

### Features

- 300V/30A,  
 $R_{DS(ON)} = 95m\Omega(Typ.)@V_{GS}=10V$
- Planar Technology
- High Ruggedness
- 100% Avalanche Tested

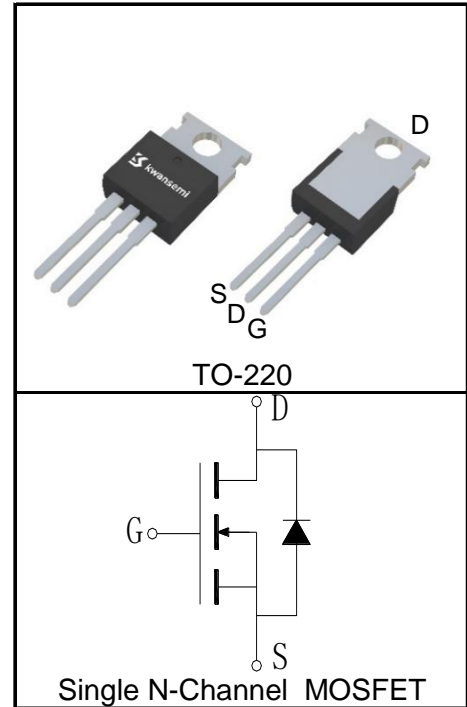
### Applications

- DC-DC Converters and Off-line UPS
- Power Management in Inverter System



Halogen-Free

### 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                     | 300               | V            |   |
| $V_{GSS}$  | Gate-Source Voltage                      | $\pm 30$          |              |   |
| $T_{Jmax}$   | Maximum Junction Temperature             | 150               | $^\circ C$   |   |
| $T_J, T_{STG}$   | Operating and Storage Temperature Range  | -55 to 150        | $^\circ C$   |   |
| $I_S$  | Diode Continuous Forward Current         | $T_C=25^\circ C$  | 30           | A |
| <b>Mounted on Large Heat Sink</b>                                |  |                   |              |   |
| $I_{DP}^{①}$   | Pulse Drain Current                      | $T_C=25^\circ C$  | 120          | A |
| $I_D^{②}$  | Continuous Drain Current( $V_{GS}=10V$ ) | $T_C=25^\circ C$  | 30           | A |
|  |  | $T_C=100^\circ C$ | 19           |   |
| $P_D$  | Maximum Power Dissipation                | $T_C=25^\circ C$  | 250          | W |
|  |  | $T_C=100^\circ C$ | 100          |   |
| $R_{\theta JC}$  | Thermal Resistance-Junction to Case      | 0.5               | $^\circ C/W$ |   |
| $R_{\theta JA}^{③}$  | Thermal Resistance-Junction to Ambient   | 62.5              | $^\circ C/W$ |   |
| <b>Drain-Source Avalanche Ratings</b>                            |  |                   |              |   |
| $E_{AS}^{④}$   | Avalanche Energy, Single Pulsed          | 784               | mJ           |   |

