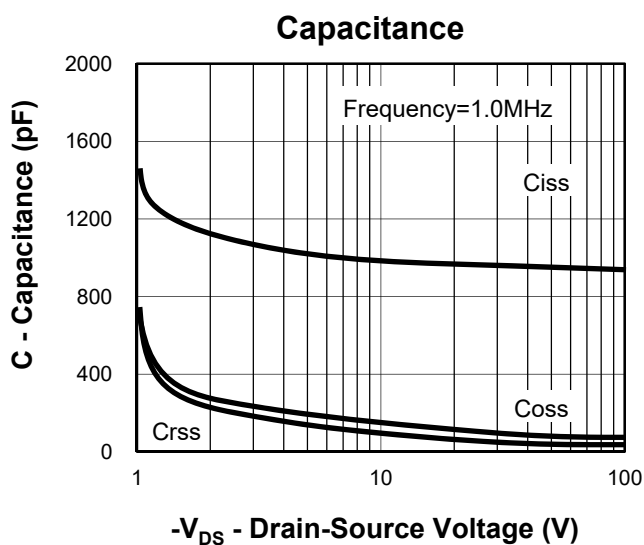
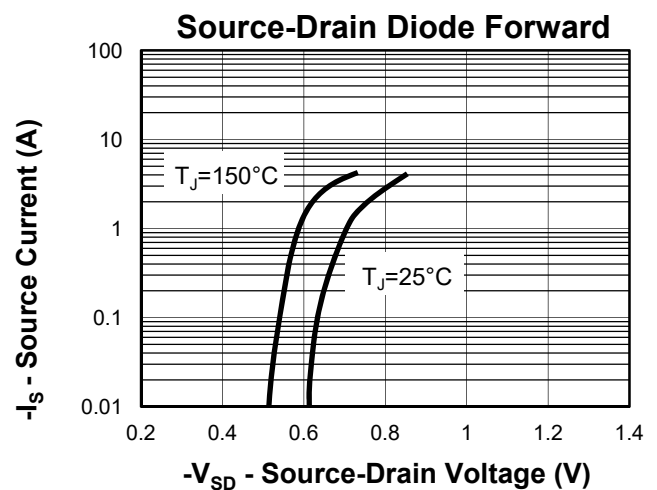
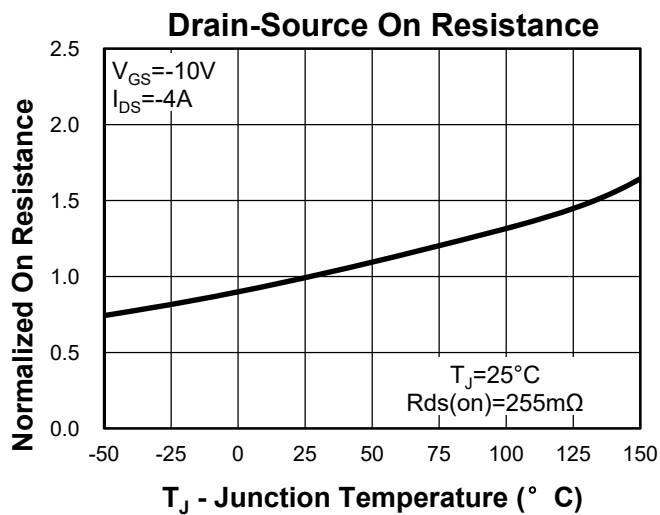
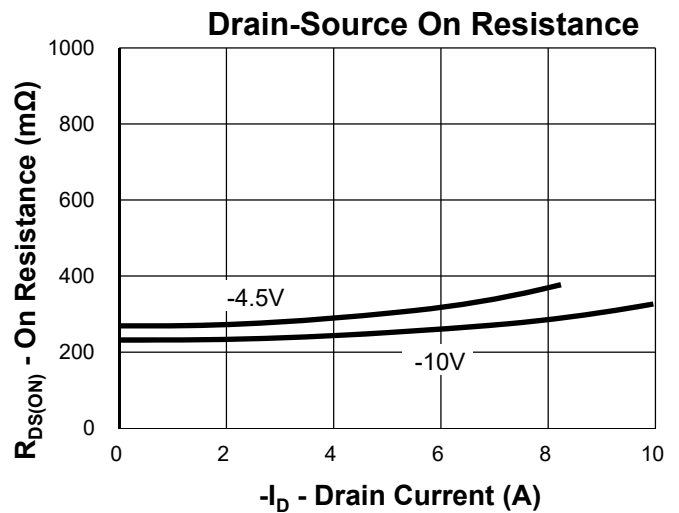
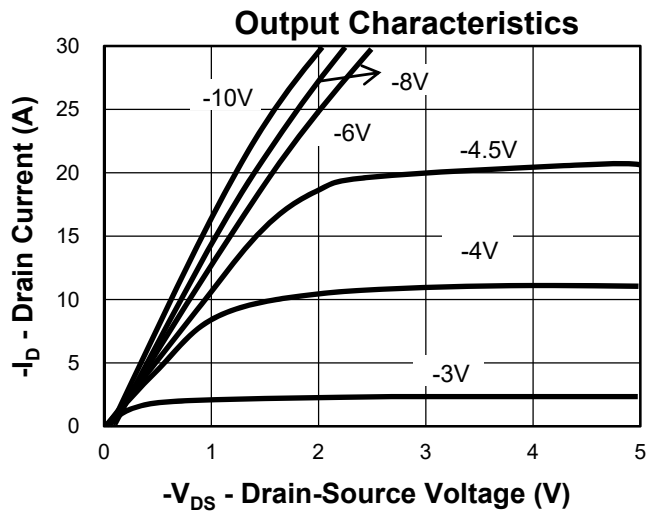
WW     =Week.

