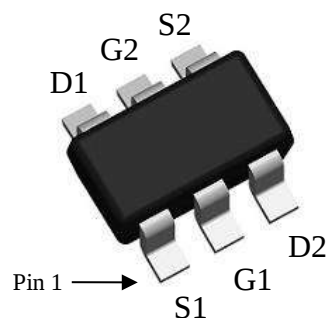


## Dual N-Channel Enhancement Mode MOSFET

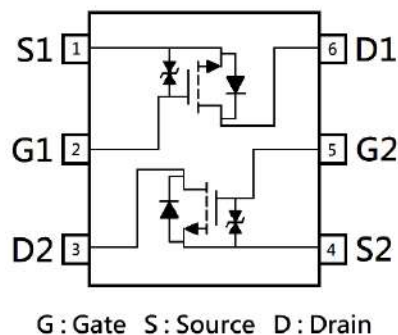
### Features:

- ESD protected gate, typical 3kV (HBM)
- High speed switching
- Easily designed drive circuits
- Low-voltage drive
- Easy to use in parallel
- RoHS compliant package

SOT-363



|                                           |              |
|-------------------------------------------|--------------|
| $BV_{DSS}$                                | 30V          |
| $I_D @ V_{GS}=10V, T_A=25^{\circ}C$       | 0.47A        |
| $R_{DS(ON) typ.} @ V_{GS}=10V, I_D=0.2A$  | 0.4 $\Omega$ |
| $R_{DS(ON) typ.} @ V_{GS}=4.5V, I_D=0.2A$ | 0.5 $\Omega$ |
| $R_{DS(ON) typ.} @ V_{GS}=2.5V, I_D=0.2A$ | 0.9 $\Omega$ |



### Ordering Information

| Device | Package                                                    | Shipping               |
|--------|------------------------------------------------------------|------------------------|
| KWDK8R | SOT-363<br>(Pb-free lead plating and halogen-free package) | 3000 pcs / Tape & Reel |

## Absolute Maximum Ratings (T<sub>A</sub>=25°C)

| Parameter                                                             | Symbol                            | Limits   | Unit |
|-----------------------------------------------------------------------|-----------------------------------|----------|------|
| Drain-Source Voltage                                                  | V <sub>DS</sub>                   | 30       | V    |
| Gate-Source Voltage                                                   | V <sub>GS</sub>                   | ±20      |      |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =25°C | I <sub>D</sub>                    | 0.47     | A    |
| Continuous Drain Current @ V <sub>GS</sub> =10V, T <sub>A</sub> =70°C |                                   | 0.38     |      |
| Pulsed Drain Current *a                                               | I <sub>DM</sub>                   | 1.9      |      |
| Continuous Body Diode Forward Current @ T <sub>A</sub> =25°C          | I <sub>S</sub>                    | 0.2      |      |
| ESD susceptibility *b                                                 | V <sub>ESD</sub>                  | 3000     | V    |
| Total Power Dissipation @ T <sub>A</sub> =25°C                        | P <sub>D</sub>                    | 0.3      | W    |
| Operating Junction and Storage Temperature Range                      | T <sub>J</sub> , T <sub>stg</sub> | -55~+150 | °C   |

## Thermal Data

| Parameter                               | Symbol           | Steady State | Unit |
|-----------------------------------------|------------------|--------------|------|
| Thermal Resistance, Junction-to-ambient | R <sub>θJA</sub> | 417          | °C/W |

Note:

\*a. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150°C. Ratings are based on low frequency and low duty cycles to keep initial T<sub>J</sub>=25°C.

\*b. Human body model, 1.5kΩ in series with 100pF.