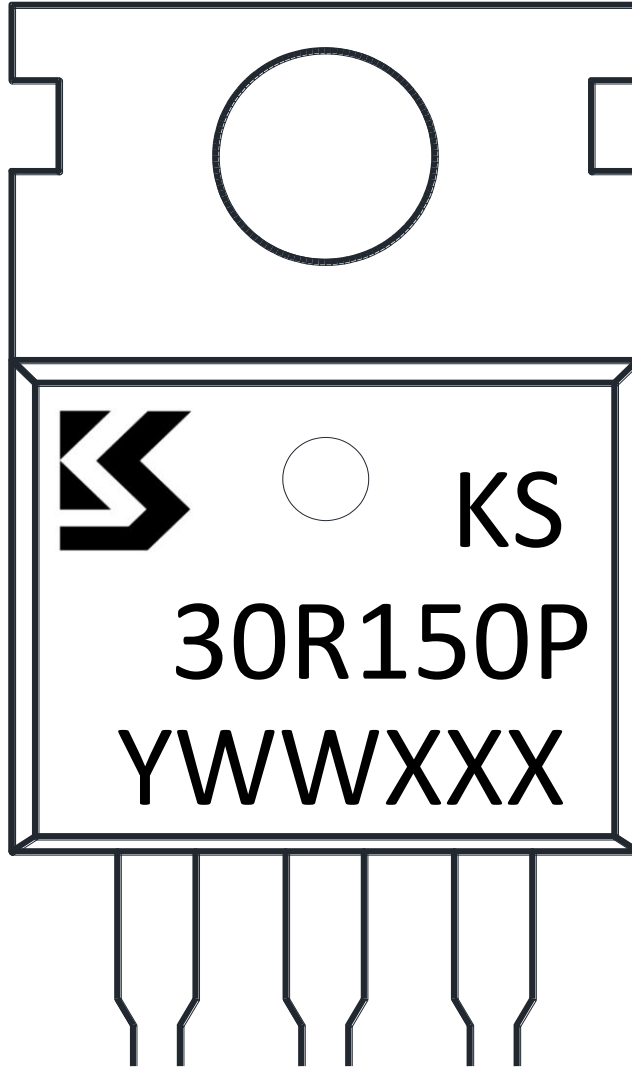
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  Unless Otherwise Noted)

| Symbol   | Parameter                        | Test Condition   | KS30R150CAP |      |           | Unit      |
|--|----------------------------------|--|-------------|------|-----------|-----------|
|  |                                  |  | Min.        | Typ. | Max.      |           |
| <b>Static Characteristics</b>                    |                                  |  |             |      |           |           |
| $BV_{DSS}$                                       | Drain-Source Breakdown Voltage   | $V_{GS}=0V, I_{DS}=250\mu A$                             | 300         |      |           | V         |
| $I_{DSS}$  | Zero Gate Voltage Drain Current  | $V_{DS}=300V, V_{GS}=0V$                                 |             |      | 1         | $\mu A$   |
|  |                                  | $T_J=125^\circ\text{C}$                                  |             |      | 30        |           |
| $V_{GS(th)}$                                     | Gate Threshold Voltage           | $V_{DS}=V_{GS}, I_{DS}=250\mu A$                         | 2           | 3    | 4         | V         |
| $I_{GSS}$  | Gate Leakage Current             | $V_{GS}=\pm 30V, V_{DS}=0V$                              |             |      | $\pm 100$ | nA        |
| $R_{DS(ON)}^{(5)}$                               | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=15A$                                 |             | 95   | 120       | $m\Omega$ |
|  |                                  | $V_{GS}=6V, I_{DS}=7A$                                   |             | 100  | 130       | $m\Omega$ |
| <b>Diode Characteristics</b>                     |                                  |  |             |      |           |           |
| $V_{SD}^{(5)}$                                   | Diode Forward Voltage            | $I_{SD}=15A, V_{GS}=0V$                                  |             | 0.8  | 1.2       | V         |
| $t_{rr}$   | Reverse Recovery Time            | $I_{SD}=15A, di_{SD}/dt=100A/\mu s$                      |             | 271  |           | ns        |
| $Q_{rr}$   | Reverse Recovery Charge          |  |             | 894  |           | nC        |
| <b>Dynamic Characteristics<sup>(6)</sup></b>     |                                  |  |             |      |           |           |
| $R_G$  | Gate Resistance                  | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$                    |             | 1.5  |           | $\Omega$  |
| $C_{iss}$  | Input Capacitance                | $V_{GS}=0V,$<br>$V_{DS}=150V,$<br>Frequency=1.0MHz       |             | 2690 |           | pF        |
| $C_{oss}$  | Output Capacitance               |  |             | 110  |           |           |
| $C_{rss}$  | Reverse Transfer Capacitance     |  |             | 35   |           |           |
| $t_{d(ON)}$                                      | Turn-on Delay Time               | $V_{DD}=150V, I_{DS}=15A,$<br>$V_{GEN}=10V, R_G=6\Omega$ |             | 22   |           | ns        |
| $t_r$  | Turn-on Rise Time                |  |             | 41   |           |           |
| $t_{d(OFF)}$                                     | Turn-off Delay Time              |  |             | 76   |           |           |
| $t_f$  | Turn-off Fall Time               |  |             | 35   |           |           |
| <b>Gate Charge Characteristics<sup>(6)</sup></b> |                                  |  |             |      |           |           |
| $Q_g$  | Total Gate Charge                | $V_{DS}=150V, V_{GS}=10V,$<br>$I_{DS}=15A$               |             | 105  |           | nC        |
| $Q_{gs}$   | Gate-Source Charge               |  |             | 12   |           |           |
| $Q_{gd}$   | Gate-Drain Charge                |  |             | 47   |           |           |

