

## Features

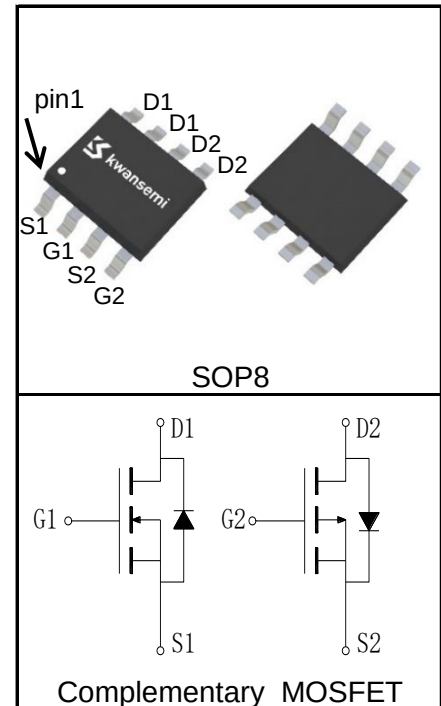
- N-Channel  
30V/12A,  
 $R_{DS(ON)} = 8m\Omega (Typ.) @ V_{GS}=10V$   
 $R_{DS(ON)} = 12m\Omega (Typ.) @ V_{GS}=4.5V$
- P-Channel  
-30V/-8A,  
 $R_{DS(ON)} = 17m\Omega (Typ.) @ V_{GS}=-10V$   
 $R_{DS(ON)} = 23m\Omega (Typ.) @ V_{GS}=-4.5V$
- Very low on-resistance
- Fast Switching

## Applications

- Load Switch



## Pin Description



## Absolute Maximum Ratings

| Symbol                                                       | Parameter                                       |                      | N-Channel  | P-Channel  | Unit |
|--------------------------------------------------------------|-------------------------------------------------|----------------------|------------|------------|------|
| Common Ratings (T <sub>A</sub> =25°C Unless Otherwise Noted) |                                                 |                      |            |            |      |
| V <sub>DSS</sub>                                             | Drain-Source Voltage                            |                      | 30         | -30        | V    |
| V <sub>GSS</sub>                                             | Gate-Source Voltage                             |                      | ±20        | ±20        |      |
| T <sub>Jmax</sub>                                            | Maximum Junction Temperature                    |                      | 150        | 150        | °C   |
| T <sub>J</sub> ,T <sub>STG</sub>                             | Operating and Storage Temperature Range         |                      | -55 to 150 | -55 to 150 | °C   |
| I <sub>S</sub>                                               | Diode Continuous Forward Current                | T <sub>A</sub> =25°C | 2.3        | -2.3       | A    |
| Mounted on Large Heat Sink                                   |                                                 |                      |            |            |      |
| I <sub>DP</sub> <sup>①</sup>                                 | Pulse Drain Current                             | T <sub>A</sub> =25°C | 48         | -32        | A    |
| I <sub>D</sub> <sup>②</sup>                                  | Continuous Drain Current(V <sub>GS</sub> =±10V) | T <sub>A</sub> =25°C | 12         | -8         | A    |
|                                                              |                                                 | T <sub>A</sub> =70°C | 9.6        | -6.4       |      |
| P <sub>D</sub>                                               | Maximum Power Dissipation                       | T <sub>A</sub> =25°C | 2          | 2          | W    |
|                                                              |                                                 | T <sub>A</sub> =70°C | 1.3        | 1.3        |      |
| R <sub>θJL</sub>                                             | Thermal Resistance-Junction to Lead             |                      | 40         | 40         | °C/W |
| R <sub>θJA</sub> <sup>③</sup>                                | Thermal Resistance-Junction to Ambient          |                      | 62.5       | 62.5       | °C/W |
| Drain-Source Avalanche Ratings                               |                                                 |                      |            |            |      |
| E <sub>AS</sub> <sup>④</sup>                                 | Avalanche Energy, Single Pulsed                 |                      | 72         | 72         | mJ   |

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

| Symbol                               | Parameter                        | Test Condition                                                               | KS3620HA |                       |       | Unit |    |
|--------------------------------------|----------------------------------|------------------------------------------------------------------------------|----------|-----------------------|-------|------|----|
|                                      |                                  |                                                                              | Min.     | Typ.                  | Max.  |      |    |
| Static Characteristics               |                                  |                                                                              |          |                       |       |      |    |
| BV <sub>DSS</sub>                    | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                  | N        | 30                    |       |      | V  |
|                                      |                                  | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA                                 | P        | -30                   |       |      |    |
| I <sub>DSS</sub>                     | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V                                    | N        |                       |       | 1    | μA |
|                                      |                                  |                                                                              |          | T <sub>J</sub> =125°C |       |      |    |
|                                      |                                  | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                   | P        |                       |       | -1   |    |
|                                      |                                  |                                                                              |          | 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                    | N        | 1.1                   | 1.6   | 2.3  | V  |
|                                      |                                  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA                   | P        | -1.1                  | -1.6  | -2.3 |    |
| I <sub>GSS</sub>                     | Gate Leakage Current             | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                   | N        |                       |       | ±100 | nA |
|                                      |                                  | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                   | P        |                       |       | ±100 |    |
| R <sub>DS(ON)</sub> <sup>⑤</sup>     | Drain-Source On-state Resistance | V <sub>GS</sub> =10V, I <sub>DS</sub> =12A                                   | N        |                       | 8     | 10.2 | mΩ |
|                                      |                                  | V <sub>GS</sub> =-10V, I <sub>DS</sub> =-8A                                  | P        |                       | 17    | 21   |    |
|                                      |                                  | V <sub>GS</sub> =4.5V, I <sub>DS</sub> =6A                                   | N        |                       | 12    | 16   |    |
|                                      |                                  | V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-4A                                 | P        |                       | 23    | 30   |    |
| Diode Characteristics                |                                  |                                                                              |          |                       |       |      |    |
| V <sub>SD</sub> <sup>⑤</sup>         | Diode Forward Voltage            | I <sub>SD</sub> =8A, V <sub>GS</sub> =0V                                     | N        |                       | 0.82  | 1.2  | V  |
|                                      |                                  | I <sub>SD</sub> =-8A, V <sub>GS</sub> =0V                                    | P        |                       | -0.87 | -1.2 |    |
| t <sub>rr</sub>                      | Reverse Recovery Time            | N-Channel<br>I <sub>SD</sub> =8A, dI <sub>SD</sub> /dt=100A/μs               | N        |                       | 15    |      | ns |
|                                      |                                  |                                                                              | P        |                       | 16    |      |    |
| Q <sub>rr</sub>                      | Reverse Recovery Charge          | P-Channel<br>I <sub>SD</sub> =-8A, dI <sub>SD</sub> /dt=100A/μs              | N        |                       | 23    |      | nC |
|                                      |                                  |                                                                              | P        |                       | 35    |      |    |
| Dynamic Characteristics <sup>⑥</sup> |                                  |                                                                              |          |                       |       |      |    |
| R <sub>G</sub>                       | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                             | N        |                       | 5     |      | Ω  |
|                                      |                                  |                                                                              | P        |                       | 8     |      |    |
| C <sub>iss</sub>                     | Input Capacitance                | N-Channel<br>V <sub>GS</sub> =0V, V <sub>DS</sub> =15V,<br>Frequency=1.0MHz  | N        |                       | 1100  |      | pF |
|                                      |                                  |                                                                              | P        |                       | 1340  |      |    |
| C <sub>oss</sub>                     | Output Capacitance               |                                                                              | N        |                       | 175   |      |    |
|                                      |                                  |                                                                              | P        |                       | 185   |      |    |
| C <sub>rss</sub>                     | Reverse Transfer Capacitance     | P-Channel<br>V <sub>GS</sub> =0V, V <sub>DS</sub> =-15V,<br>Frequency=1.0MHz | N        |                       | 140   |      |    |
|                                      |                                  |                                                                              | P        |                       | 160   |      |    |