## Electrical Characteristics (T<sub>A</sub>=25°C, unless otherwise specified)

| Symbol                    | Min. | Typ. | Max. | Unit | Test Conditions                                                                       |
|---------------------------|------|------|------|------|---------------------------------------------------------------------------------------|
| Static                    |      |      |      |      |                                                                                       |
| BV <sub>DSS</sub>         | 30   | -    | -    | V    | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                            |
| V <sub>GS(th)</sub>       | 0.7  | -    | 1.6  |      | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                              |
| G <sub>FS</sub>           | -    | 0.5  | -    | S    | V <sub>DS</sub> =5V, I <sub>D</sub> =0.2A                                             |
| I <sub>GSS</sub>          | -    | -    | ±10  | μA   | V <sub>GS</sub> =±16V, V <sub>DS</sub> =0V                                            |
| I <sub>DSS</sub>          | -    | -    | 1    |      | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V                                             |
| R <sub>DS(ON)</sub>       | -    | 0.4  | 0.8  | Ω    | V <sub>GS</sub> =10V, I <sub>D</sub> =0.2A                                            |
|                           | -    | 0.5  | 1.3  |      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.2A                                           |
|                           | -    | 0.9  | 6.5  |      | V <sub>GS</sub> =2.5V, I <sub>D</sub> =0.2A                                           |
| Dynamic                   |      |      |      |      |                                                                                       |
| C <sub>iss</sub>          | -    | 27   | -    | pF   | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz                                     |
| C <sub>oss</sub>          | -    | 12   | -    |      |                                                                                       |
| C <sub>rss</sub>          | -    | 8    | -    |      |                                                                                       |
| Q <sub>g</sub> *1, 2      | -    | 1.7  | -    | nC   | V <sub>DS</sub> =15V, I <sub>D</sub> =0.2A, V <sub>GS</sub> =10V                      |
| Q <sub>gs</sub> *1, 2     | -    | 0.7  | -    |      |                                                                                       |
| Q <sub>gd</sub> *1, 2     | -    | 0.3  | -    |      |                                                                                       |
| t <sub>d(ON)</sub> *1, 2  | -    | 3.2  | -    | ns   | V <sub>DS</sub> =15V, I <sub>D</sub> =0.2A, V <sub>GS</sub> =10V, R <sub>GS</sub> =1Ω |
| t <sub>r</sub> *1, 2      | -    | 16   | -    |      |                                                                                       |
| t <sub>d(OFF)</sub> *1, 2 | -    | 10   | -    |      |                                                                                       |
| t <sub>f</sub> *1, 2      | -    | 14   | -    |      |                                                                                       |
| Source-Drain Diode        |      |      |      |      |                                                                                       |
| V <sub>SD</sub> *1        | -    | 0.8  | 1.2  | V    | I <sub>S</sub> =0.2A, V <sub>GS</sub> =0V                                             |
| t <sub>rr</sub>           | -    | 5    | -    | ns   | I <sub>F</sub> =0.2A, dI <sub>F</sub> /dt=100A/μs                                     |
| Q <sub>rr</sub>           | -    | 1.2  | -    | nC   |                                                                                       |

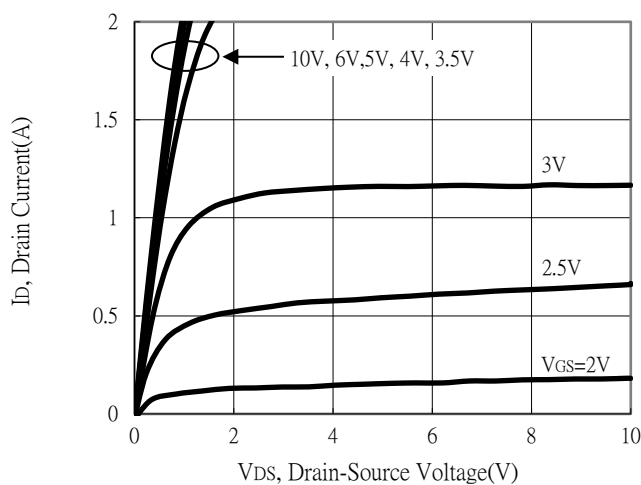
Note:

\*1. Pulse Test : Pulse Width ≤300μs, Duty Cycle≤2%

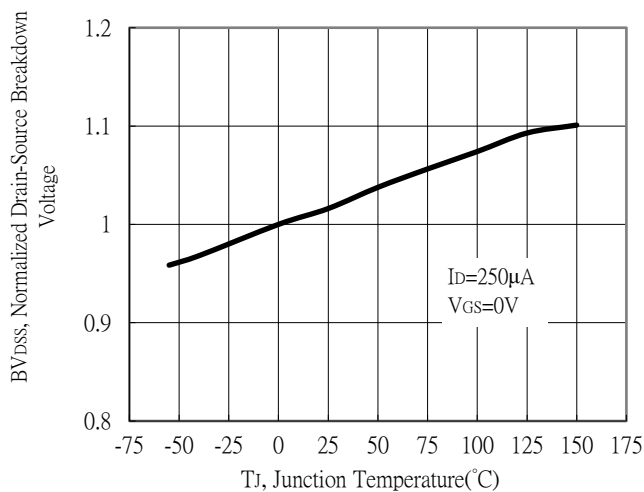
\*2. Independent of operating temperature

## Typical Characteristics

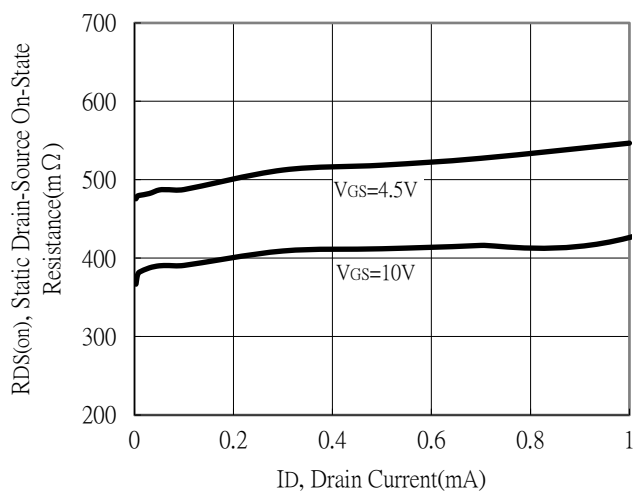
Typical Output Characteristics



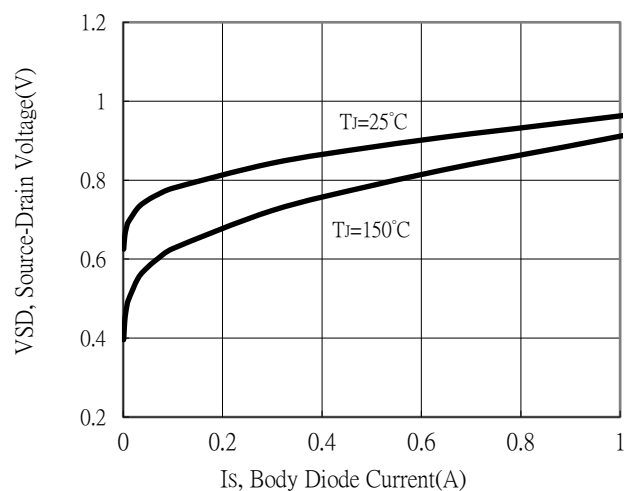
Breakdown Voltage vs Ambient Temperature



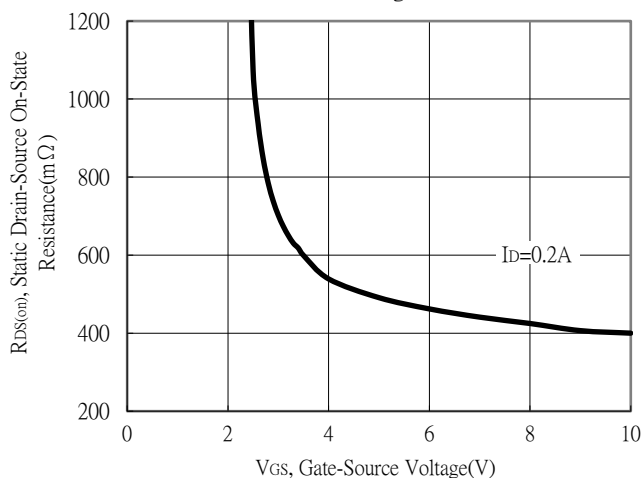
Static Drain-Source On-State resistance vs Drain Current