- 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  $T_J = 25^\circ\text{C}$ ,  $I_{ASmax} = 56A$ ,  $L = 0.5\text{mH}$ ,  $V_{DD} = 48V$ ,  $R_G = 25\Omega$ ,  $V_{GS} = 10V$ . Part not recommended for use above this value. 100% Final Test at  $I_{AS} = 42A$ ,  $L = 0.5\text{mH}$ .
  - ⑤ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑥ Guaranteed by design, not subject to production testing.

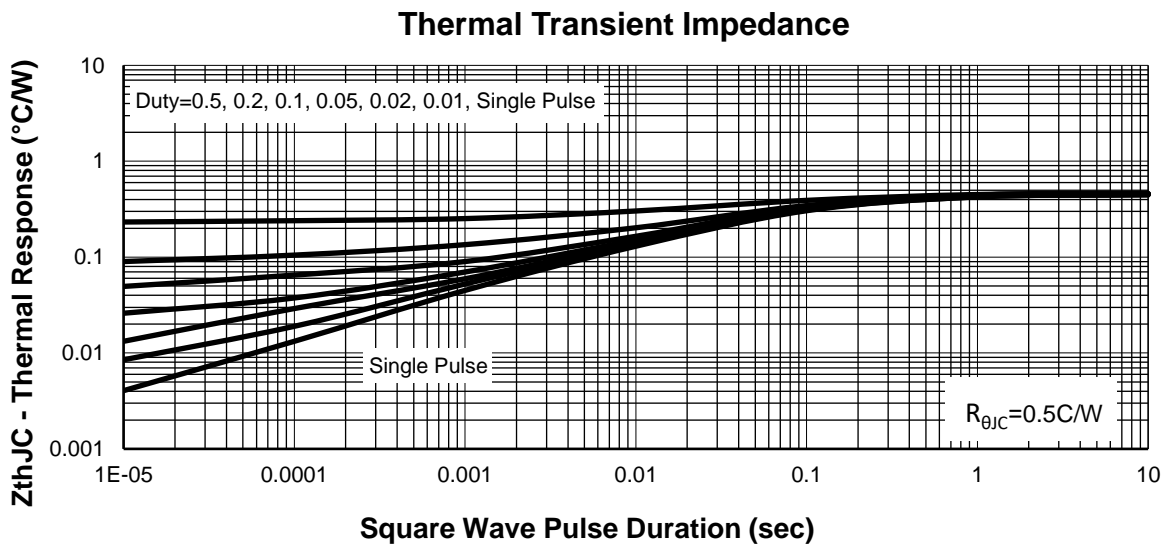
