

## Features

- 120V/200A,  
 $R_{DS(on)} = 3.7m\Omega(Typ.)@V_{GS}=10V$
- Excellent  $Q_G \times R_{DS(on)}$  product(FOM)
- SGT Technology
- High Ruggedness
- 100% Avalanche Tested

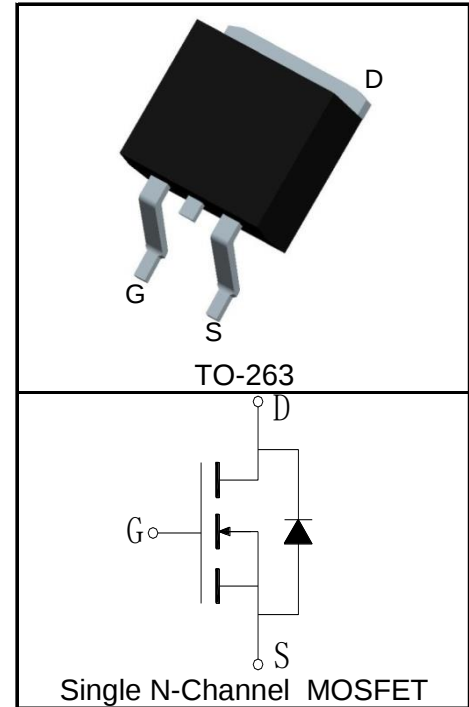
## Applications

- Motor Control
- Synchronous Rectification
- Battery Management System



Halogen-Free

## 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                           |                       | 120        | 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  | 200        | A    |
| Mounted on Large Heat Sink                                   |                                                |                       |            |      |
| I <sub>DP</sub> <sup>①</sup>                                 | 300μs Pulse Drain Current Tested               | T <sub>C</sub> =25°C  | 800        | A    |
| I <sub>D</sub> <sup>②</sup>                                  | Continuous Drain Current(V <sub>GS</sub> =10V) | T <sub>C</sub> =25°C  | 200        | A    |
|                                                              |                                                | T <sub>C</sub> =100°C | 141        |      |
| P <sub>D</sub>                                               | Maximum Power Dissipation                      | T <sub>C</sub> =25°C  | 288        | W    |
|                                                              |                                                | T <sub>C</sub> =100°C | 144        |      |
| R <sub>θJC</sub>                                             | Thermal Resistance-Junction to Case            |                       | 0.52       | °C/W |
| R <sub>θJA</sub> <sup>③</sup>                                | Thermal Resistance-Junction to Ambient         |                       | 62.5       | °C/W |
| Drain-Source Avalanche Ratings                               |                                                |                       |            |      |
| E <sub>AS</sub> <sup>④</sup>                                 | Avalanche Energy, Single Pulsed                |                       | 506        | mJ   |

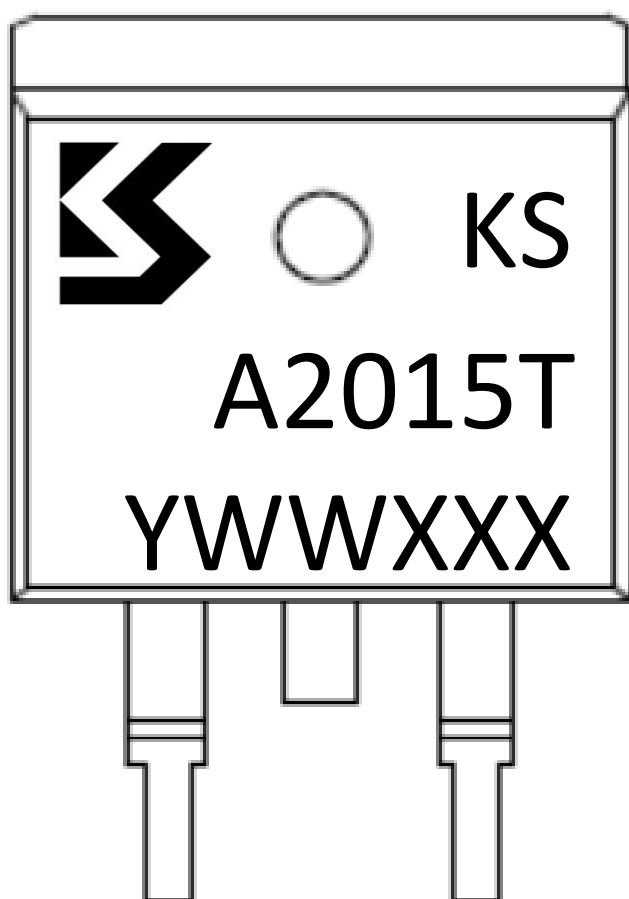
**Electrical Characteristics** ( $T_C=25^{\circ}\text{C}$  Unless Otherwise Noted)