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

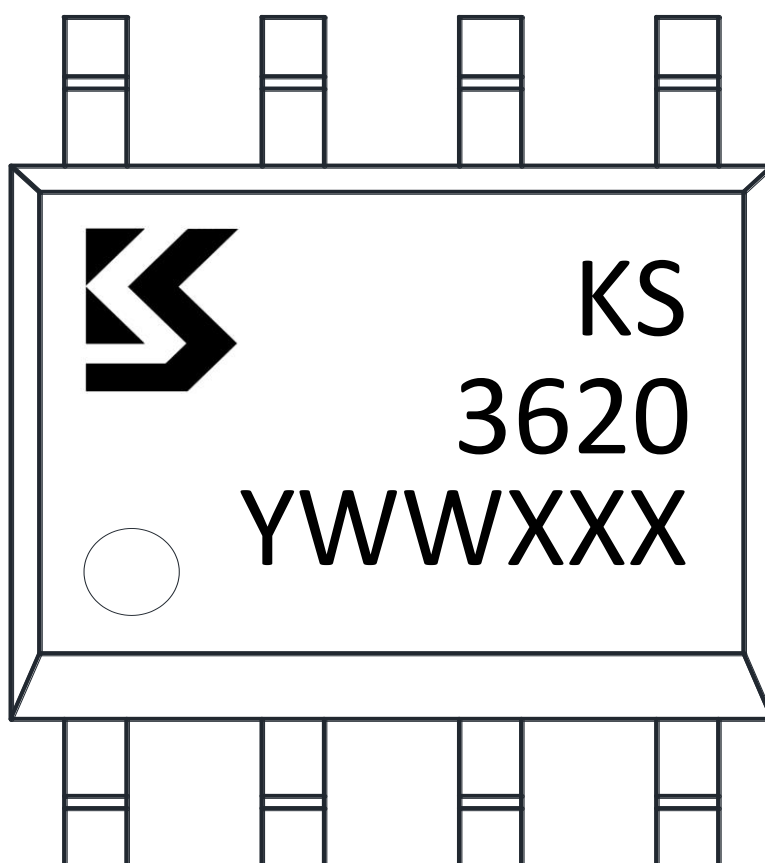
| Symbol                                   | Parameter           | Test Condition                                                                                       | KS3620HA |      |      | Unit |
|------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------|----------|------|------|------|
|                                          |                     |                                                                                                      | Min.     | Typ. | Max. |      |
| Dynamic Characteristics <sup>⑥</sup>     |                     |                                                                                                      |          |      |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time  | N-Channel<br>V <sub>DD</sub> =15V, I <sub>DS</sub> =8A,<br>V <sub>GEN</sub> =10V, R <sub>G</sub> =3Ω | N        |      | 8    | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time   |                                                                                                      | P        |      | 11   |      |
|                                          |                     |                                                                                                      | N        |      | 11   |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time |                                                                                                      | P        |      | 14   |      |
|                                          |                     | N                                                                                                    |          | 25   |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time  | P                                                                                                    |          | 55   |      |      |
|                                          |                     | N                                                                                                    |          | 7    |      |      |
|                                          |                     | P                                                                                                    |          | 30   |      |      |
| Gate Charge Characteristics <sup>⑥</sup> |                     |                                                                                                      |          |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge   | N-Channel<br>V <sub>DS</sub> =15V, V <sub>GS</sub> =10V,<br>I <sub>DS</sub> =8A                      | N        |      | 22   | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge  |                                                                                                      | P        |      | 24   |      |
|                                          |                     | N                                                                                                    |          | 3    |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge   | P                                                                                                    |          | 5.2  |      |      |
|                                          |                     | N                                                                                                    |          | 5.3  |      |      |
|                                          |                     | P                                                                                                    |          | 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  $T_J = 25^{\circ}\text{C}$ , N Channel:  $I_{ASmax} = 17\text{A}$ ,  $L = 0.5\text{mH}$ ,  $V_{DD} = 20\text{V}$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10\text{V}$ , Part not recommended for use above this value. P-Channel:  $I_{ASmax} = -17\text{A}$ ,  $L = 0.5\text{mH}$ ,  $V_{DD} = -20\text{V}$ ,  $R_G = 25\Omega$ ,  $V_{GS} = -10\text{V}$ , Part not recommended for use above this value.
- ⑤ Pulse test; Pulse width  $\leq 300\mu\text{s}$ , 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 |
|----------|---------|-----------|----------|-----------|------------|
| KS3620HA | SOP8    | Tape&Reel | 3000     | 13"       | 12mm       |

