

### Features

- 200V/4.8A,  
 $R_{DS(ON)} = 510m\Omega(Typ.)@V_{GS}=10V$   
 $R_{DS(ON)} = 490m\Omega(Typ.)@V_{GS}=4.5V$
- Low  $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged

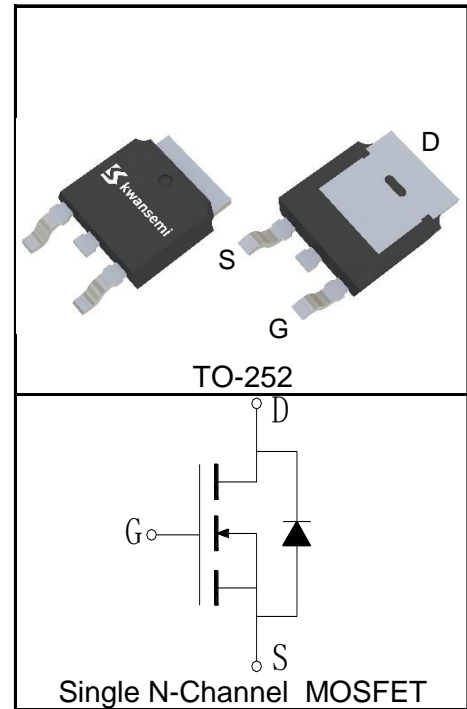
### Applications

- Power Switching Application
- 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                         | 200                           | V                  |
| $V_{GSS}$  | Gate-Source Voltage                          | $\pm 20$                      |                    |
| $T_{Jmax}$   | Maximum Junction Temperature                 | 150                           | $^\circ\text{C}$   |
| $T_J, T_{STG}$   | Operating and Storage Temperature Range      | -55 to 150                    | $^\circ\text{C}$   |
| $I_S$  | Diode Continuous Forward Current             | $T_C=25^\circ\text{C}$<br>4.8 | 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>19  | A                  |
| $I_D^{②}$  | Continuous Drain Current( $V_{GS}=10V$ )     | $T_C=25^\circ\text{C}$<br>4.8 | A                  |
|  |  | $T_C=100^\circ\text{C}$<br>3  |                    |
| $P_D$  | Maximum Power Dissipation                    | $T_C=25^\circ\text{C}$<br>39  | W                  |
|  |  | $T_C=100^\circ\text{C}$<br>15 |                    |
| $R_{\theta JC}$  | Thermal Resistance-Junction to Case          | 3.15                          | $^\circ\text{C/W}$ |
| $R_{\theta JA}^{③}$  | Thermal Resistance-Junction to Ambient       | 100                           | $^\circ\text{C/W}$ |
| <b>Drain-Source Avalanche Ratings</b>                                  |  |                               |                    |
| $E_{AS}^{④}$   | Avalanche Energy, Single Pulsed              | 101                           | mJ                 |