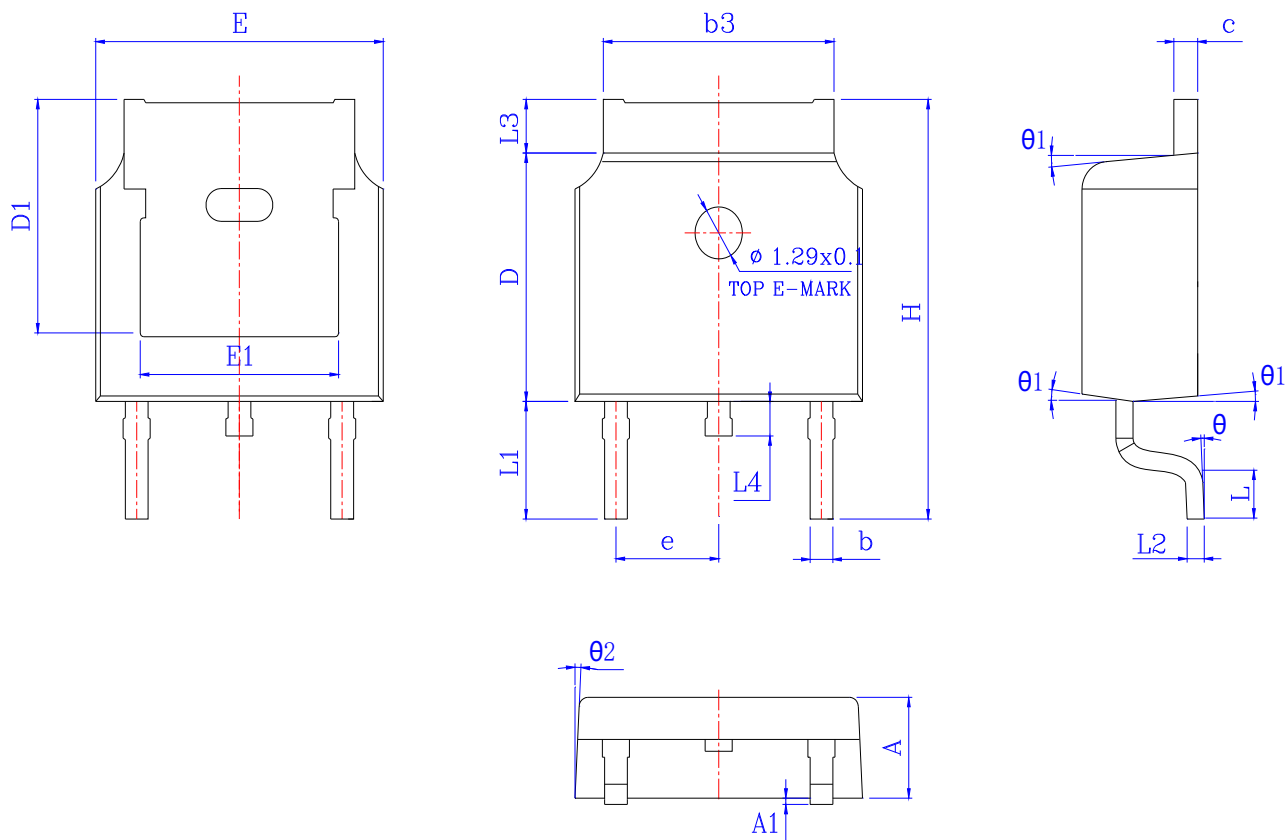
XXX    =Lot number.