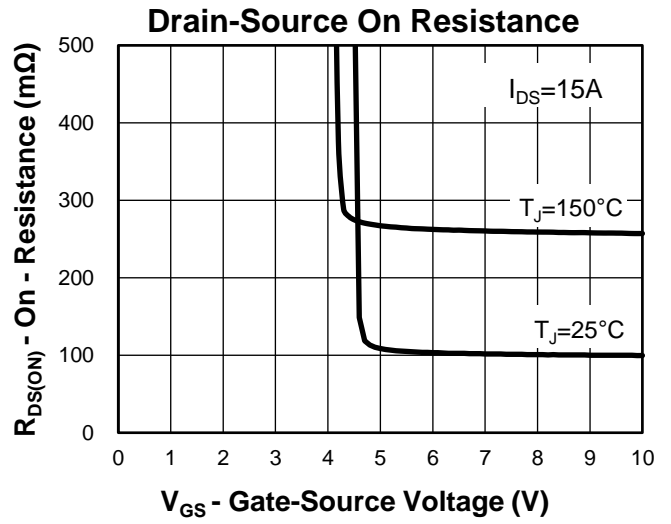
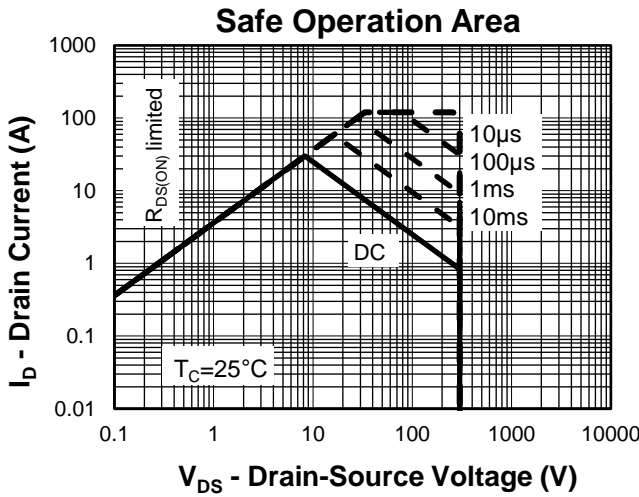
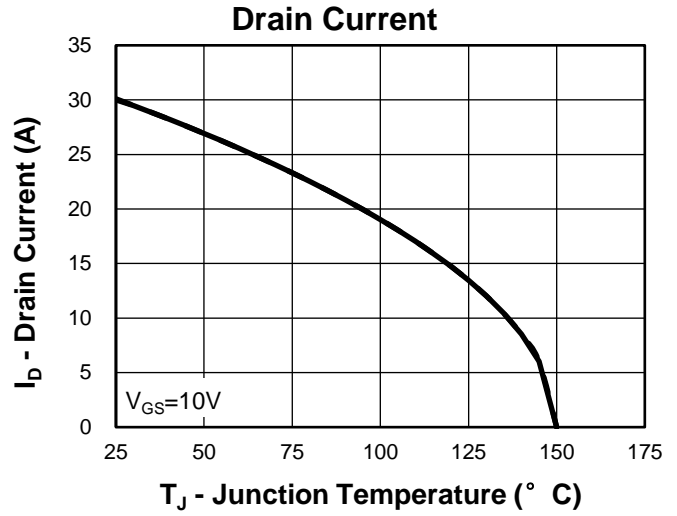
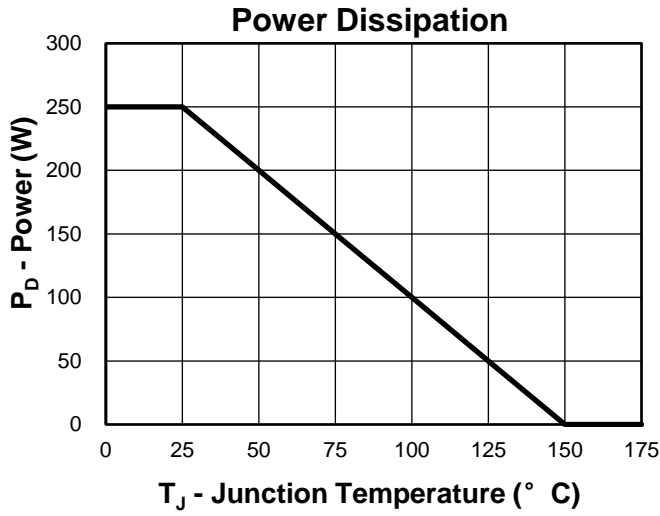
**Ordering and Marking Information**

| Device      | Package | Packaging | Quantity | Reel Size | Tape width |
|-------------|---------|-----------|----------|-----------|------------|
| KS30R150CAP | TO-220  | Tube      | 50       | -         | -          |

