

### Features

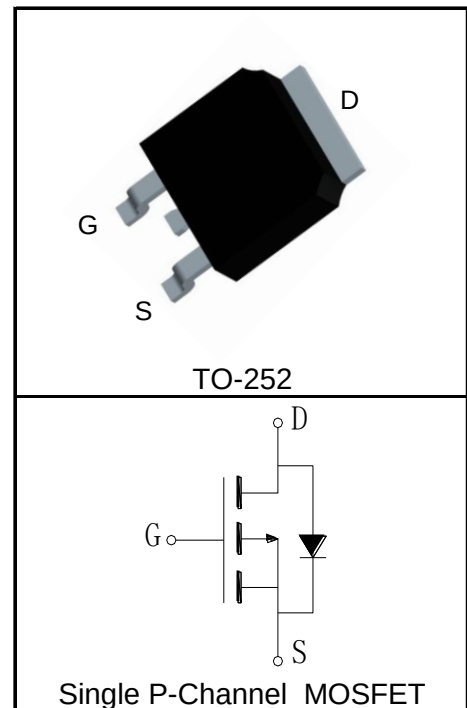
- -40V/-13A,  
 $R_{DS(ON)} = 65m\Omega(Typ.)@V_{GS}=-10V$   
 $R_{DS(ON)} = 80m\Omega(Typ.)@V_{GS}=-4.5V$
- Low  $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged

### Applications

- Power Switching Appliaction
- Load Switching



### Pin Description



### Absolute Maximum Ratings

| Symbol                                                       | Parameter                                       |                       | Rating     | Unit |
|--------------------------------------------------------------|-------------------------------------------------|-----------------------|------------|------|
| Common Ratings (T <sub>C</sub> =25°C Unless Otherwise Noted) |                                                 |                       |            |      |
| V <sub>DSS</sub>                                             | Drain-Source Voltage                            |                       | -40        | V    |
| V <sub>GSS</sub>                                             | Gate-Source Voltage                             |                       | ±20        |      |
| T <sub>J</sub>                                               | Maximum Junction Temperature                    |                       | 175        | °C   |
| T <sub>STG</sub>                                             | Storage Temperature Range                       |                       | -55 to 175 | °C   |
| I <sub>S</sub>                                               | Diode Continuous Forward Current                | T <sub>C</sub> =25°C  | -13        | A    |
| Mounted on Large Heat Sink                                   |                                                 |                       |            |      |
| I <sub>DP</sub> <sup>①</sup>                                 | 300μs Pulse Drain Current Tested                | T <sub>C</sub> =25°C  | -52        | A    |
| I <sub>D</sub> <sup>②</sup>                                  | Continuous Drain Current(V <sub>GS</sub> =-10V) | T <sub>C</sub> =25°C  | -13        | A    |
|                                                              |                                                 | T <sub>C</sub> =100°C | -9         |      |
| P <sub>D</sub>                                               | Maximum Power Dissipation                       | T <sub>C</sub> =25°C  | 25         | W    |
|                                                              |                                                 | T <sub>C</sub> =100°C | 13         |      |
| R <sub>θJC</sub>                                             | Thermal Resistance-Junction to Case             |                       | 6          | °C/W |
| R <sub>θJA</sub> <sup>③</sup>                                | Thermal Resistance-Junction to Ambient          |                       | 100        | °C/W |
| Drain-Source Avalanche Ratings                               |                                                 |                       |            |      |
| E <sub>AS</sub> <sup>④</sup>                                 | Avalanche Energy, Single Pulsed                 |                       | 9          | mJ   |

