

### Features

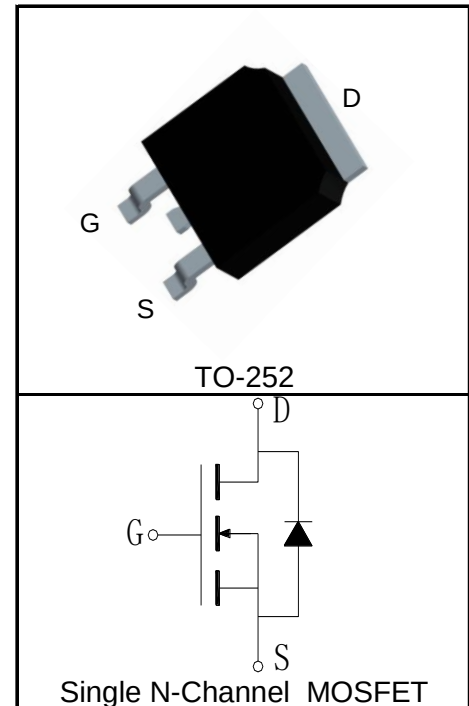
- 30V/45A,  
 $R_{DS(ON)} = 9.5m\Omega(Typ.)@V_{GS}=10V$   
 $R_{DS(ON)} = 15m\Omega(Typ.)@V_{GS}=4.5V$
- Low  $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged

### Applications

- Power Switching Appliaction
- Load Switching



### Pin Description



### Absolute Maximum Ratings

| Symbol                                                           | Parameter                                | Rating            | Unit         |
|------------------------------------------------------------------|------------------------------------------|-------------------|--------------|
| <b>Common Ratings</b> ( $T_C=25^\circ C$ Unless Otherwise Noted) |                                          |                   |              |
| $V_{DSS}$                                                        | Drain-Source Voltage                     | 30                | V            |
| $V_{GSS}$                                                        | Gate-Source Voltage                      | $\pm 20$          |              |
| $T_J$                                                            | Maximum Junction Temperature             | 175               | $^\circ C$   |
| $T_{STG}$                                                        | Storage Temperature Range                | -55 to 175        | $^\circ C$   |
| $I_S$                                                            | Diode Continuous Forward Current         | $T_C=25^\circ C$  | A            |
| <b>Mounted on Large Heat Sink</b>                                |                                          |                   |              |
| $I_{DP}^{①}$                                                     | 300 $\mu s$ Pulse Drain Current Tested   | $T_C=25^\circ C$  | A            |
| $I_D^{②}$                                                        | Continuous Drain Current( $V_{GS}=10V$ ) | $T_C=25^\circ C$  | A            |
|                                                                  |                                          | $T_C=100^\circ C$ |              |
| $P_D$                                                            | Maximum Power Dissipation                | $T_C=25^\circ C$  | W            |
|                                                                  |                                          | $T_C=100^\circ C$ |              |
| $R_{\theta JC}$                                                  | Thermal Resistance-Junction to Case      | 3.8               | $^\circ C/W$ |
| $R_{\theta JA}^{③}$                                              | Thermal Resistance-Junction to Ambient   | 100               | $^\circ C/W$ |
| <b>Drain-Source Avalanche Ratings</b>                            |                                          |                   |              |
| $E_{AS}^{④}$                                                     | Avalanche Energy, Single Pulsed          | 30                | mJ           |