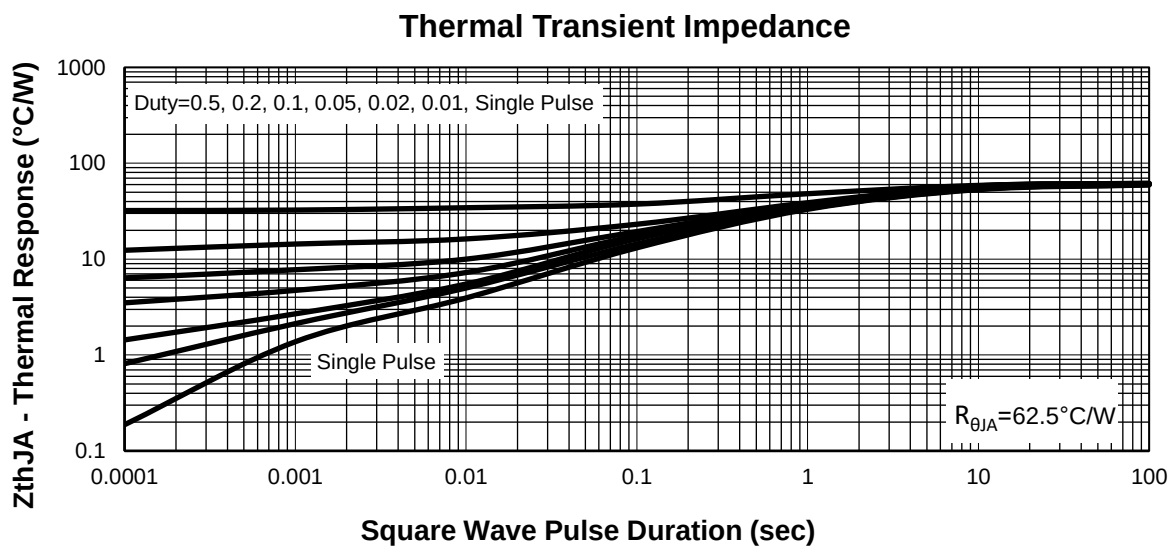
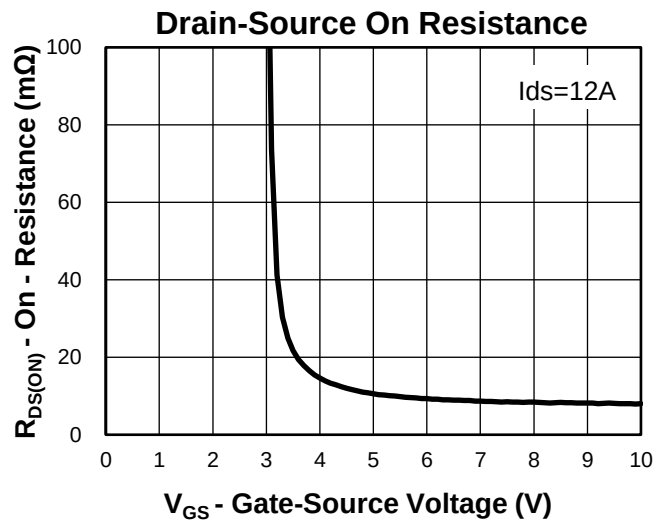
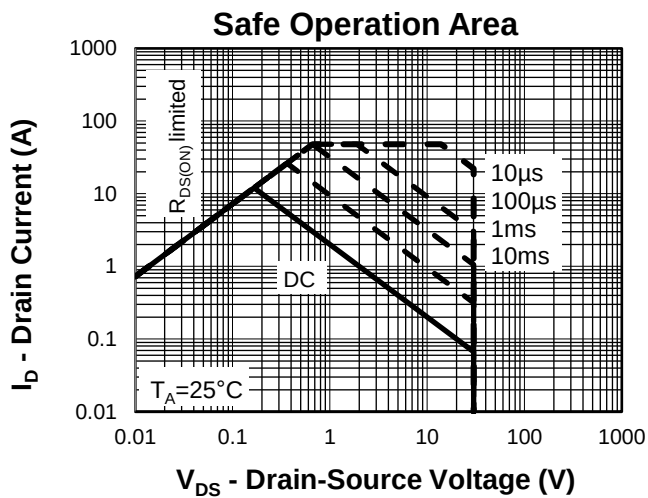
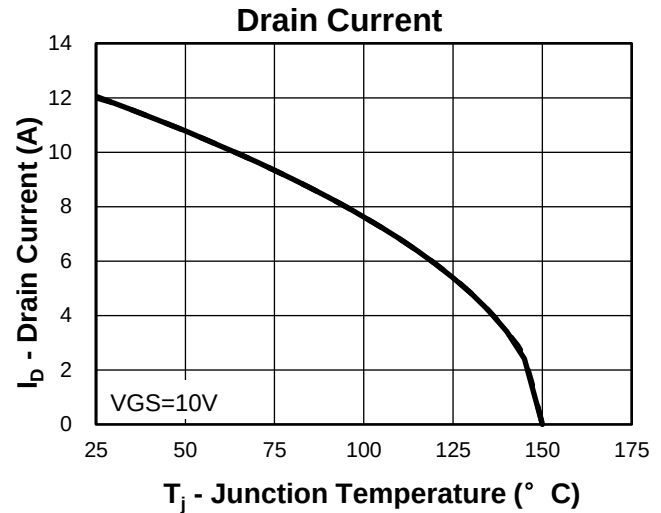
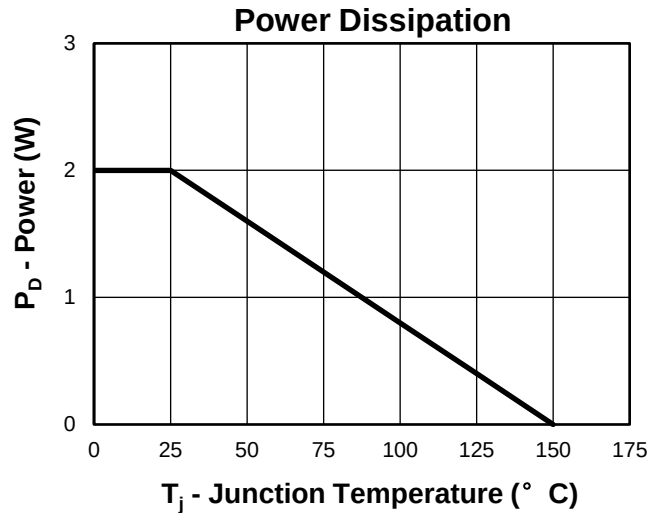