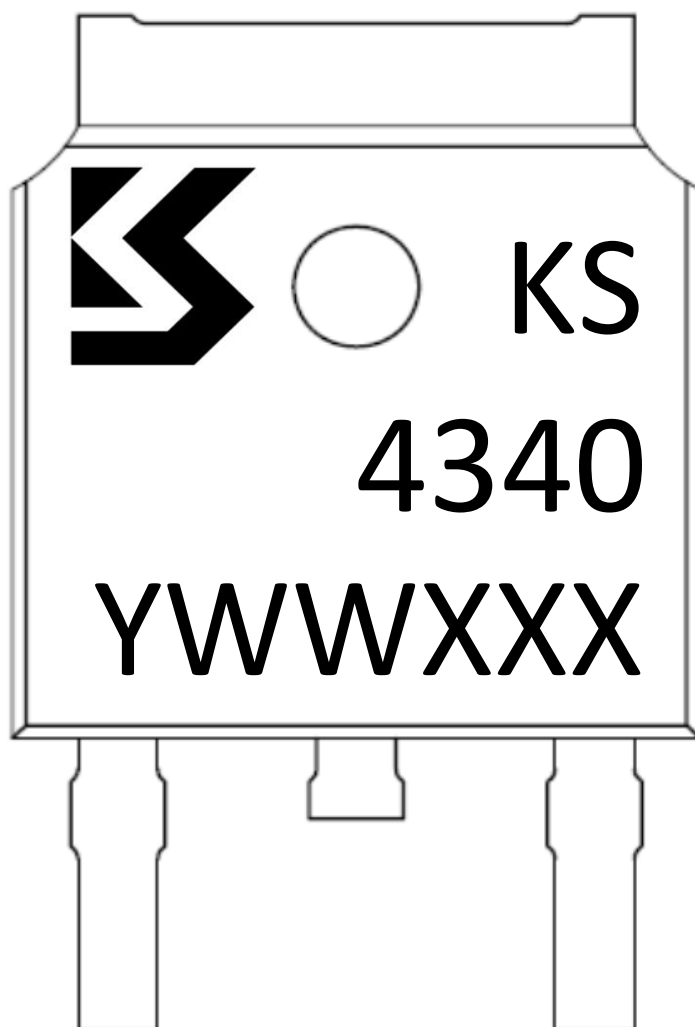
**Electrical Characteristics** ( $T_C=25^{\circ}\text{C}$  Unless Otherwise Noted)

| Symbol                                   | Parameter                        | Test Condition                                                                             | KS4340DB |       |      | Unit |
|------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------|----------|-------|------|------|
|                                          |                                  |                                                                                            | Min.     | Typ.  | Max. |      |
| Static Characteristics                   |                                  |                                                                                            |          |       |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA                                               | -40      |       |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-40V, 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     | -1.6  | -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> =-6A                                                |          | 65    | 80   | mΩ   |
|                                          |                                  | V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-4A                                               |          | 80    | 100  | mΩ   |
| Diode Characteristics                    |                                  |                                                                                            |          |       |      |      |
| V <sub>SD</sub> <sup>⑤</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =-6A, V <sub>GS</sub> =0V                                                  |          | -0.85 | -1.2 | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =-6A, dI <sub>SD</sub> /dt=-100A/μs                                        |          | 12    |      | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                            |          | 21    |      | nC   |
| Dynamic Characteristics <sup>⑥</sup>     |                                  |                                                                                            |          |       |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                           |          | 9.5   |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =-20V,<br>Frequency=1.0MHz                         |          | 500   |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                            |          | 65    |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                            |          | 30    |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =-20V, I <sub>DS</sub> =-6A,<br>V <sub>GEN</sub> =-10V, R <sub>G</sub> =3Ω |          | 13    |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                            |          | 10    |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                            |          | 24    |      |      |
| 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> =-20V, V <sub>GS</sub> =-10V,<br>I <sub>DS</sub> =-6A                      |          | 9.4   |      | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                            |          | 2.2   |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                            |          | 2.5   |      |      |

- 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  $T_{Jmax}$ ,  $I_{AS} = -6A$ ,  $L = 0.5\text{mH}$ ,  $V_{DD} = -20V$ ,  $R_G = 25\Omega$ , 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 |
|----------|---------|-----------|----------|-----------|------------|
| KS4340DB | TO-252  | Tape&Reel | 2500     | 13"       | 16mm       |