| Symbol                                   | Parameter                        | Test Condition                                                                           | KSA2015GAT |      |      | Unit |
|------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------|------------|------|------|------|
|                                          |                                  |                                                                                          | Min.       | Typ. | Max. |      |
| Static Characteristics                   |                                  |                                                                                          |            |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                              | 120        |      |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =120V, 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                                | 2          | 3    | 4    | 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> =40A                                               |            | 3.7  | 4.5  | mΩ   |
|                                          |                                  | V <sub>GS</sub> =6V, I <sub>DS</sub> =20A                                                |            | 4.5  | 6    | mΩ   |
| Diode Characteristics                    |                                  |                                                                                          |            |      |      |      |
| V <sub>SD</sub> <sup>⑤</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =40A, V <sub>GS</sub> =0V                                                |            | 0.81 | 1.2  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =40A, dI <sub>SD</sub> /dt=100A/μs                                       |            | 53   |      | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                          |            | 76   |      | nC   |
| Dynamic Characteristics <sup>⑥</sup>     |                                  |                                                                                          |            |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                         |            | 1.9  |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =60V,<br>Frequency=1.0MHz                        |            | 6735 |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                          |            | 1030 |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                          |            | 35   |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =60V, I <sub>DS</sub> =40A,<br>V <sub>GEN</sub> =10V, R <sub>G</sub> =3Ω |            | 18   |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                          |            | 24   |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                          |            | 55   |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                          |            | 31   |      |      |
| Gate Charge Characteristics <sup>⑥</sup> |                                  |                                                                                          |            |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =60V, V <sub>GS</sub> =10V,<br>I <sub>DS</sub> =40A                      |            | 73   |      | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                          |            | 16   |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                          |            | 13   |      |      |

- Notes:
- ① Pulse width limited by safe operating area.
  - ② Calculated continuous current based on maximum allowable junction temperature. The package limitation current is 75A.
  - 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  $T_{Jmax}$ ,  $I_{AS}=45A$ ,  $L=0.5\text{mH}$ ,  $V_{DD}=48V$ ,  $R_G=25\Omega$ , 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 |
|------------|---------|-----------|----------|-----------|------------|
| KSA2015GAT | TO-263  | Tape&Reel | 800      | 13"       | 24mm       |