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

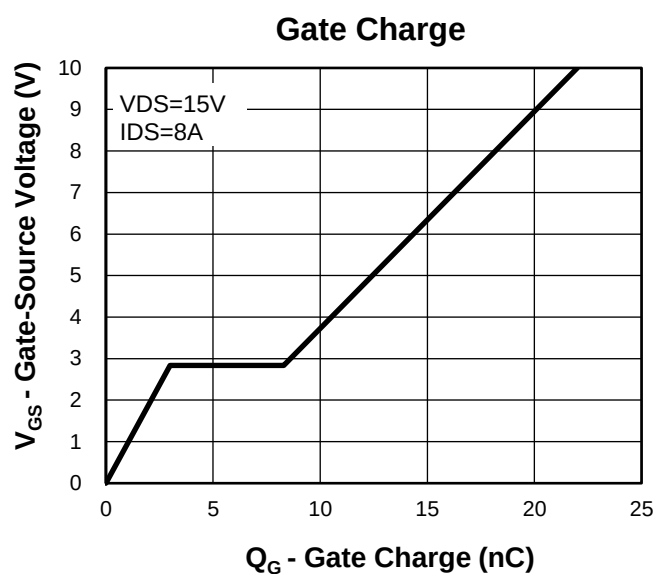
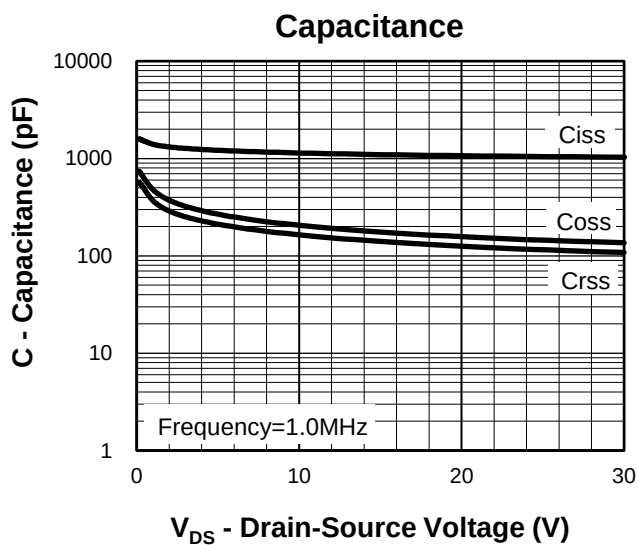
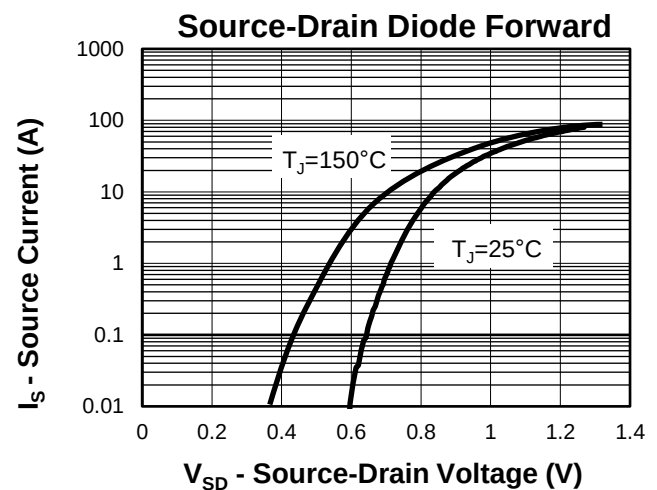
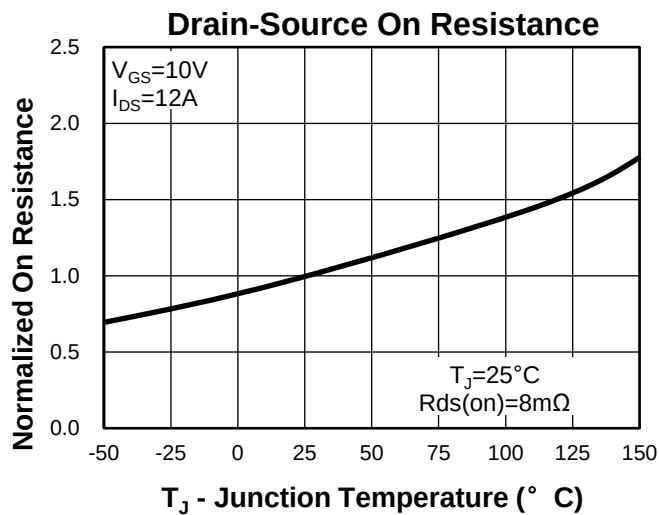
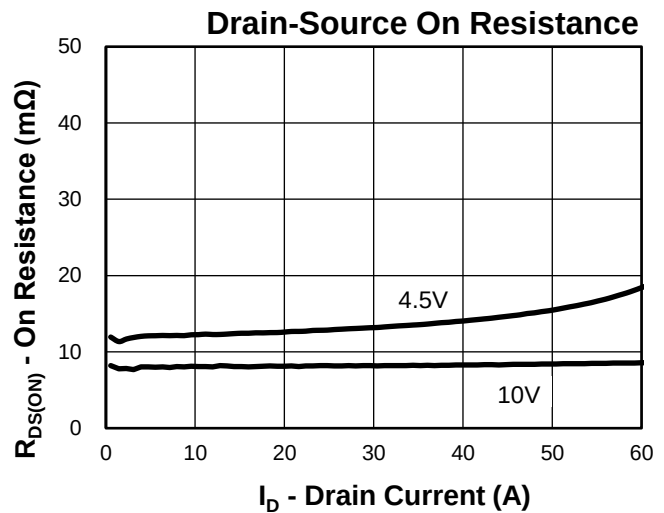
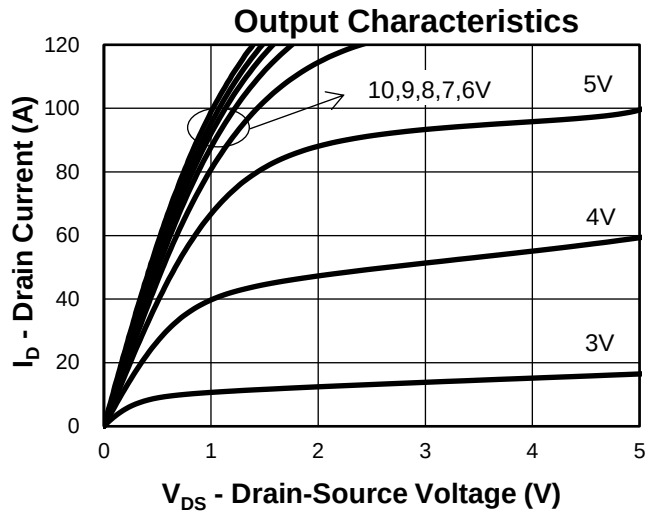
2nd Line: Part Number(3620)