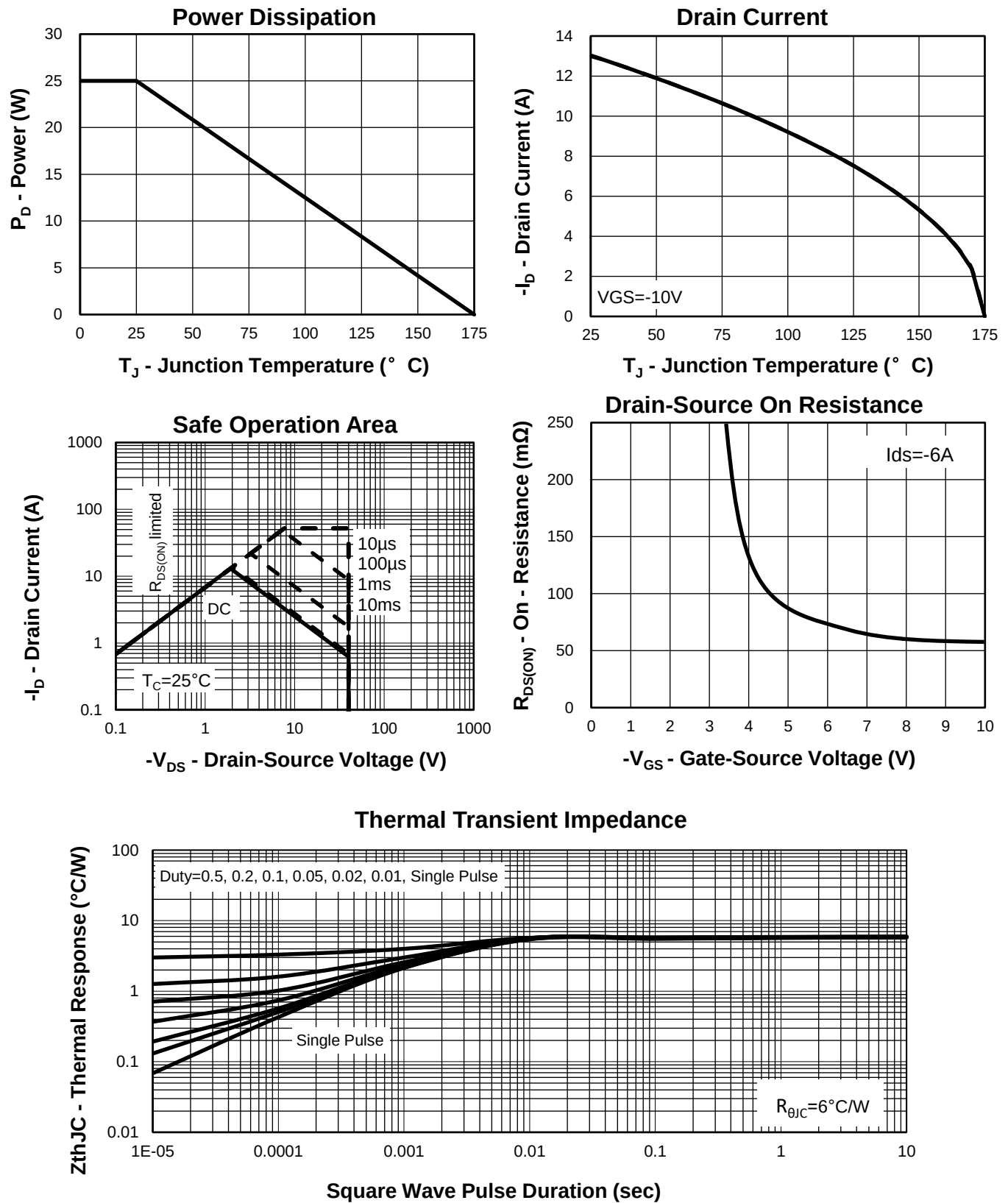


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

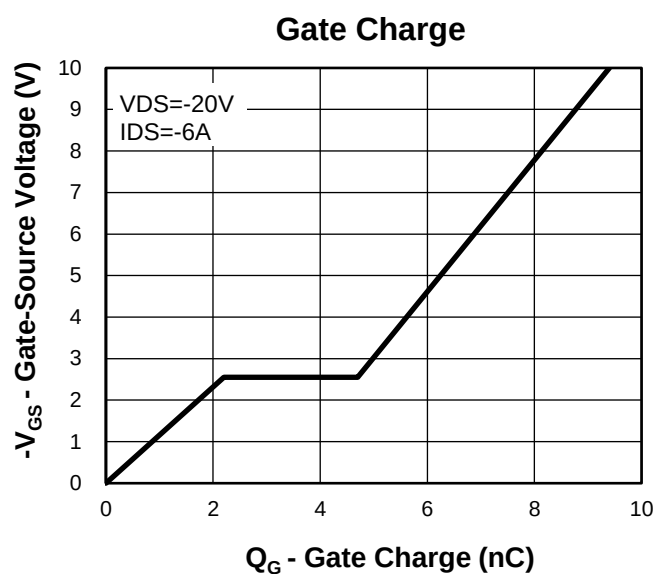
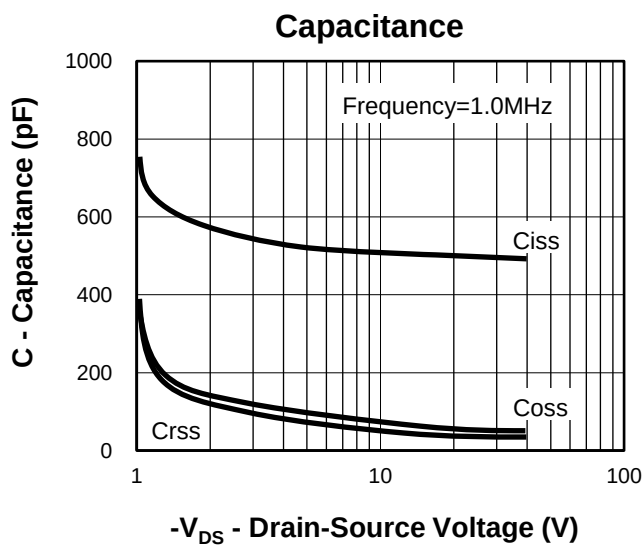