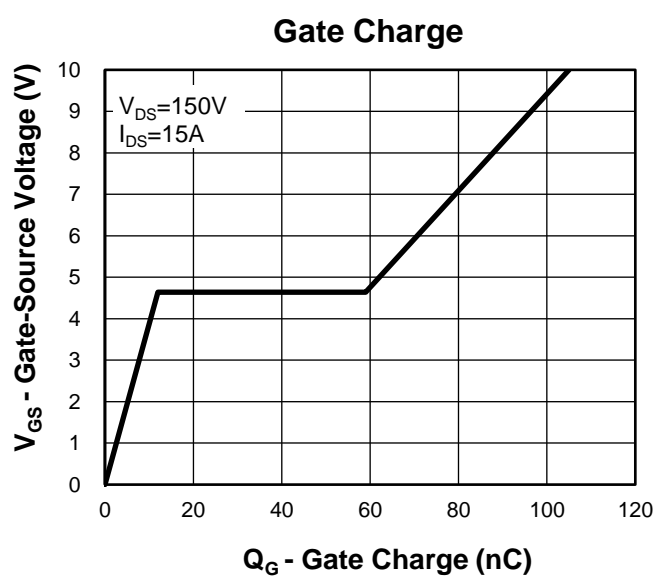
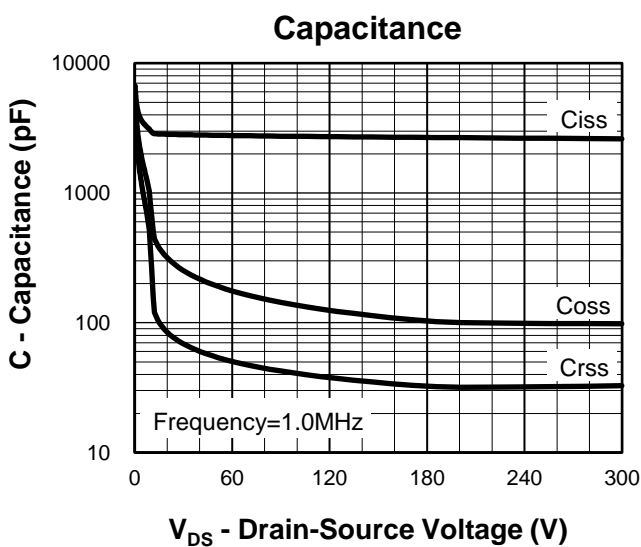
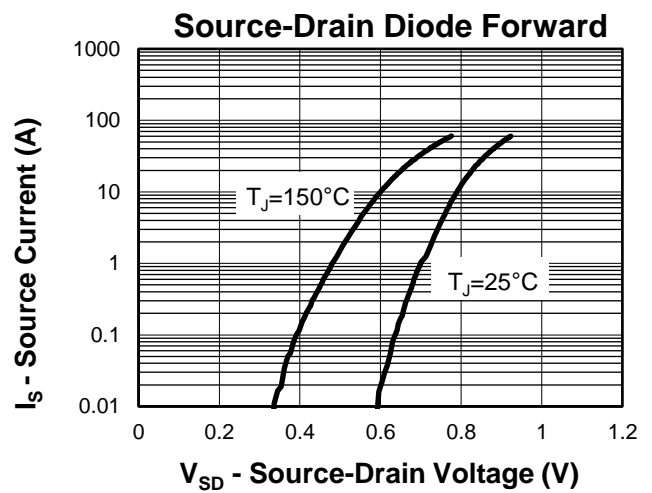
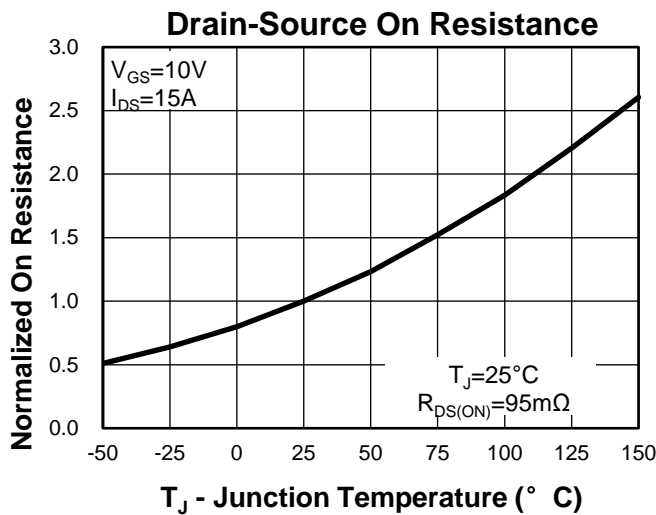
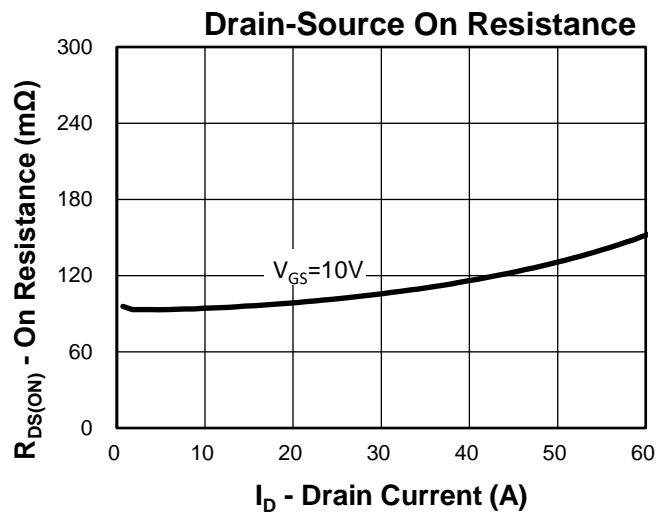
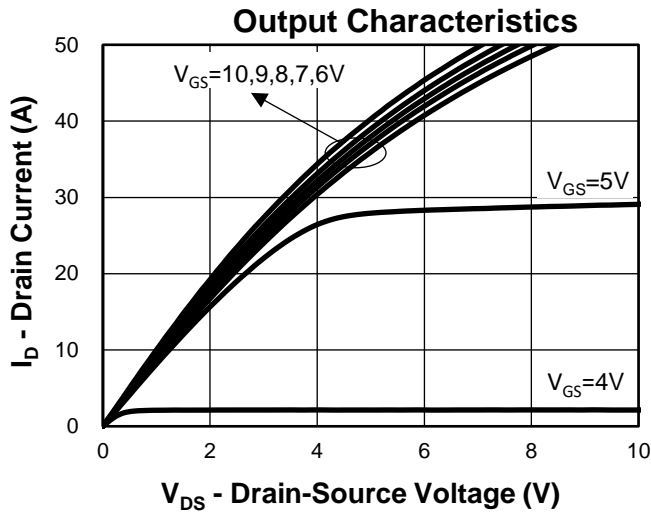