3rd Line: Lot Number(YWWXXX)

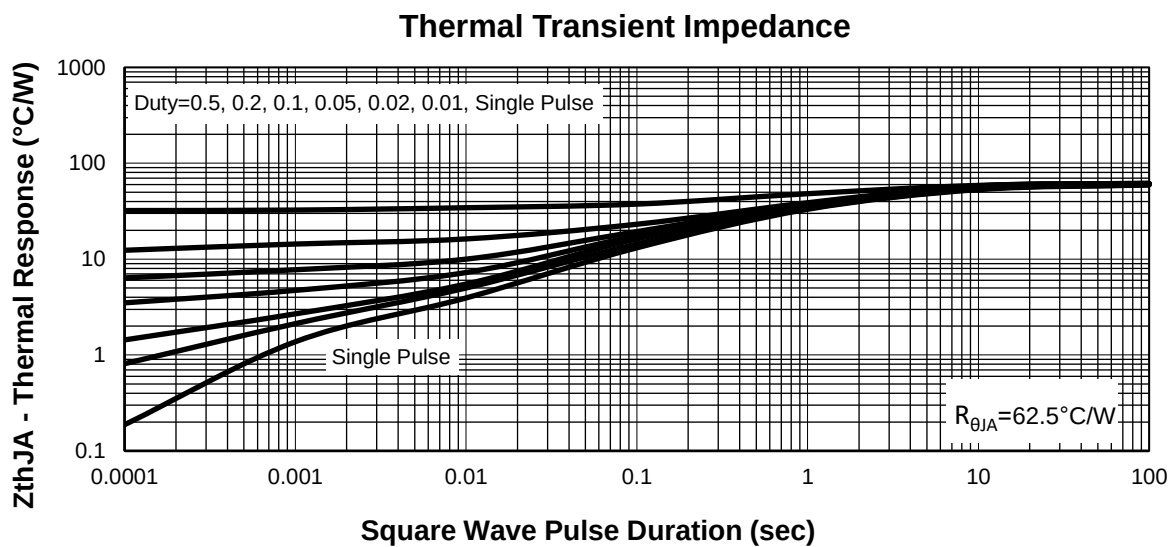
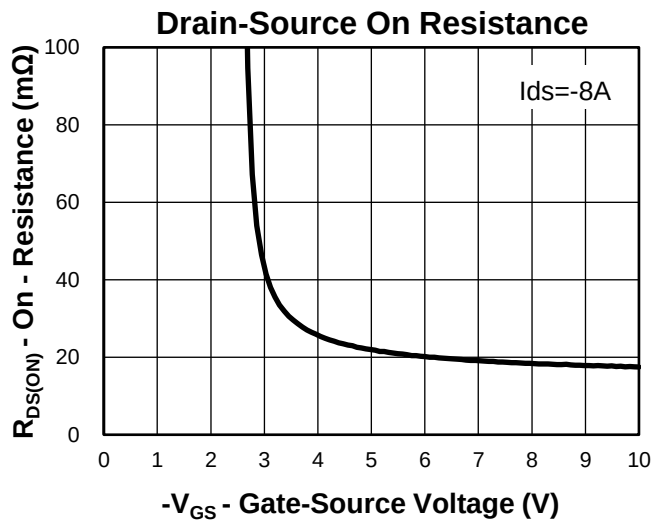
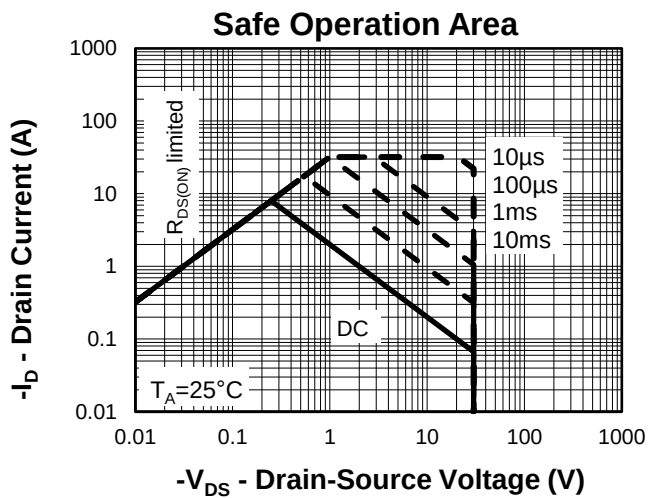
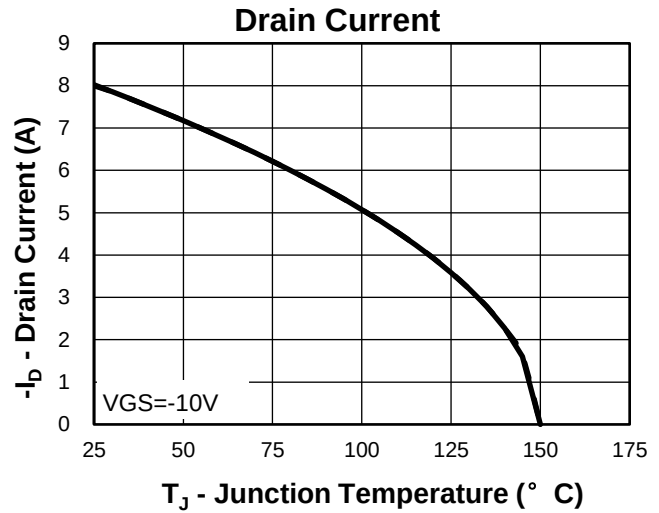
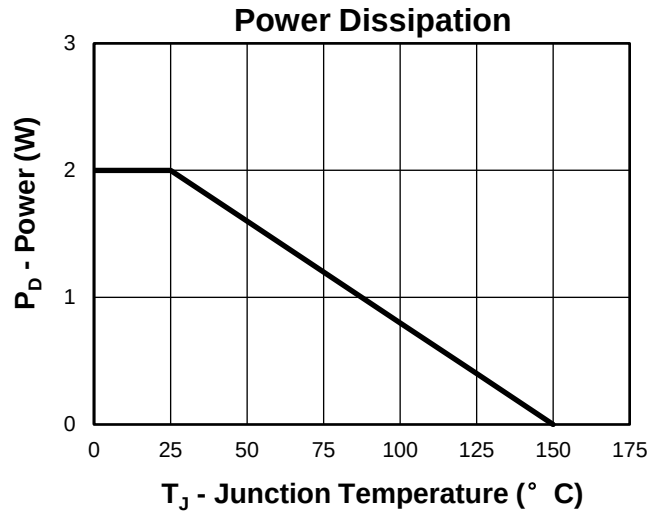
## Typical Characteristics(N-Channel)