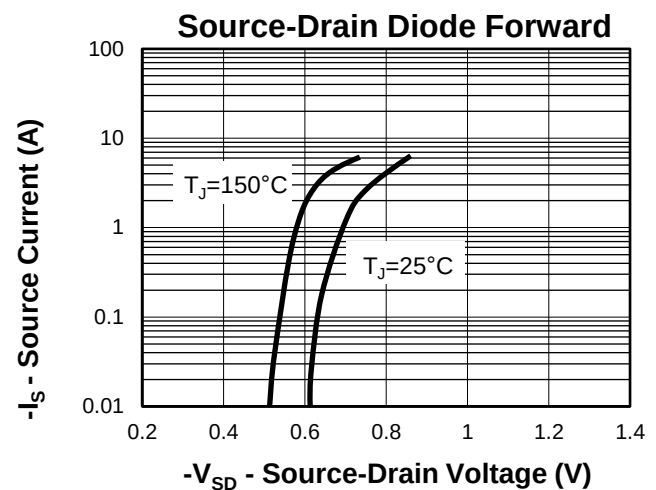
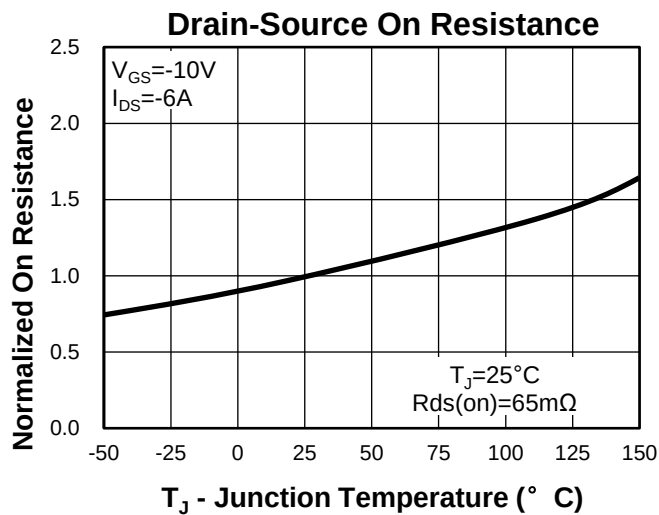
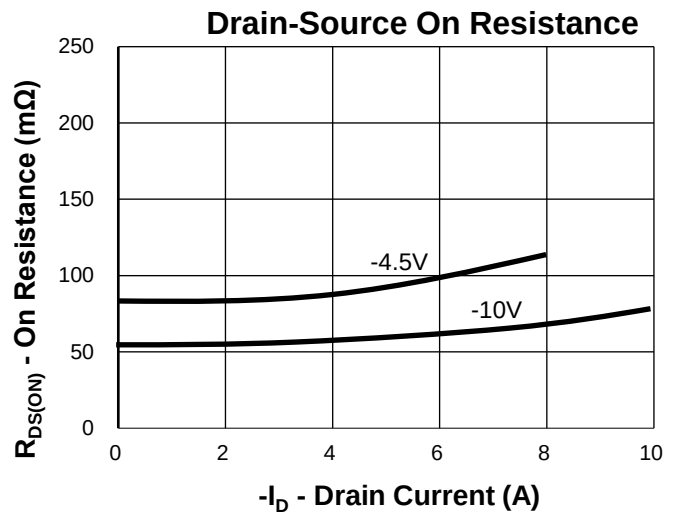
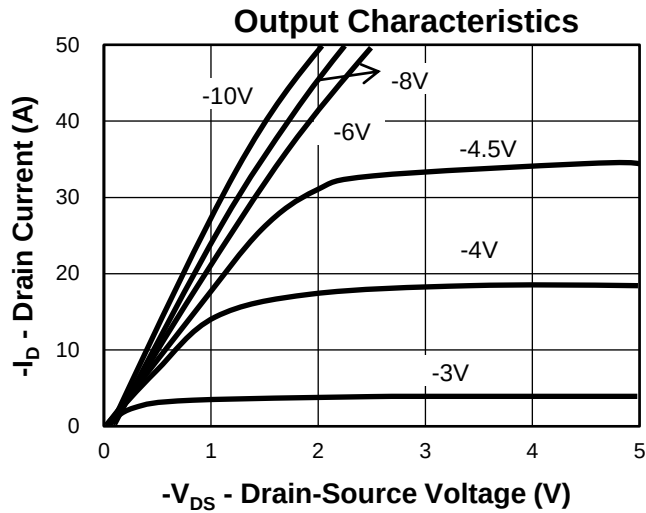
2nd Line: Part Number(4340)