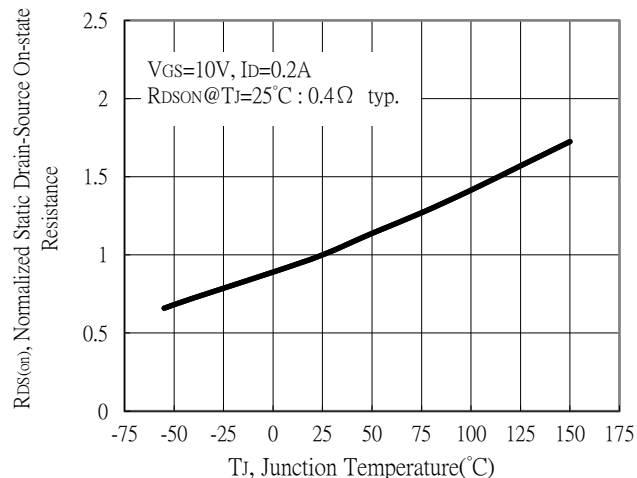
Body Diode Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

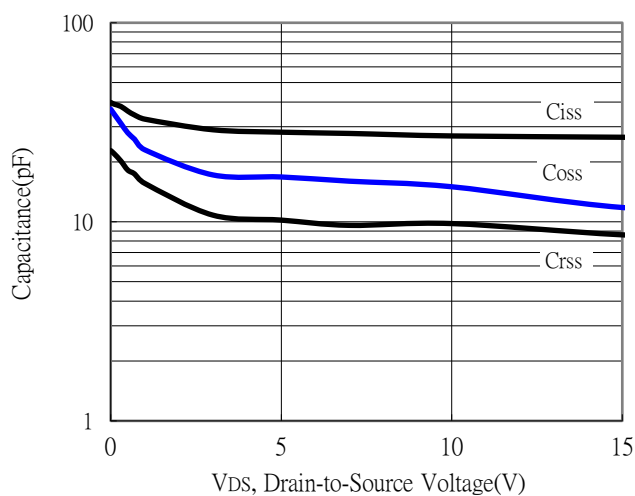


Drain-Source On-State Resistance vs Junction Temperature

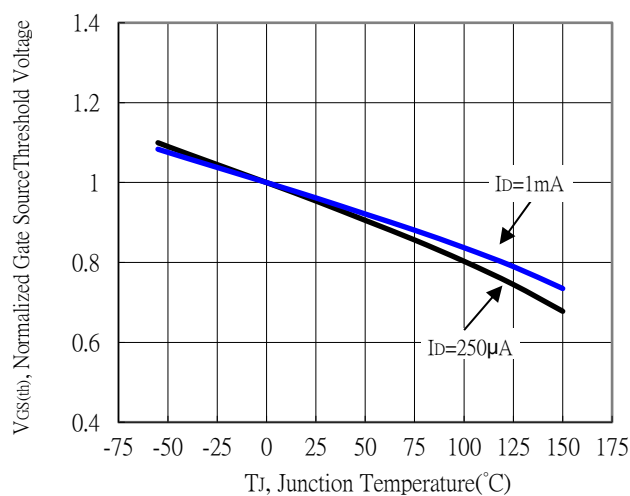