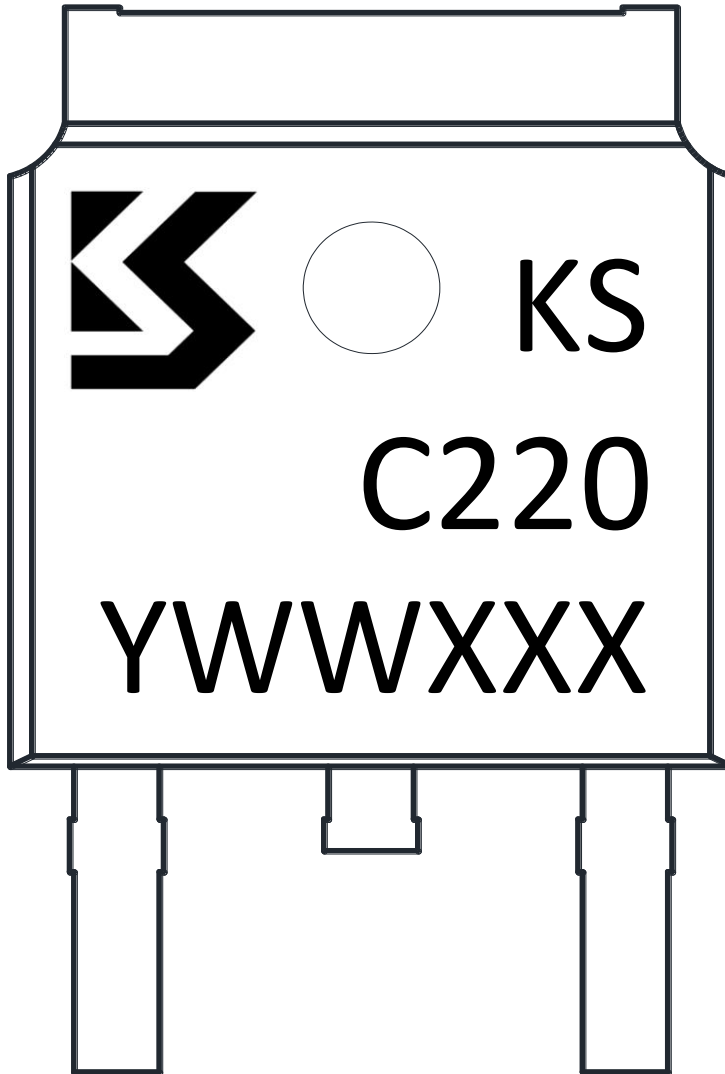
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

| Symbol   | Parameter                        | Test Condition  | KSC220DA |      |           | Unit      |
|--|----------------------------------|---|----------|------|-----------|-----------|
|  |                                  |   | Min.     | Typ. | Max.      |           |
| <b>Static Characteristics</b>                    |                                  |   |          |      |           |           |
| $BV_{DSS}$                                       | Drain-Source Breakdown Voltage   | $V_{GS}=0V, I_{DS}=250\mu A$                            | 200      |      |           | V         |
| $I_{DSS}$  | Zero Gate Voltage Drain Current  | $V_{DS}=200V, V_{GS}=0V$                                |          |      | 1         | $\mu A$   |
|  |                                  | $T_J=125^\circ\text{C}$                                 |          |      | 30        |           |
| $V_{GS(th)}$                                     | Gate Threshold Voltage           | $V_{DS}=V_{GS}, I_{DS}=250\mu A$                        | 1.1      | 1.8  | 2.3       | V         |
| $I_{GSS}$  | Gate Leakage Current             | $V_{GS}=\pm 20V, V_{DS}=0V$                             |          |      | $\pm 100$ | nA        |
| $R_{DS(ON)}^{(5)}$                               | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=4A$                                 |          | 510  | 600       | $m\Omega$ |
|  |                                  | $V_{GS}=4.5V, I_{DS}=3A$                                |          | 490  | 650       | $m\Omega$ |
| <b>Diode Characteristics</b>                     |                                  |   |          |      |           |           |
| $V_{SD}^{(5)}$                                   | Diode Forward Voltage            | $I_{SD}=4A, V_{GS}=0V$                                  |          | 0.83 | 1.2       | V         |
| $t_{rr}$   | Reverse Recovery Time            | $I_{SD}=4A, di_{SD}/dt=100A/\mu s$                      |          | 75   |           | ns        |
| $Q_{rr}$   | Reverse Recovery Charge          |   |          | 218  |           | nC        |
| <b>Dynamic Characteristics<sup>(6)</sup></b>     |                                  |   |          |      |           |           |
| $R_G$  | Gate Resistance                  | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$                   |          | 2.8  |           | $\Omega$  |
| $C_{iss}$  | Input Capacitance                | $V_{GS}=0V,$<br>$V_{DS}=100V,$<br>Frequency=1.0MHz      |          | 690  |           | pF        |
| $C_{oss}$  | Output Capacitance               |   |          | 25   |           |           |
| $C_{rss}$  | Reverse Transfer Capacitance     |   |          | 15   |           |           |
| $t_{d(ON)}$                                      | Turn-on Delay Time               | $V_{DD}=100V, I_{DS}=4A,$<br>$V_{GEN}=10V, R_G=3\Omega$ |          | 11   |           | ns        |
| $t_r$  | Turn-on Rise Time                |   |          | 19   |           |           |
| $t_{d(OFF)}$                                     | Turn-off Delay Time              |   |          | 36   |           |           |
| $t_f$  | Turn-off Fall Time               |   |          | 22   |           |           |
| <b>Gate Charge Characteristics<sup>(6)</sup></b> |                                  |   |          |      |           |           |
| $Q_g$  | Total Gate Charge                | $V_{DS}=100V, V_{GS}=10V,$<br>$I_{DS}=4A$               |          | 15   |           | nC        |
| $Q_{gs}$   | Gate-Source Charge               |   |          | 2.1  |           |           |
| $Q_{gd}$   | Gate-Drain Charge                |   |          | 4.4  |           |           |