## Typical Characteristics



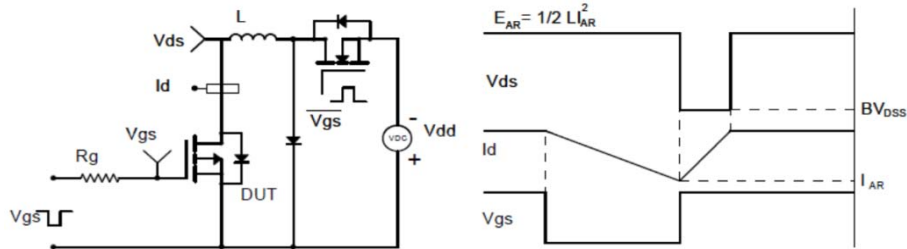
## Typical Characteristics



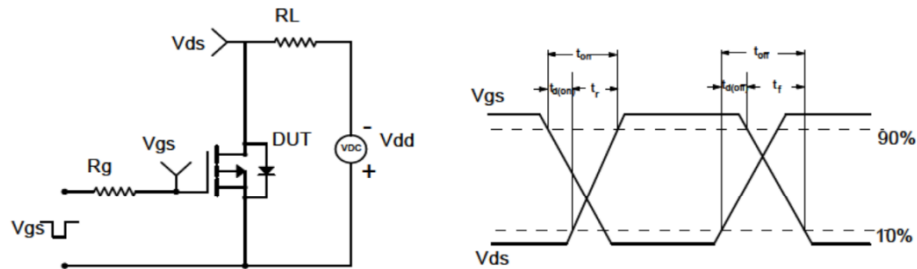
**Package Information**
**TO-252**


| SYMBOL     | MM        |        |        | INCH      |       |       |
|------------|-----------|--------|--------|-----------|-------|-------|
|            | MIN       | NOM    | MAX    | MIN       | NOM   | MAX   |
| A          | 2.200     | 2.300  | 2.400  | 0.087     | 0.091 | 0.094 |
| A1         | *         | *      | 0.100  | *         | *     | 0.004 |
| b          | 0.660     | 0.760  | 0.860  | 0.026     | 0.030 | 0.034 |
| b3         | 5.130     | 5.295  | 5.460  | 0.202     | 0.208 | 0.215 |
| c          | 0.470     | 0.535  | 0.600  | 0.019     | 0.021 | 0.024 |
| D          | 6.000     | 6.100  | 6.200  | 0.236     | 0.240 | 0.244 |
| D1         | 5.30 REF  |        |        | 0.20 REF  |       |       |
| E          | 6.500     | 6.600  | 6.700  | 0.256     | 0.260 | 0.264 |
| E1         | 4.700     | 4.810  | 4.920  | 0.185     | 0.189 | 0.194 |
| e          | 2.28 REF  |        |        | 0.09 REF  |       |       |
| H          | 9.800     | 10.100 | 10.400 | 0.386     | 0.398 | 0.409 |
| L          | 1.400     | 1.550  | 1.700  | 0.055     | 0.061 | 0.067 |
| L1         | 2.743 REF |        |        | 0.108 REF |       |       |
| L2         | 0.510 BSC |        |        | 0.020 BSC |       |       |
| L3         | 0.900     | 1.075  | 1.250  | 0.035     | 0.042 | 0.049 |
| L4         | 0.600     | 0.800  | 1.000  | 0.024     | 0.031 | 0.039 |
| $\theta$   | 0°        | *      | 8°     | 0°        | *     | 8°    |
| $\theta 1$ | 5°        | 7°     | 9°     | 5°        | 7°    | 9°    |
| $\theta 2$ | 5°        | 7°     | 9°     | 5°        | 7°    | 9°    |

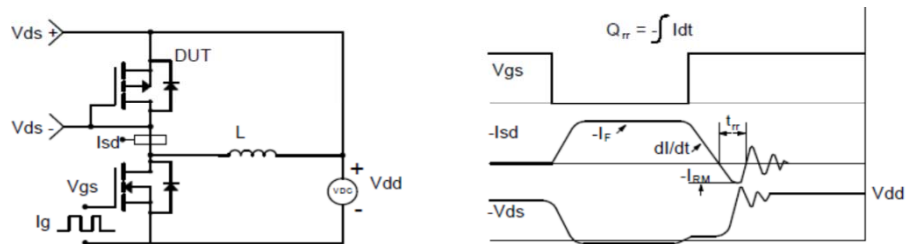
### Avalanche Test Circuit and Waveforms



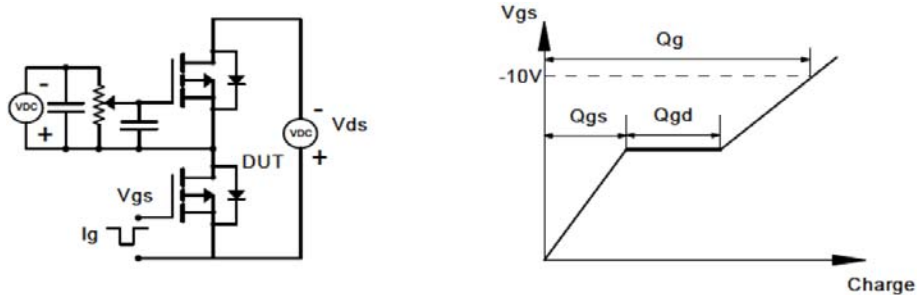
### Switching Time Test Circuit and Waveforms



### Diode Recovery Test Circuit and Waveforms



### Gate Charge Test Circuit and Waveform



### Customer Service

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