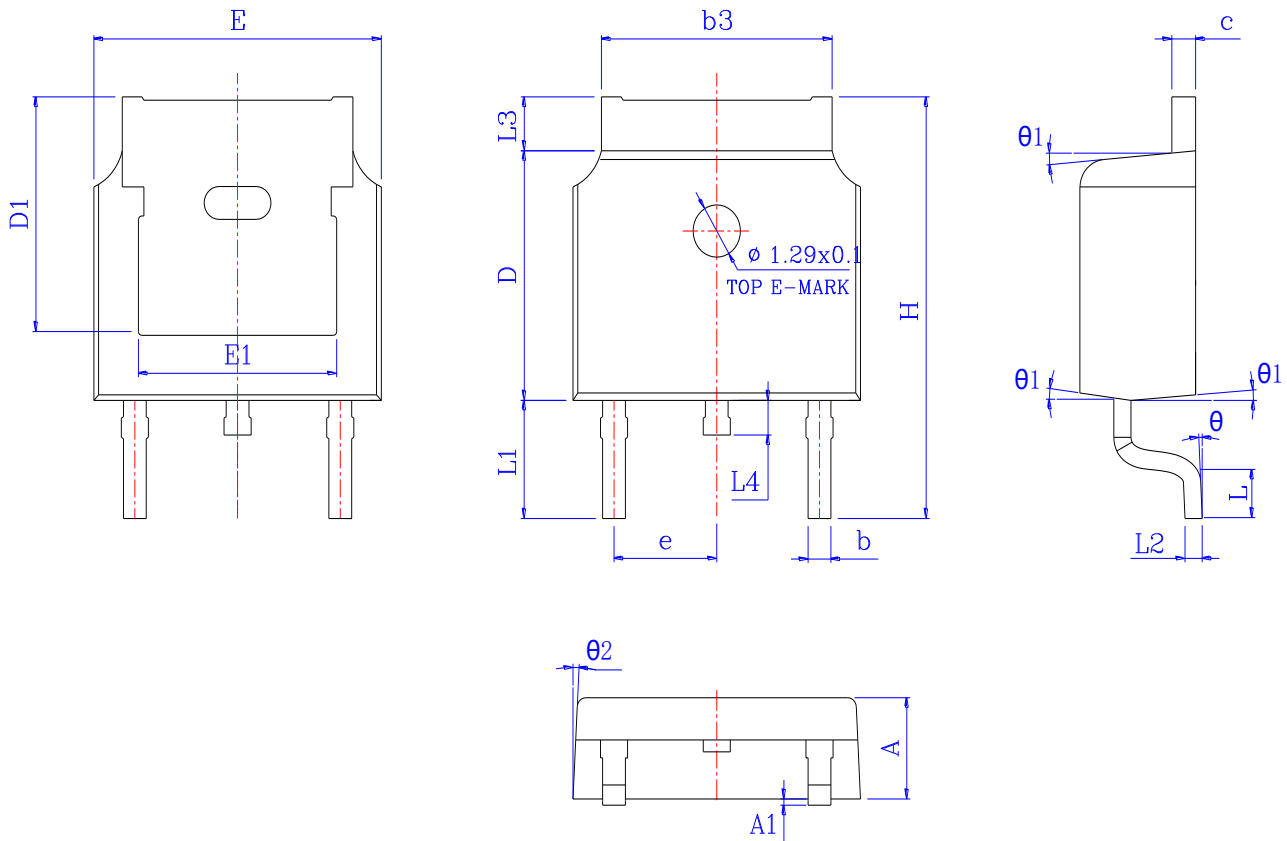
3rd Line: Lot Number(YWWXXX)