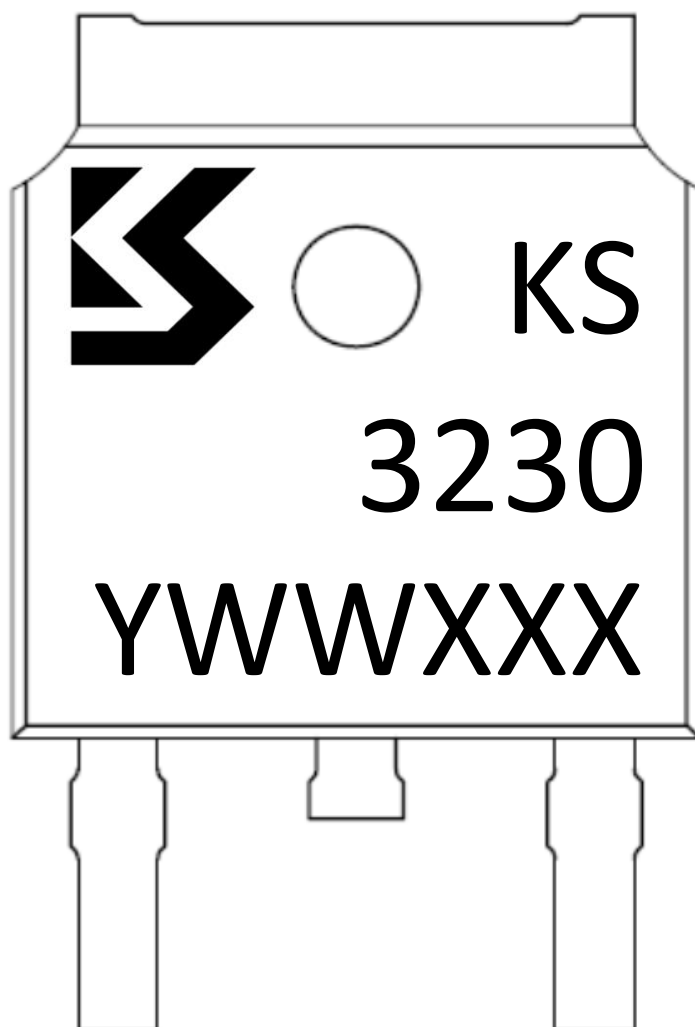
**Electrical Characteristics** ( $T_C=25^{\circ}\text{C}$  Unless Otherwise Noted)

| Symbol                                   | Parameter                        | Test Condition                                                                        | KS3230DA |      |      | Unit |
|------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------|----------|------|------|------|
|                                          |                                  |                                                                                       | Min.     | Typ. | Max. |      |
| Static Characteristics                   |                                  |                                                                                       |          |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                           | 30       |      |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V                                             |          |      | 1    | μA   |
|                                          |                                  | T <sub>J</sub> =125°C                                                                 |          |      | 30   |      |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA                             | 1.1      | 1.5  | 2.3  | 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> =20A                                            |          | 9.5  | 12   | mΩ   |
|                                          |                                  | V <sub>GS</sub> =4.5V, I <sub>DS</sub> =15A                                           |          | 15   | 20   | mΩ   |
| Diode Characteristics                    |                                  |                                                                                       |          |      |      |      |
| V <sub>SD</sub> <sup>⑤</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =20A, V <sub>GS</sub> =0V                                             |          | 0.91 | 1.2  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =20A, dI <sub>SD</sub> /dt=100A/μs                                    |          | 31   |      | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                       |          | 44   |      | nC   |
| Dynamic Characteristics <sup>⑥</sup>     |                                  |                                                                                       |          |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                      |          | 1    |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, Frequency=1.0MHz                           |          | 795  |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                       |          | 120  |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                       |          | 90   |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =15V, I <sub>DS</sub> =20A, V <sub>GEN</sub> =10V, R <sub>G</sub> =3Ω |          | 9    |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                       |          | 16   |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                       |          | 25   |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                       |          | 10   |      |      |
| Gate Charge Characteristics <sup>⑥</sup> |                                  |                                                                                       |          |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>DS</sub> =20A                      |          | 15   |      | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                       |          | 3.8  |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                       |          | 4.5  |      |      |

- 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  $T_{Jmax}$ ,  $I_{AS}=11A$ ,  $L=0.5mH$ ,  $V_{DD}=15V$ ,  $R_G=25\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ , 100% tested and guaranteed.
  - 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 |
|----------|---------|-----------|----------|-----------|------------|
| KS3230DA | TO-252  | Tape&Reel | 2500     | 13"       | 16mm       |