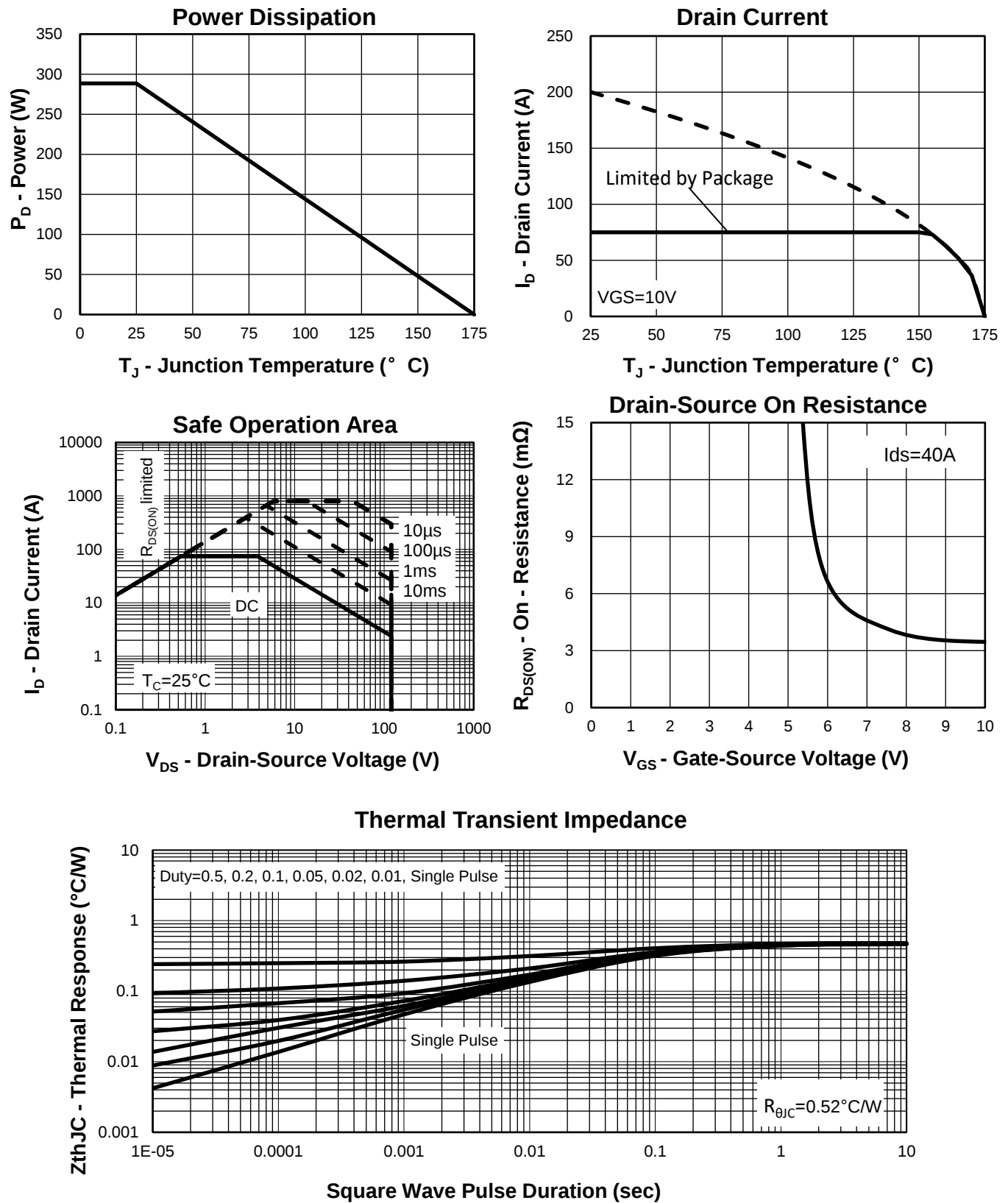


1st Line: Kwansemi LOGO, Kwansemi Code(KS)