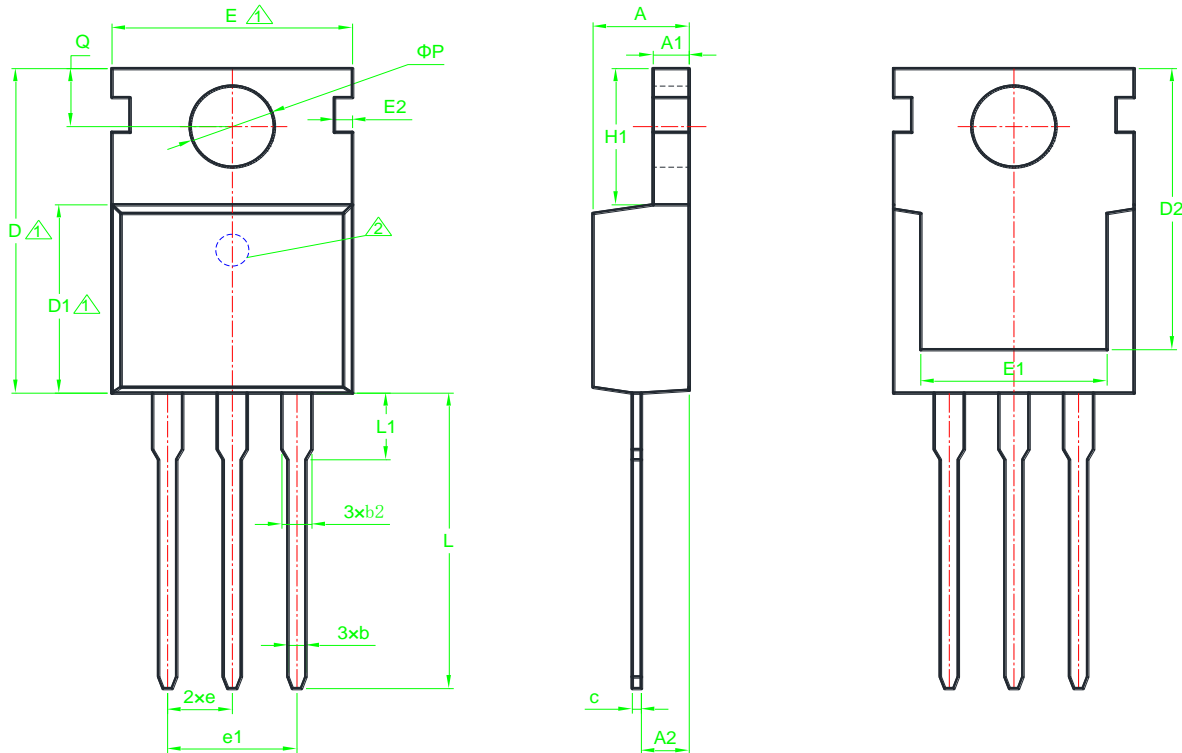
1st Line: Kwansemi LOGO, Kwansemi Code(KS)  
2nd Line: Part Number(30R150P)  
3rd Line: Lot Number(YWWXXX)