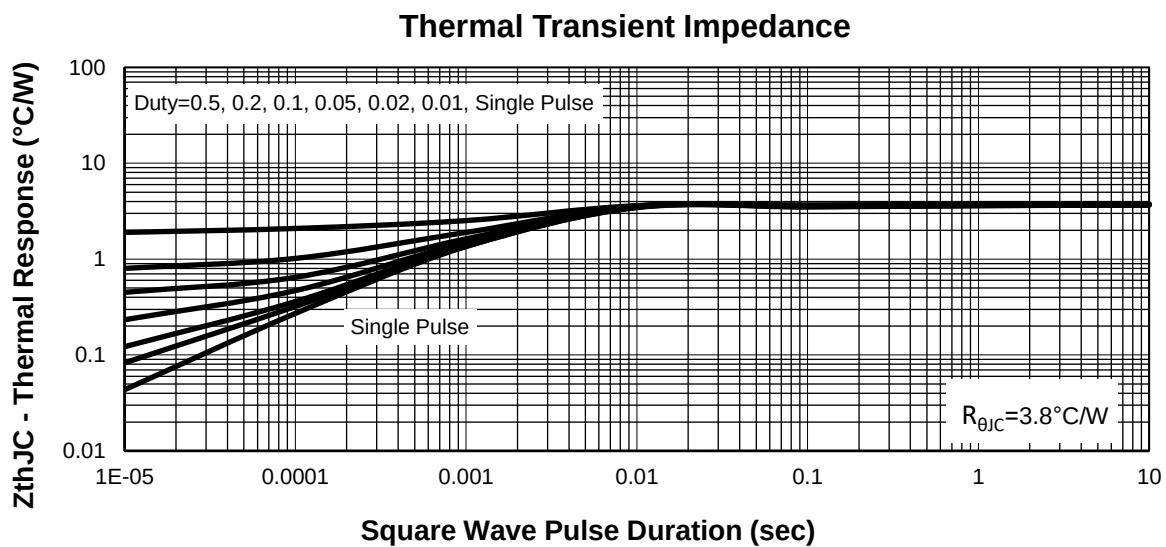
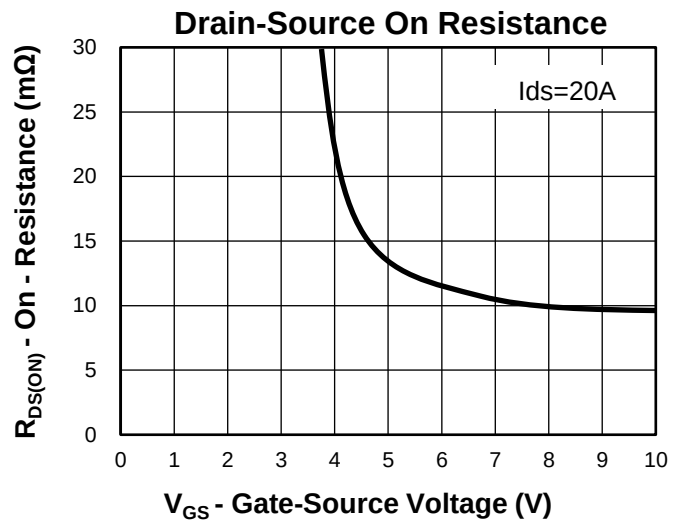
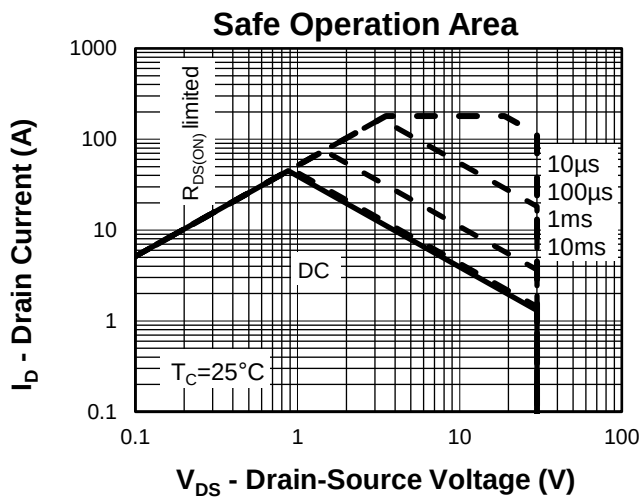
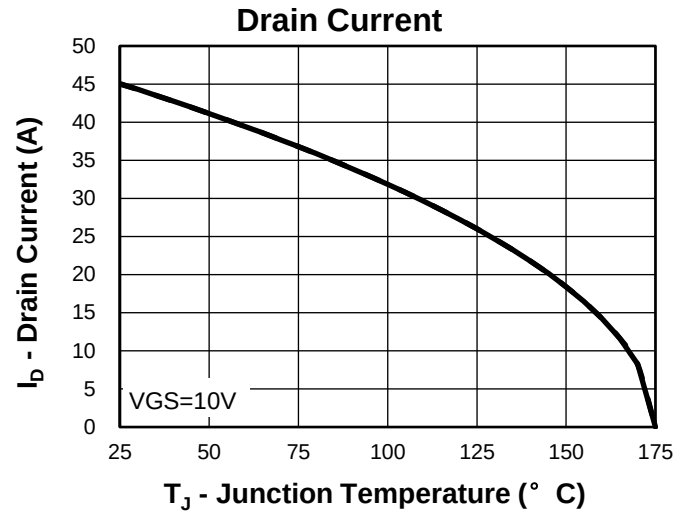
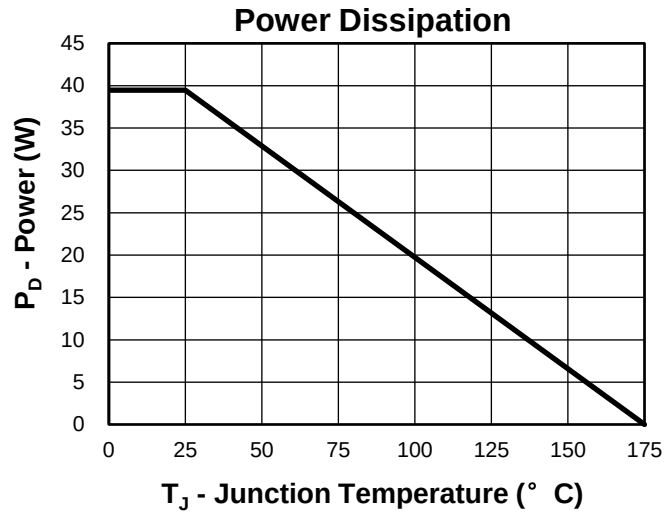