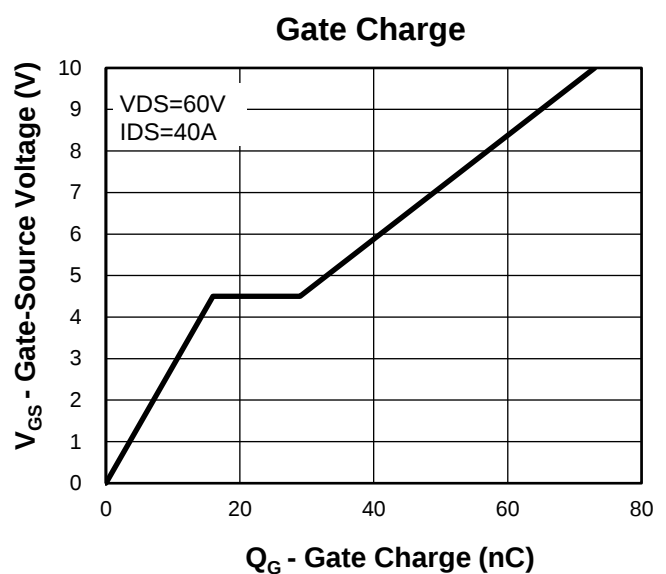
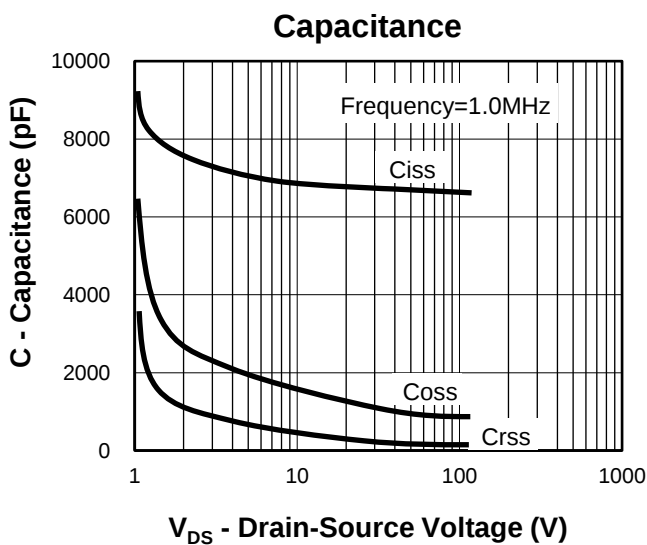
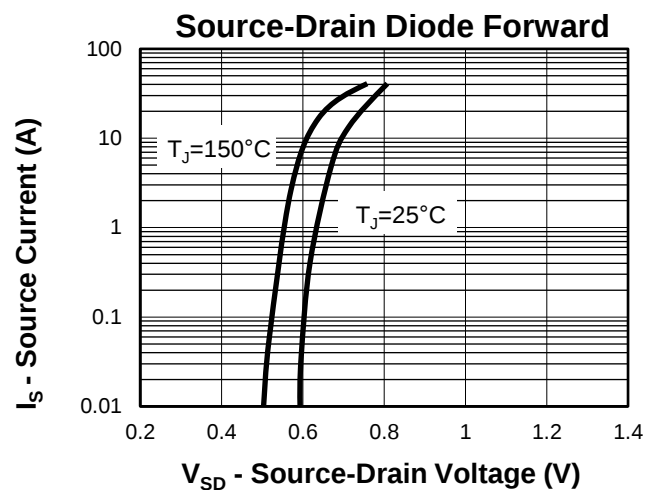
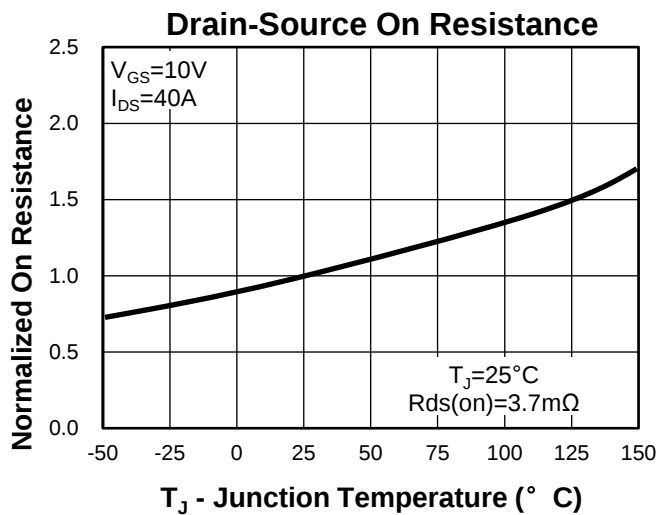
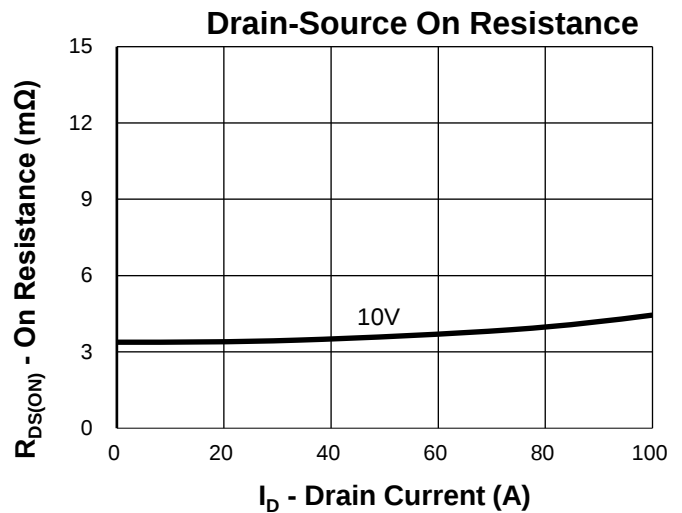
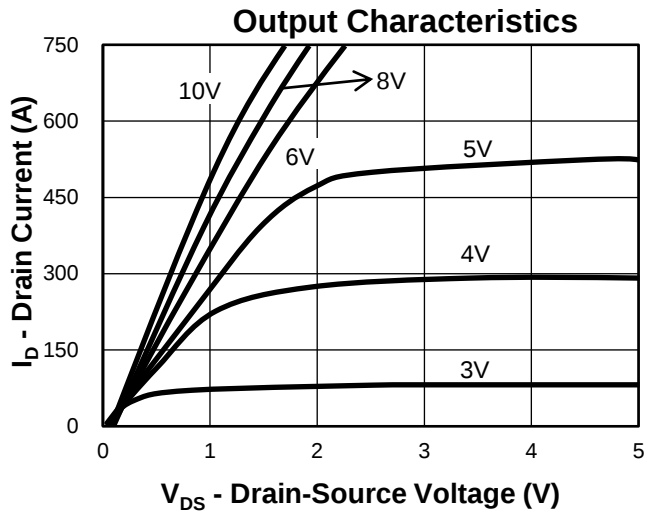
2nd Line: Part Number(A2015T)