## Typical Characteristics (Cont.)

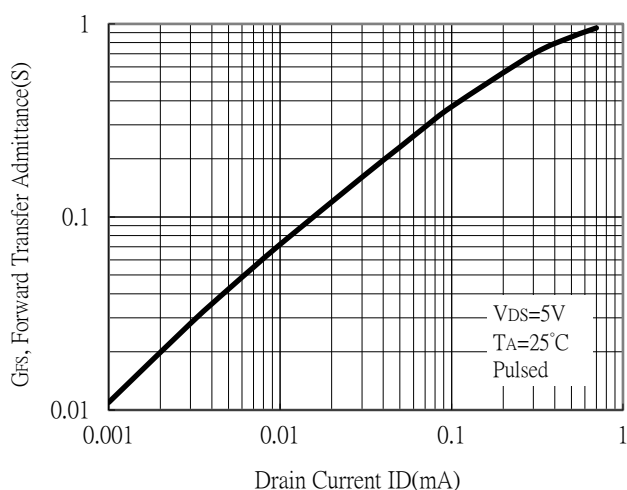
Capacitance vs Drain-to-Source Voltage



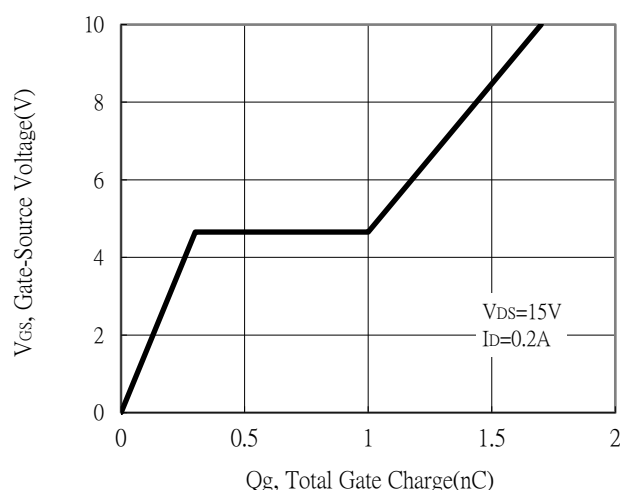
Threshold Voltage vs Junction Temperature



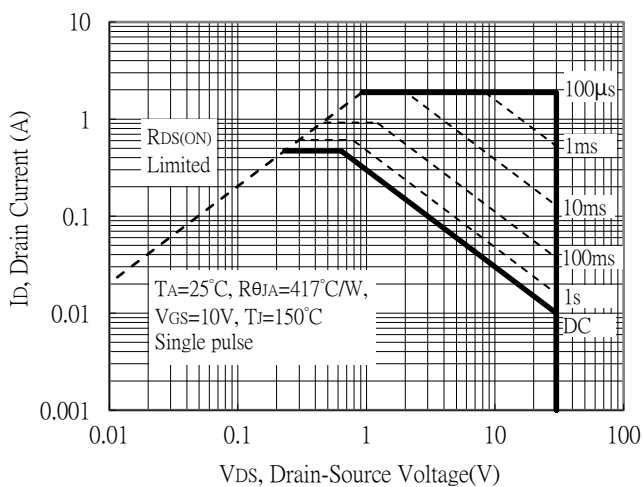
Forward Transfer Admittance vs Drain Current