- 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  $T_J = 25^\circ\text{C}$ ,  $I_{ASmax} = 1.5A$ ,  $L = 90\text{mH}$ ,  $V_{DD} = 50V$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10V$ . Part not recommended for use above this value. 100% Final Test at  $I_{AS} = 1.5A$ ,  $L = 45\text{mH}$ .
  - 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 |
|----------|---------|-----------|----------|-----------|------------|
| KSC220DA | TO-252  | Tape&Reel | 2500     | 13"       | 16mm       |

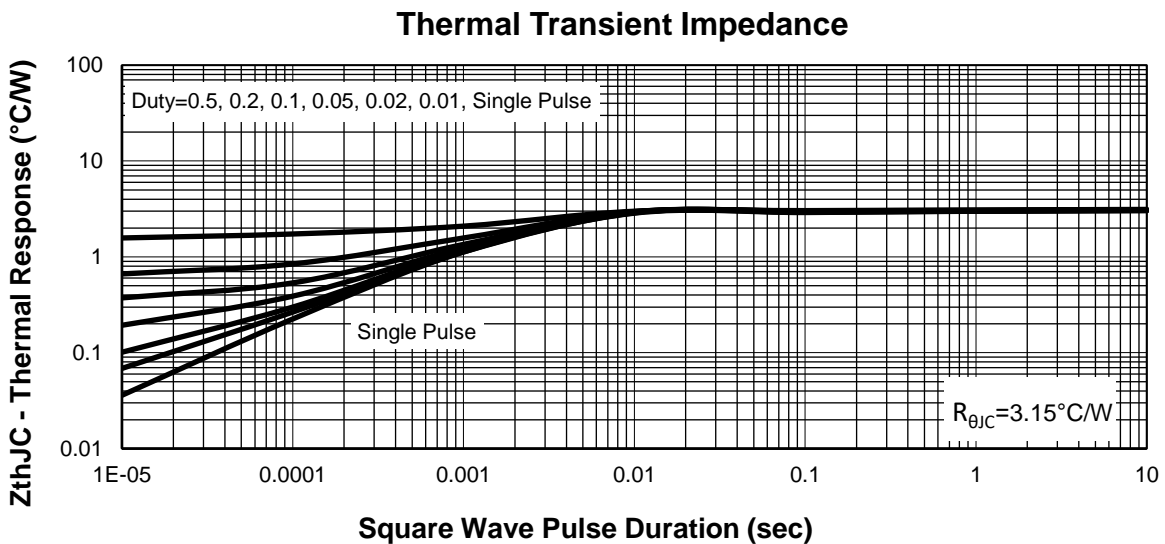
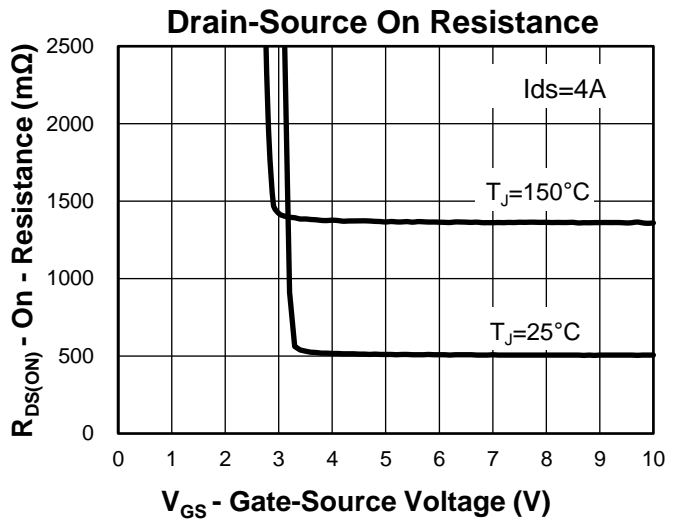
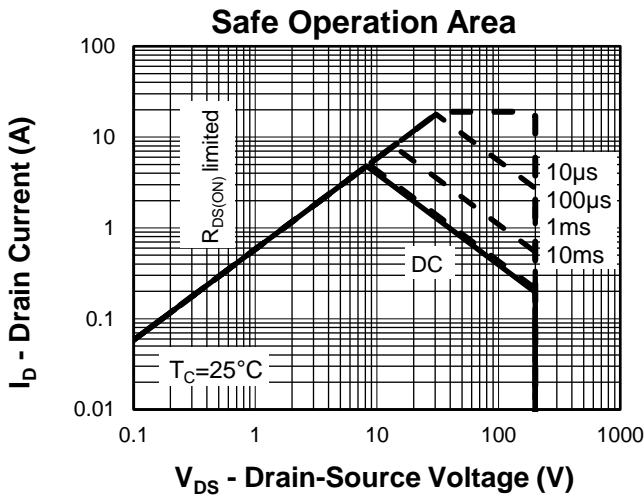
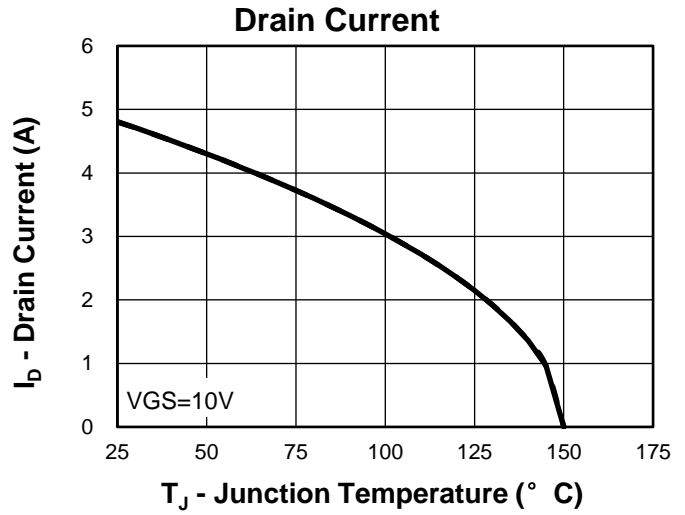
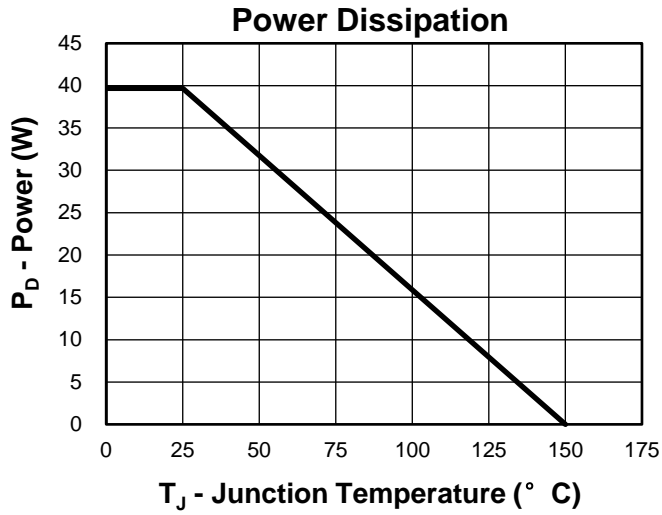