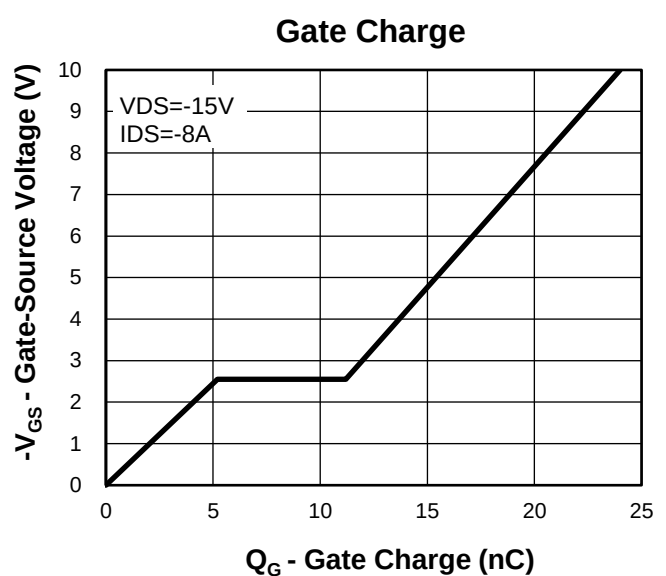
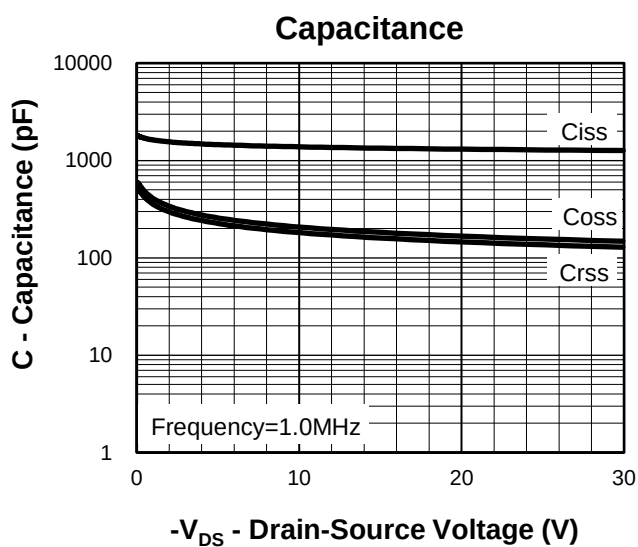
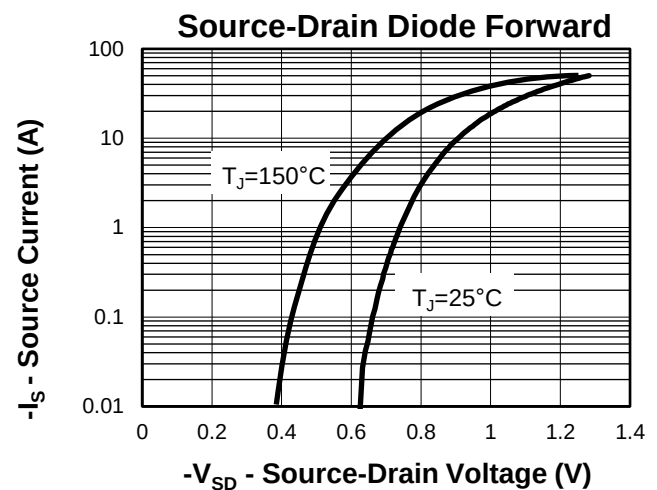
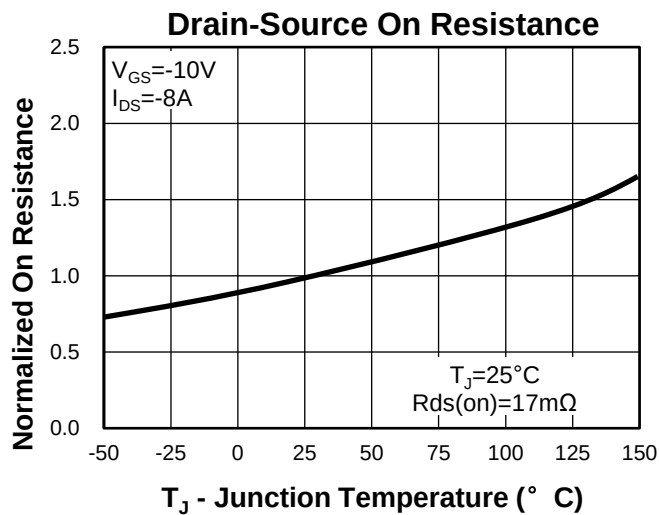
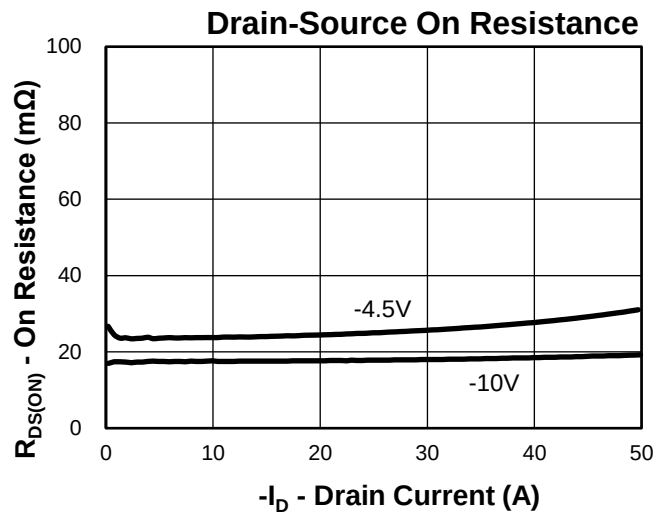
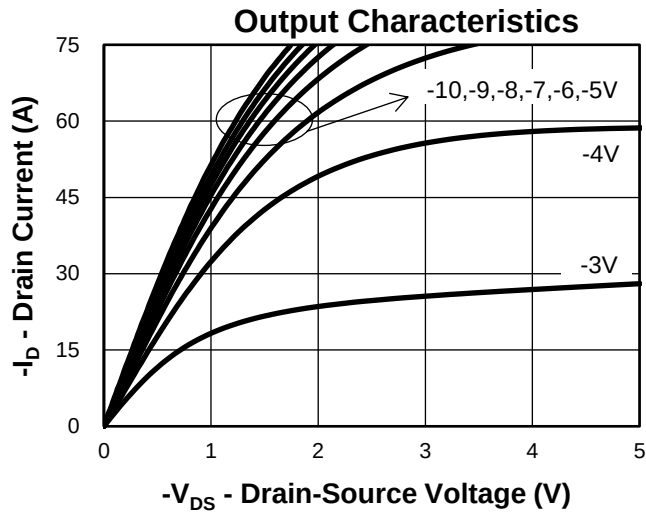
## Typical Characteristics(N-Channel)