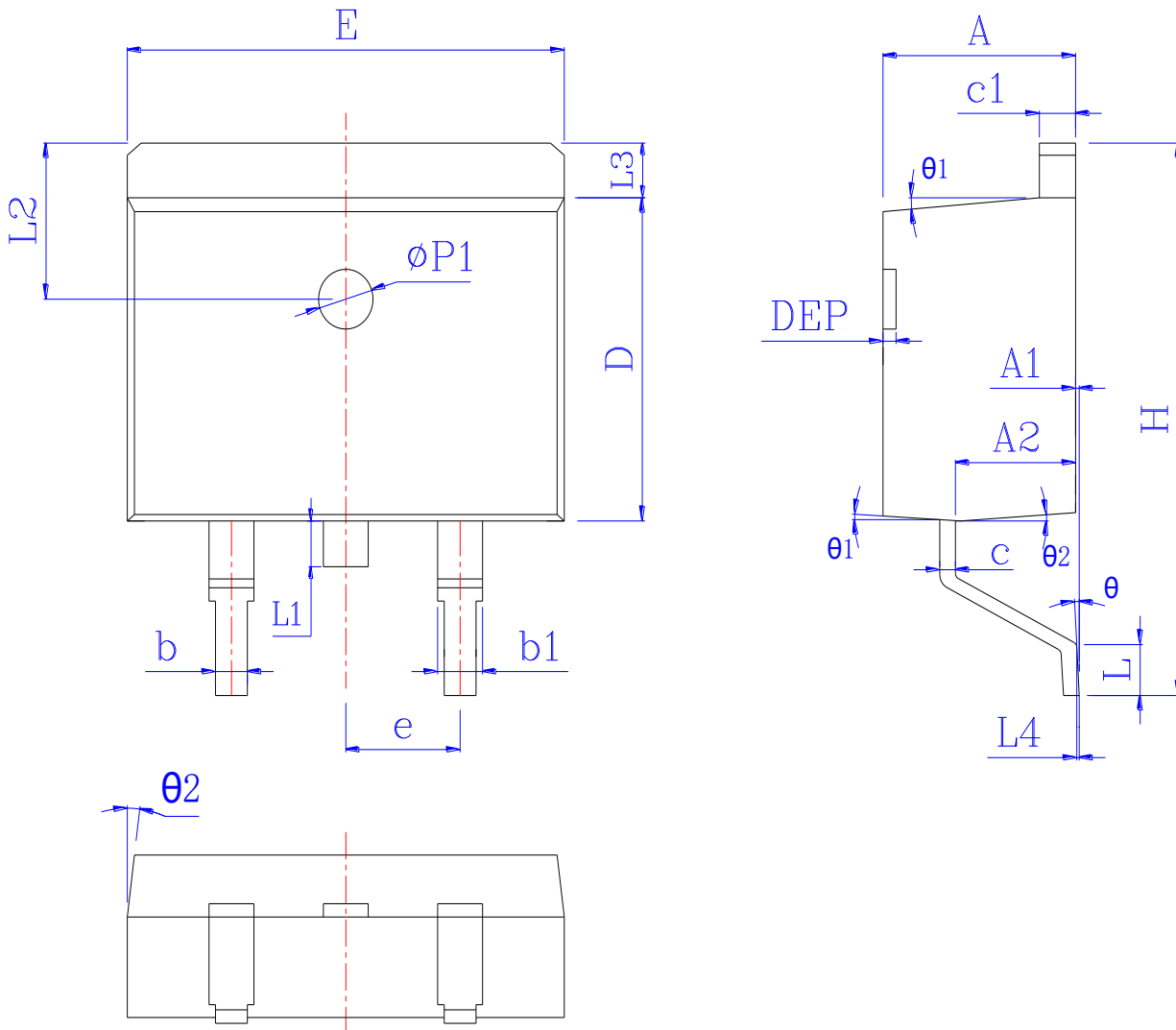
3rd Line: Lot Number(YWWXXX)