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

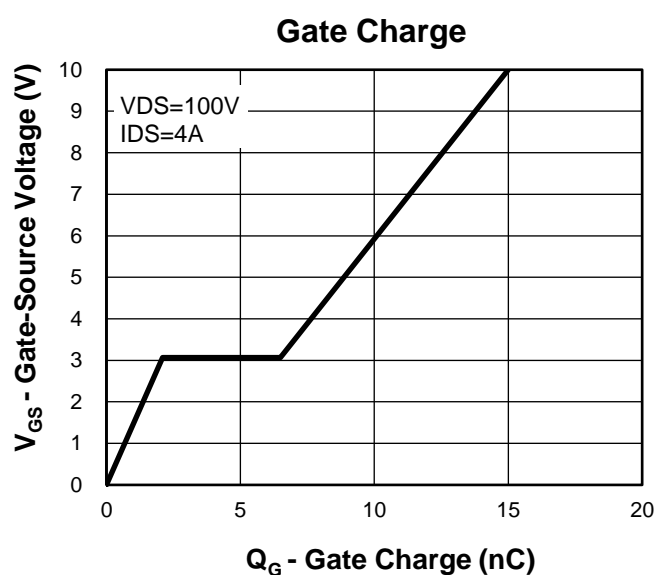
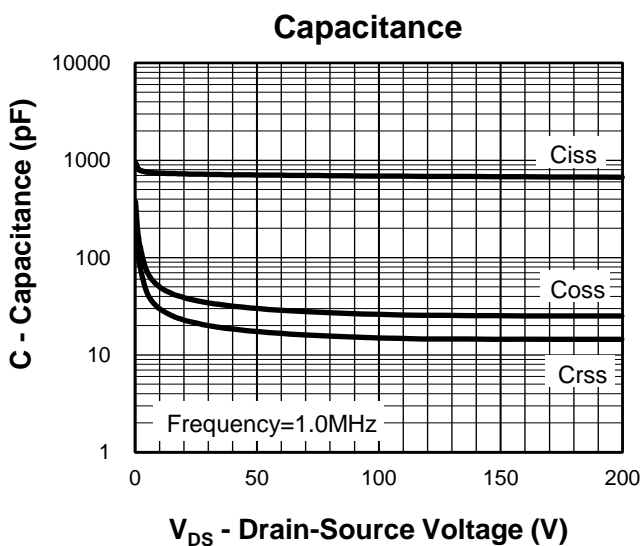
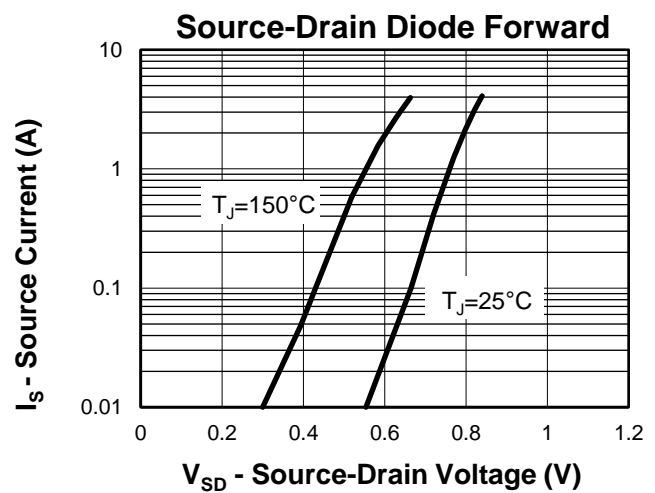
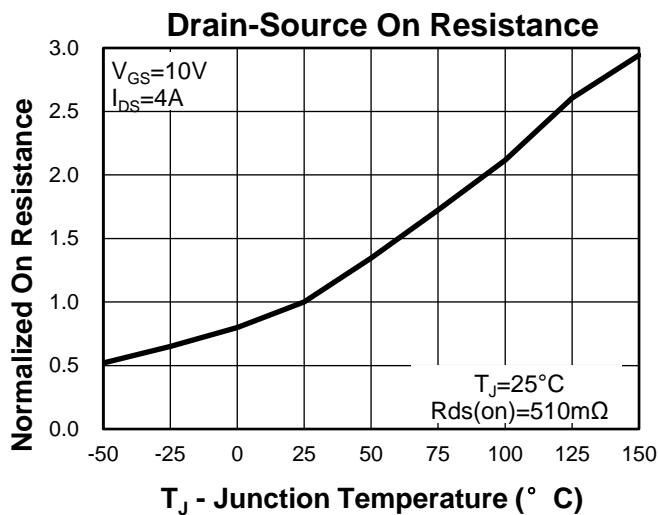