## Typical Characteristics(P-Channel)



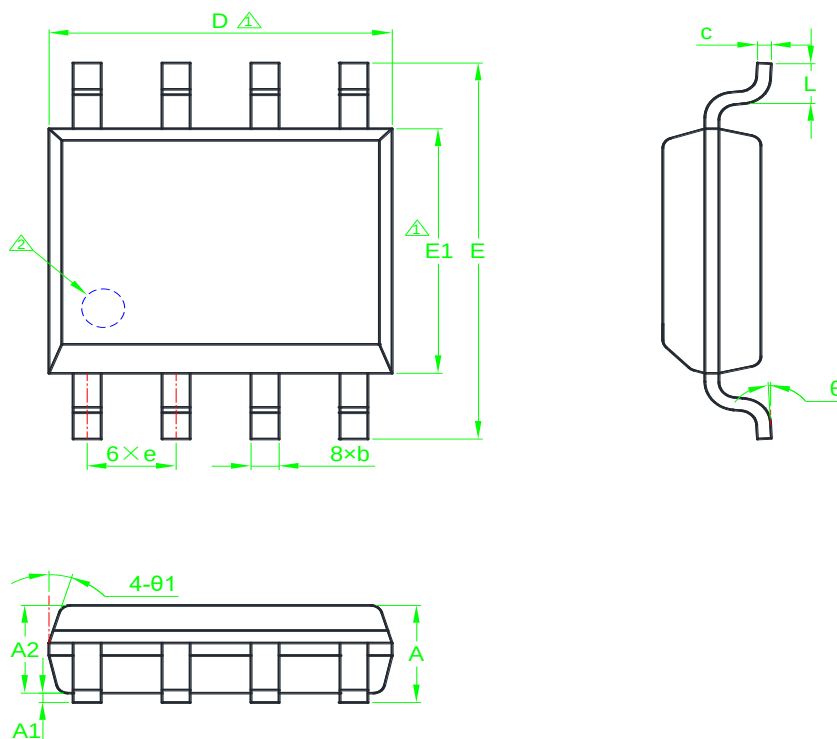
## Typical Characteristics(P-Channel)





## Package Information

### SOP8

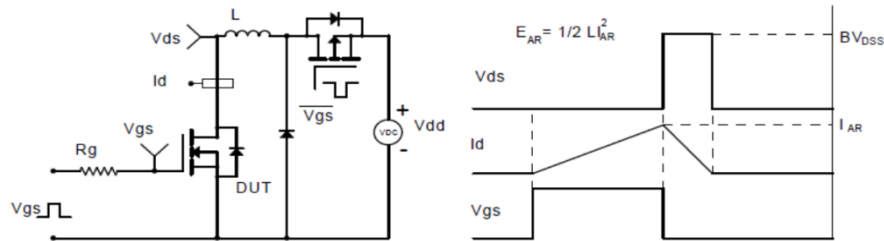


| SYMBOL | MM      |      |      | INCH     |       |       |
|--------|---------|------|------|----------|-------|-------|
|        | MIN     | NOM  | MAX  | MIN      | NOM   | MAX   |
| A      | 1.35    | *    | 1.75 | 0.053    | *     | 0.069 |
| A1     | 0.10    | *    | 0.25 | 0.004    | *     | 0.010 |
| A2     | 1.25    | 1.45 | 1.65 | 0.049    | 0.057 | 0.065 |
| b      | 0.33    | *    | 0.51 | 0.013    | *     | 0.020 |
| c      | 0.15    | *    | 0.25 | 0.006    | *     | 0.010 |
| D      | 4.70    | 4.90 | 5.10 | 0.185    | 0.193 | 0.201 |
| E      | 5.80    | 6.00 | 6.30 | 0.228    | 0.236 | 0.248 |
| E1     | 3.80    | 3.90 | 4.00 | 0.150    | 0.154 | 0.157 |
| e      | 1.27BSC |      |      | 0.050BSC |       |       |
| L      | 0.40    | *    | 1.27 | 0.016    | *     | 0.050 |
| θ      | 0°      | *    | 8°   | 0°       | *     | 8°    |
| θ 1    | 5°      | *    | 15°  | 5°       | *     | 15°   |

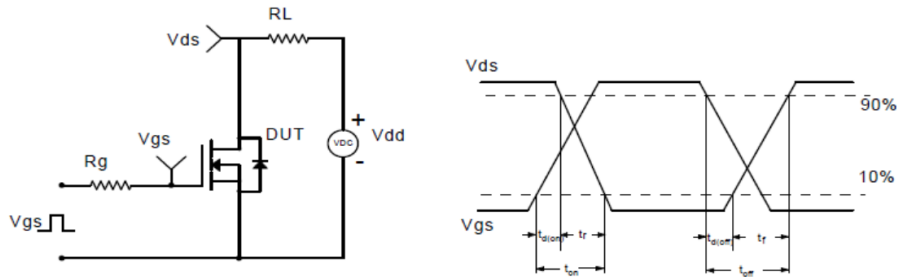
① Dimensions D and E1 do not include mold flash protrusions or gate burrs.