## Typical Characteristics



## Typical Characteristics



**Package Information**
**TO-263**


| SYMBOL | MM      |       |       | INCH     |       |       | SYMBOL    | MM       |      |      | INCH      |       |       |
|--------|---------|-------|-------|----------|-------|-------|-----------|----------|------|------|-----------|-------|-------|
|        | MIN     | NOM   | MAX   | MIN      | NOM   | MAX   |           | MIN      | NOM  | MAX  | MIN       | NOM   | MAX   |
| A      | 4.40    | 4.55  | 4.72  | 0.173    | 0.179 | 0.186 | L         | 1.94     | 2.30 | 2.60 | 0.076     | 0.091 | 0.102 |
| A1     | 0.00    | 0.10  | 0.25  | 0.000    | 0.005 | 0.010 | L3        | 1.17     | 1.29 | 1.40 | 0.046     | 0.051 | 0.055 |
| A2     | 2.59    | 2.69  | 2.79  | 0.102    | 0.106 | 0.110 | L1        | *        | *    | 1.70 | *         | *     | 0.067 |
| b      | 0.76    | *     | 0.90  | 0.030    | *     | 0.035 | L4        | 0.25 BSC |      |      | 0.01 BSC  |       |       |
| b1     | 1.22    | *     | 1.36  | 0.048    | *     | 0.054 | L2        | 2.50 REF |      |      | 0.098 REF |       |       |
| c      | 0.33    | *     | 0.47  | 0.013    | *     | 0.019 | $\theta$  | 0°       | *    | 8°   | 0°        | *     | 8°    |
| c1     | 1.22    | *     | 1.32  | 0.048    | *     | 0.052 | $\theta1$ | 5°       | 7°   | 9°   | 5°        | 7°    | 9°    |
| D      | 8.60    | *     | 9.29  | 0.339    | *     | 0.366 | $\theta2$ | 1°       | 3°   | 5°   | 1°        | 3°    | 5°    |
| E      | 9.95    | *     | 10.26 | 0.392    | *     | 0.404 | DEP       | 0.05     | 0.10 | 0.20 | 0.002     | 0.004 | 0.008 |
| e      | 2.54BSC |       |       | 0.100BSC |       |       | $\Phi p1$ | 1.40     | 1.50 | 1.60 | 0.055     | 0.059 | 0.063 |
| H      | 14.70   | 15.10 | 15.79 | 0.579    | 0.594 | 0.622 |           |          |      |      |           |       |       |

### 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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