## Typical Characteristics



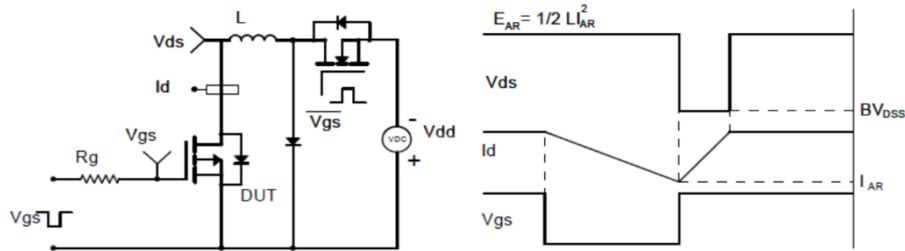
## Typical Characteristics



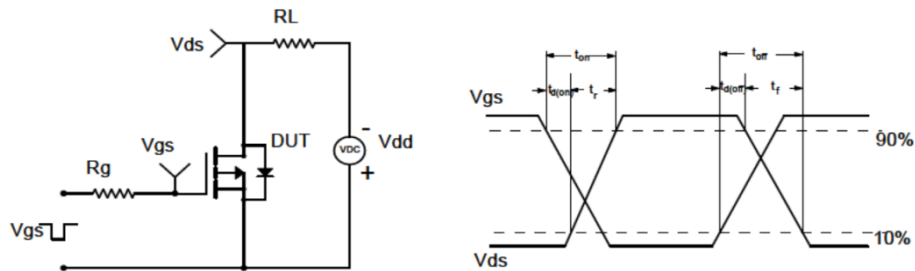
**Package Information**
**TO-252**


| 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 |
| $\theta$   | 0°        | *      | 8°     | 0°        | *     | 8°    |
| $\theta 1$ | 5°        | 7°     | 9°     | 5°        | 7°    | 9°    |
| $\theta 2$ | 5°        | 7°     | 9°     | 5°        | 7°    | 9°    |

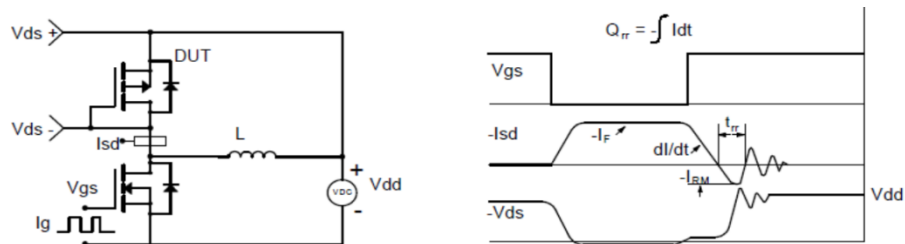
### Avalanche Test Circuit and Waveforms



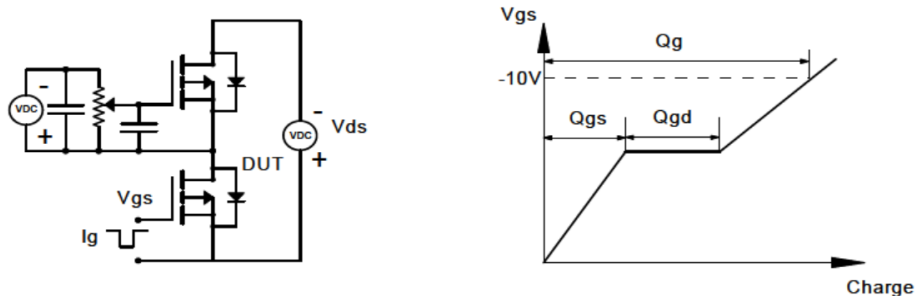
### Switching Time Test Circuit and Waveforms



### Diode Recovery Test Circuit and Waveforms



### Gate Charge Test Circuit and Waveform



### Customer Service

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