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

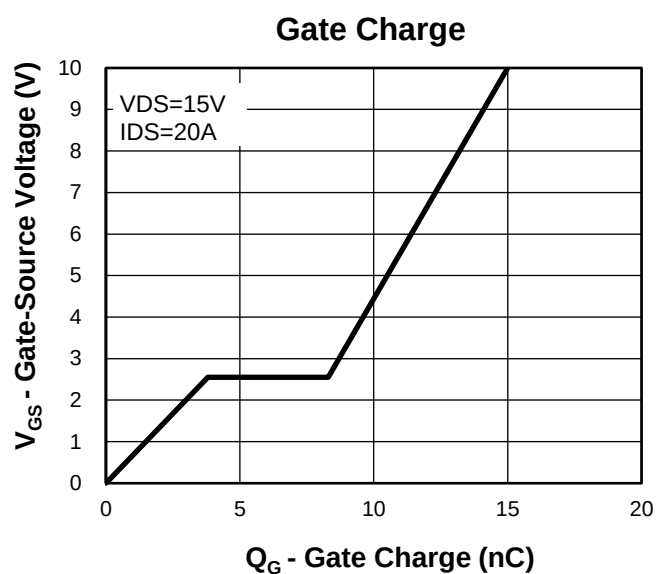
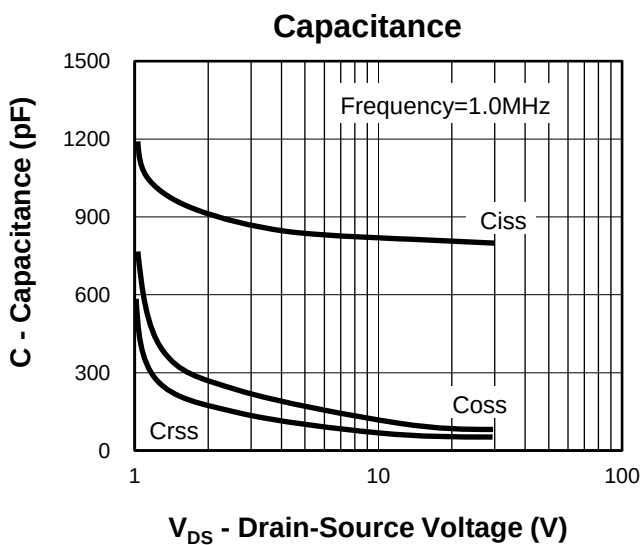
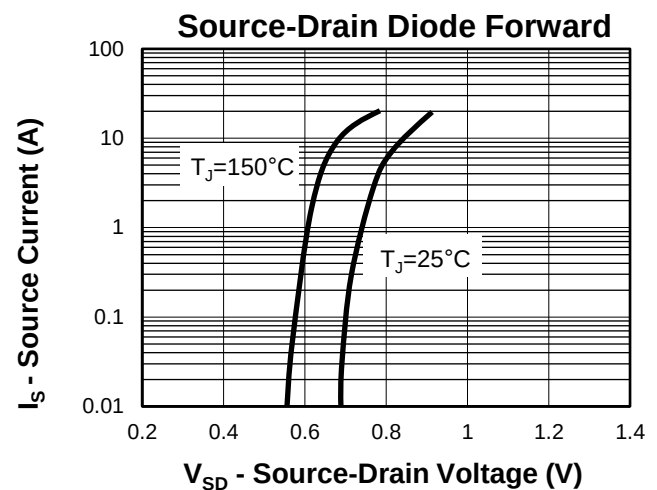