② The existence and size of demolding hole are variable depending on mold.

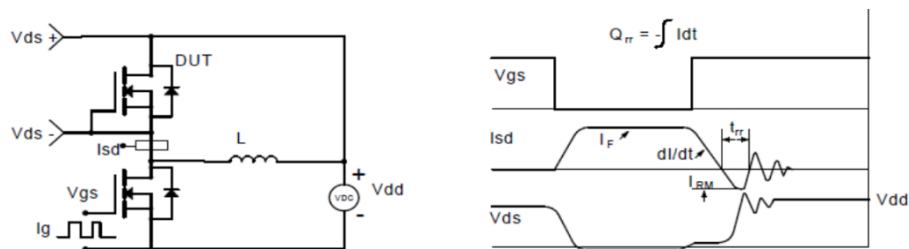
### Avalanche Test Circuit and Waveforms(N-Channel)



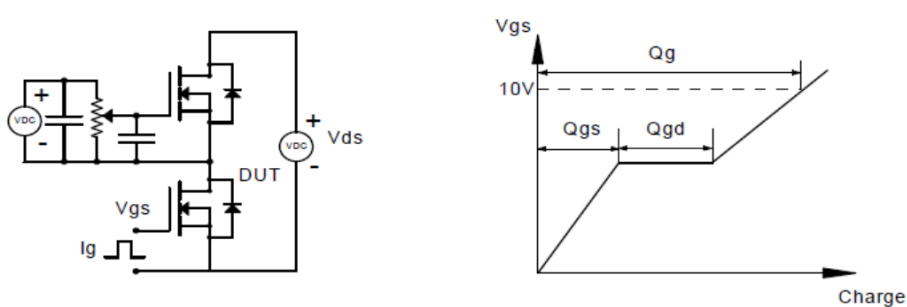
### Switching Time Test Circuit and Waveforms(N-Channel)



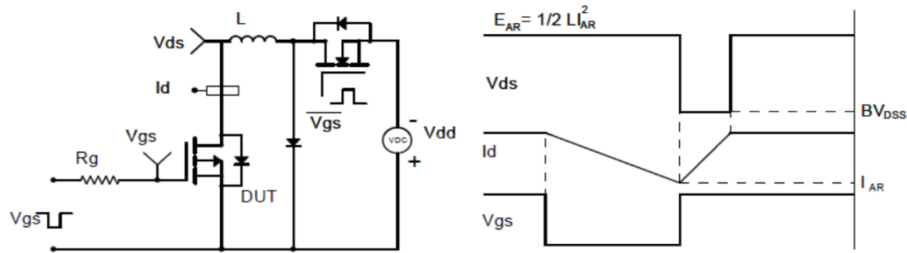
### Diode Recovery Test Circuit and Waveforms(N-Channel)



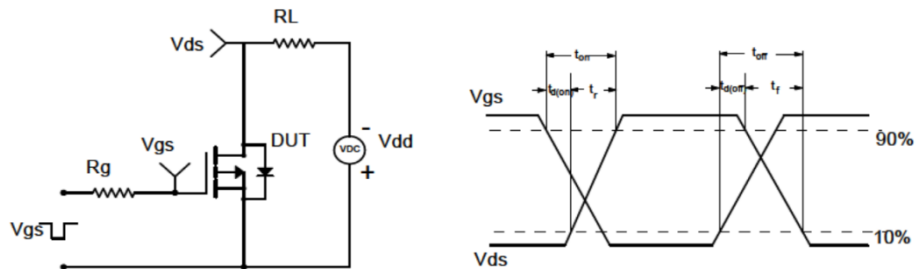
### Gate Charge Test Circuit and Waveform(N-Channel)



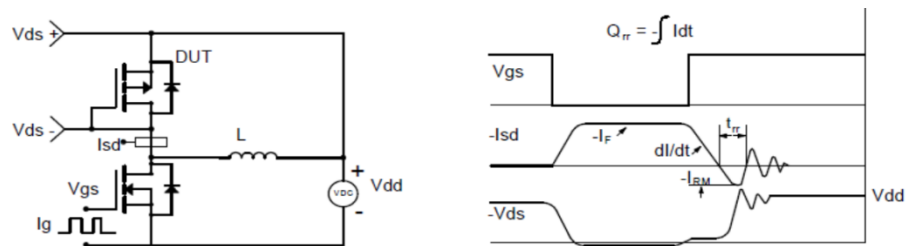
### Avalanche Test Circuit and Waveforms(P-Channel)



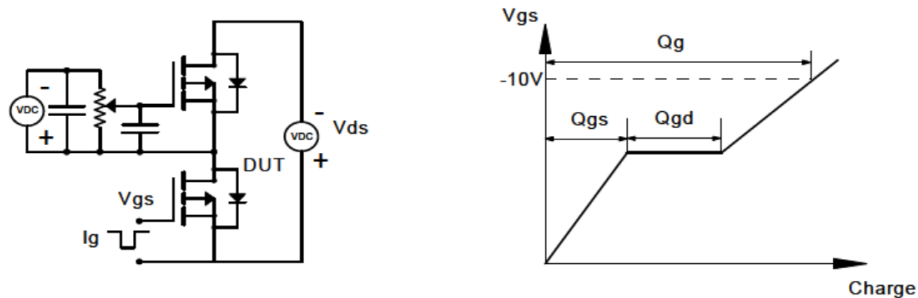
### Switching Time Test Circuit and Waveforms(P-Channel)



### Diode Recovery Test Circuit and Waveforms(P-Channel)



### Gate Charge Test Circuit and Waveform(P-Channel)



## Customer Service

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