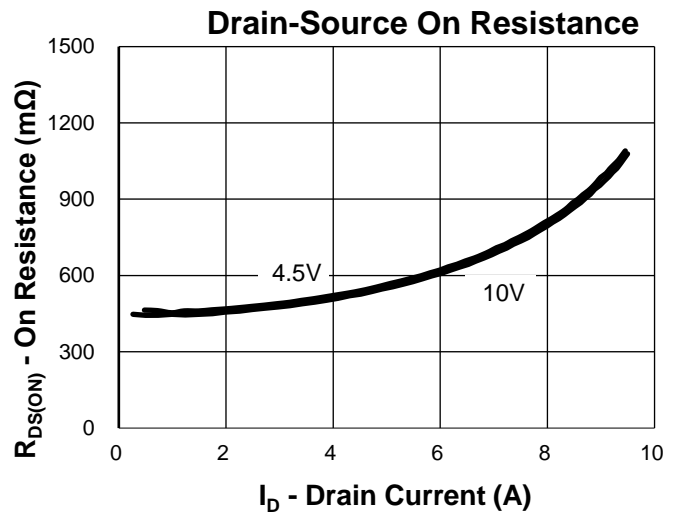
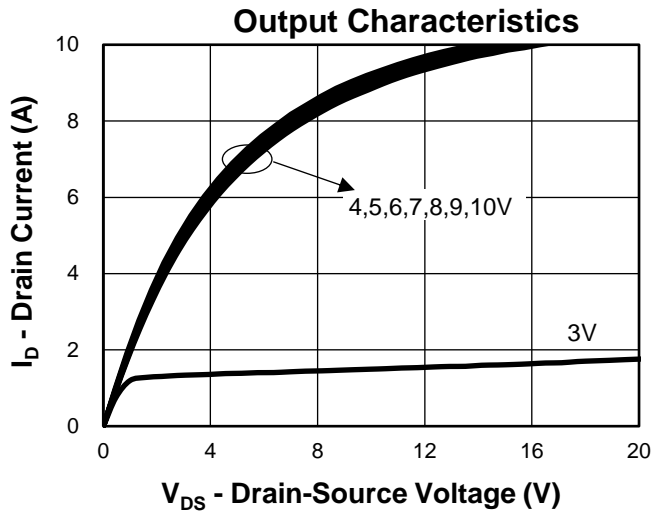
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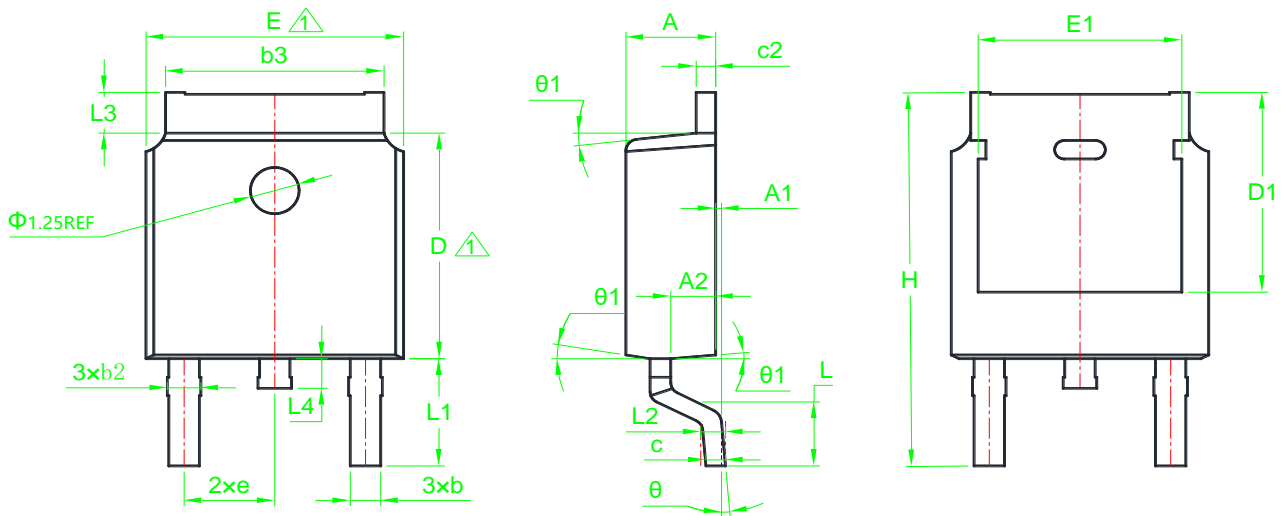
3rd Line: Lot Number(YWWXXX)