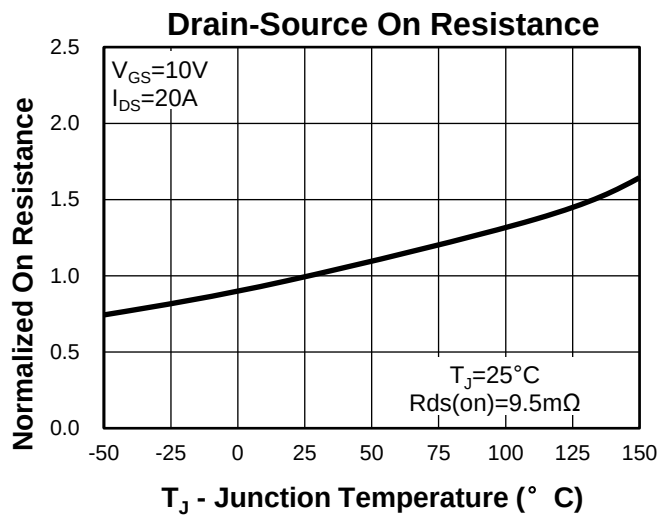
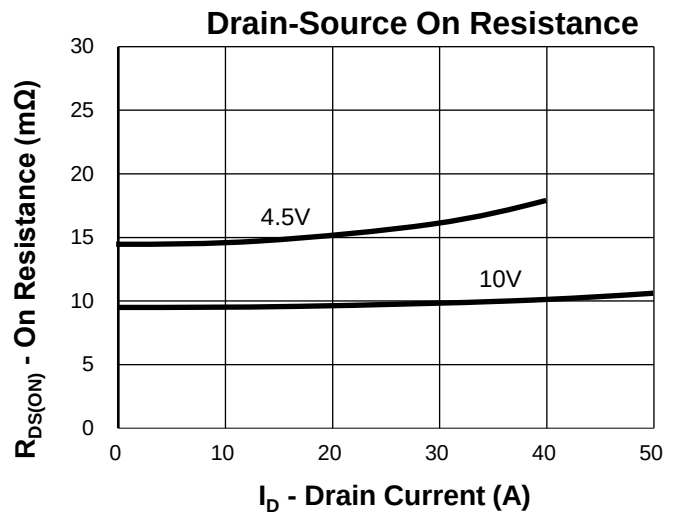
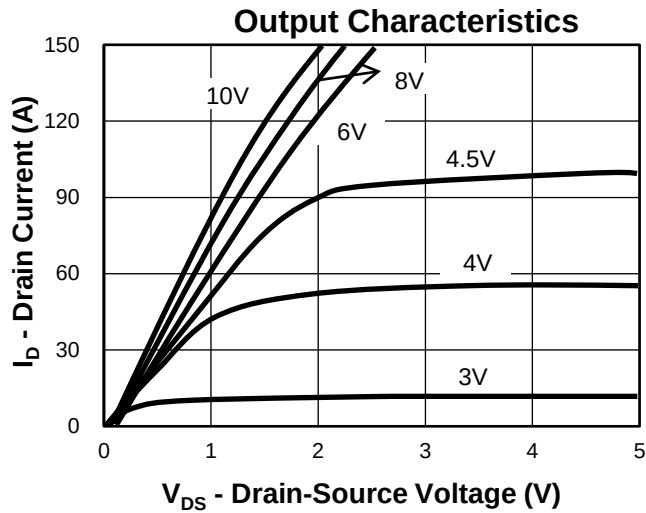
2nd Line: Part Number(3230)