### Typical Characteristics



Typical Characteristics



**Package Information**
**TO-220**


| SYMBOL | MM    |       |       | INCH  |       |       | SYMBOL   | MM      |       |       | INCH     |       |       |
|--------|-------|-------|-------|-------|-------|-------|----------|---------|-------|-------|----------|-------|-------|
|        | MIN   | NOM   | MAX   | MIN   | NOM   | MAX   |          | MIN     | NOM   | MAX   | MIN      | NOM   | MAX   |
| A      | 4.30  | 4.55  | 4.80  | 0.169 | 0.179 | 0.189 | E1       | 7.00    | *     | 8.40  | 0.276    | *     | 0.331 |
| A1     | 1.20  | 1.30  | 1.45  | 0.047 | 0.051 | 0.057 | E2       | *       | *     | 0.75  | *        | *     | 0.030 |
| A2     | 2.20  | 2.40  | 2.70  | 0.087 | 0.094 | 0.106 | e        | 2.54BSC |       |       | 0.100BSC |       |       |
| b      | 0.70  | 0.80  | 0.95  | 0.028 | 0.031 | 0.037 | e1       | 5.08BSC |       |       | 0.200BSC |       |       |
| b2     | 1.15  | 1.35  | 1.50  | 0.045 | 0.053 | 0.059 | H1       | 6.30    | 6.50  | 6.80  | 0.248    | 0.256 | 0.268 |
| c      | 0.40  | 0.50  | 0.60  | 0.016 | 0.020 | 0.024 | L        | 12.70   | 13.20 | 13.90 | 0.500    | 0.520 | 0.547 |
| D      | 15.10 | 15.60 | 16.10 | 0.594 | 0.614 | 0.634 | L1       | 2.85    | *     | 3.50  | 0.112    | *     | 0.138 |
| D1     | 8.75  | 9.20  | 9.65  | 0.344 | 0.362 | 0.380 | $\Phi P$ | 3.50    | 3.65  | 3.80  | 0.138    | 0.144 | 0.150 |
| D2     | 12.20 | 12.50 | 12.80 | 0.480 | 0.492 | 0.504 | Q        | 2.70    | *     | 2.90  | 0.106    | *     | 0.114 |
| E      | 9.70  | 10.00 | 10.30 | 0.382 | 0.394 | 0.406 |          |         |       |       |          |       |       |

① Dimensions D and D1 and E 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



### Switching Time Test Circuit and Waveforms



### Diode Recovery Test Circuit and Waveforms



### Gate Charge Test Circuit and Waveform



### Customer Service

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