### Typical Characteristics



### Typical Characteristics

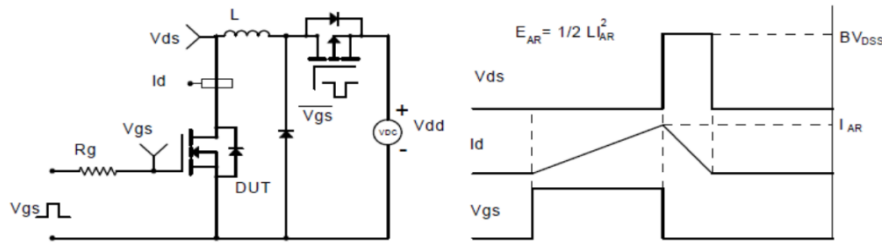


**Package Information**
**TO-252**


| SYMBOL | MM       |      |      | INCH     |       |       | SYMBOL     | MM       |       |       | INCH     |       |       |
|--------|----------|------|------|----------|-------|-------|------------|----------|-------|-------|----------|-------|-------|
|        | MIN      | NOM  | MAX  | MIN      | NOM   | MAX   |            | MIN      | NOM   | MAX   | MIN      | NOM   | MAX   |
| A      | 2.20     | 2.30 | 2.38 | 0.087    | 0.091 | 0.094 | E          | 6.40     | 6.60  | 6.70  | 0.252    | 0.260 | 0.264 |
| A1     | 0.00     | *    | 0.15 | 0.000    | *     | 0.006 | E1         | 4.55     | *     | 5.15  | 0.179    | *     | 0.203 |
| A2     | 0.90     | 1.00 | 1.10 | 0.035    | 0.039 | 0.043 | H          | 9.60     | 10.10 | 10.40 | 0.378    | 0.398 | 0.409 |
| b      | 0.65     | 0.75 | 0.85 | 0.026    | 0.030 | 0.033 | L          | 1.40     | 1.50  | 1.70  | 0.055    | 0.059 | 0.067 |
| b2     | 0.72     | *    | 0.90 | 0.028    | *     | 0.035 | L1         | 2.90REF  |       |       | 0.114REF |       |       |
| b3     | 5.13     | 5.33 | 5.46 | 0.202    | 0.210 | 0.215 | L2         | 0.508BSC |       |       | 0.020BSC |       |       |
| c      | 0.47     | 0.51 | 0.54 | 0.019    | 0.020 | 0.021 | L3         | 0.90     | *     | 1.25  | 0.035    | *     | 0.049 |
| D      | 6.00     | 6.10 | 6.20 | 0.236    | 0.240 | 0.244 | L4         | 0.60     | *     | 1.00  | 0.024    | *     | 0.039 |
| D1     | 5.25     | 5.35 | 5.60 | 0.207    | 0.211 | 0.220 | $\theta$   | 0°       | *     | 10°   | 0°       | *     | 10°   |
| e      | 2.286BSC |      |      | 0.090BSC |       |       | $\theta 1$ | 5°       | *     | 9°    | 5°       | *     | 9°    |

$\triangle 1$  Dimensions D and E do not include mold flash protrusions or gate burrs.

### 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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