3rd Line: Lot Number(YWWXXX)

## Typical Characteristics

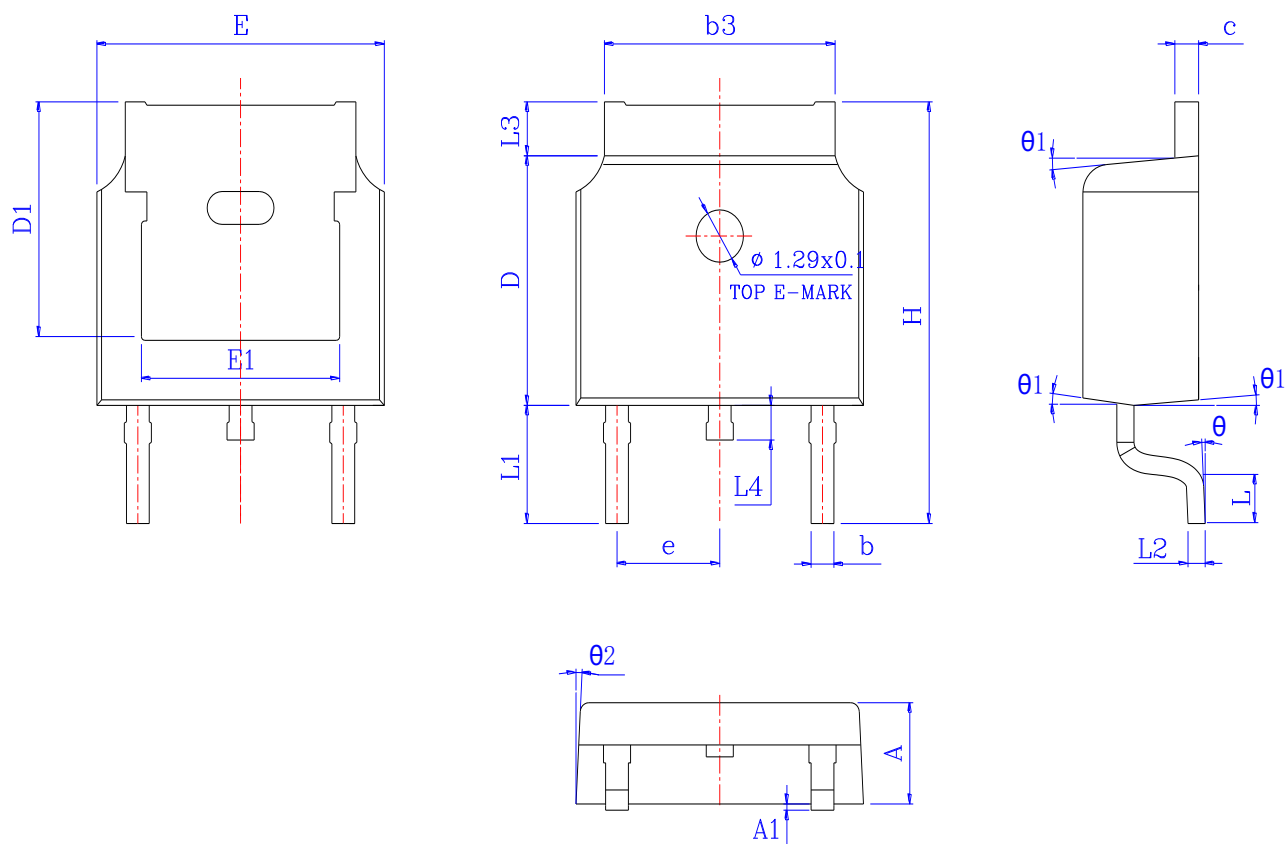


## Typical Characteristics



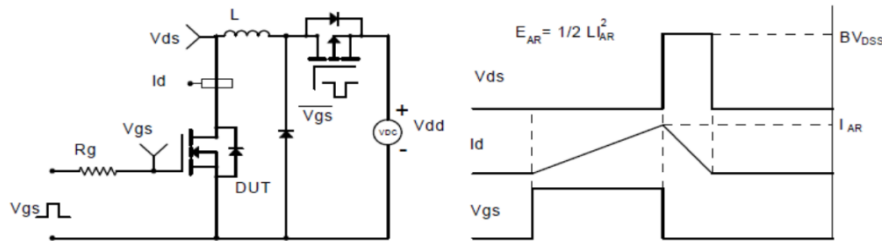
## Package Information

# TO-252

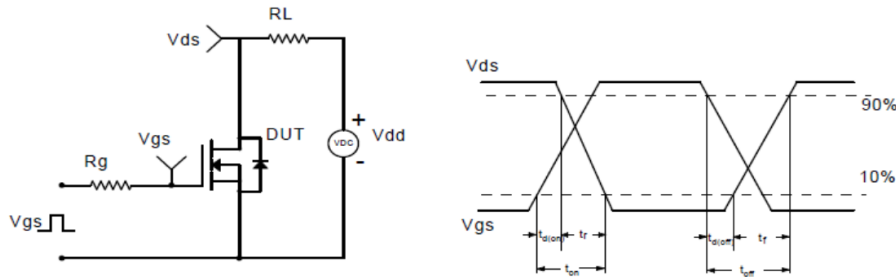


| SYMBOL | MM        |        |        | INCH      |       |       |
|--------|-----------|--------|--------|-----------|-------|-------|
|        | MIN       | NOM    | MAX    | MIN       | NOM   | MAX   |
| A      | 2.200     | 2.300  | 2.400  | 0.087     | 0.091 | 0.094 |
| A1     | *         | *      | 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     | *      | *      | 0.185     | *     | *     |
| 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 |
| θ      | 0°        | *      | 8°     | 0°        | *     | 8°    |
| θ 1    | 5°        | 7°     | 9°     | 5°        | 7°    | 9°    |
| θ 2    | 5°        | 7°     | 9°     | 5°        | 7°    | 9°    |

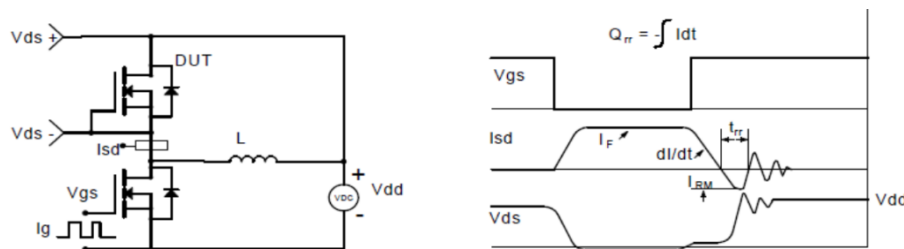
### Avalanche Test Circuit and Waveforms



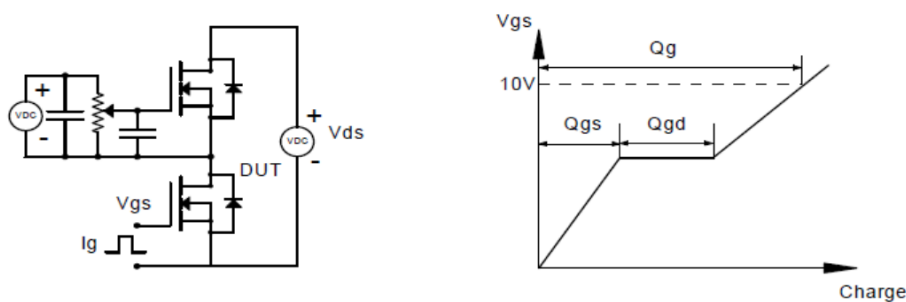
### Switching Time Test Circuit and Waveforms



### Diode Recovery Test Circuit and Waveforms



### Gate Charge Test Circuit and Waveform



### Customer Service

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