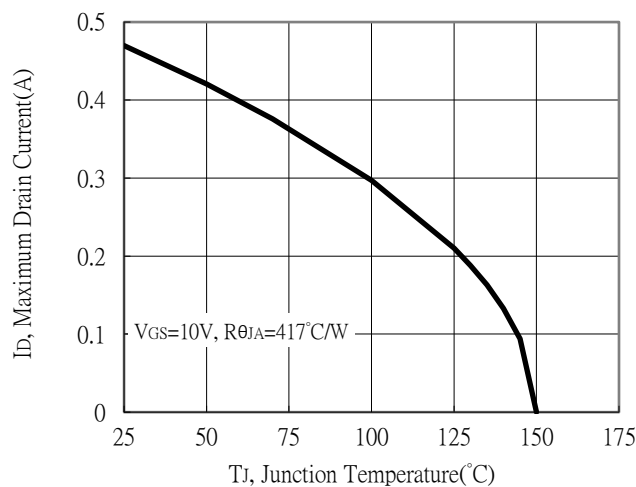
Gate Charge Characteristics



Maximum Safe Operating Area

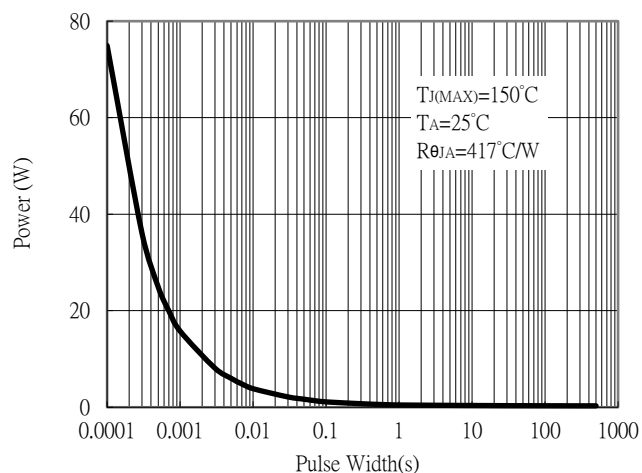


Maximum Drain Current vs Junction Temperature

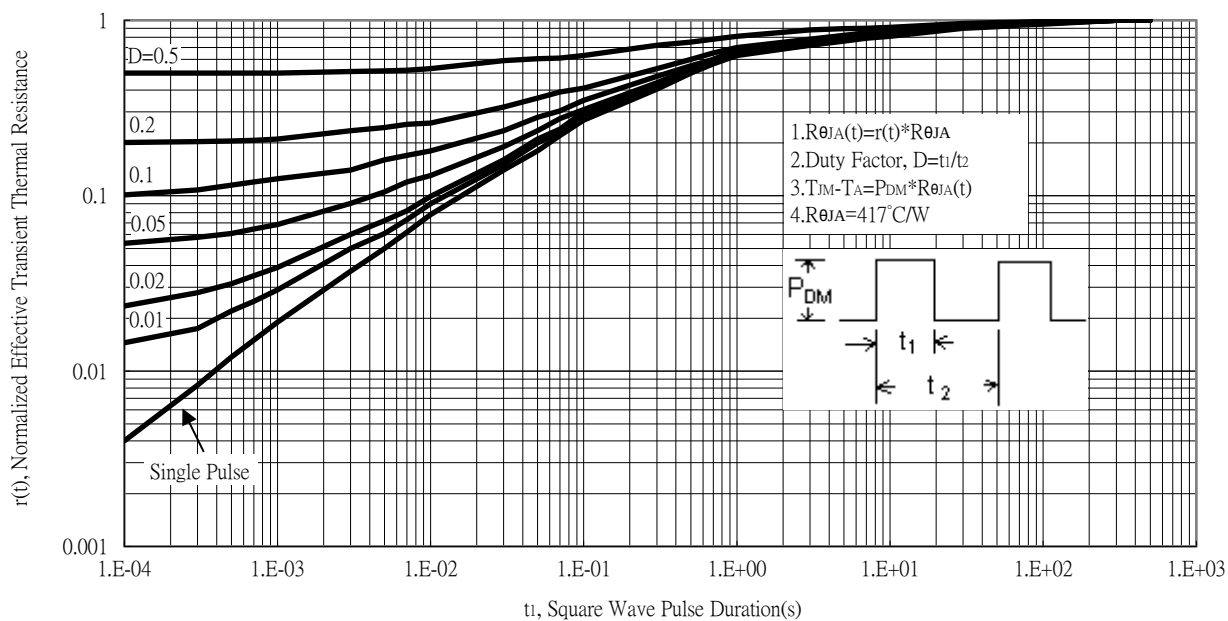


## Typical Characteristics (Cont.)

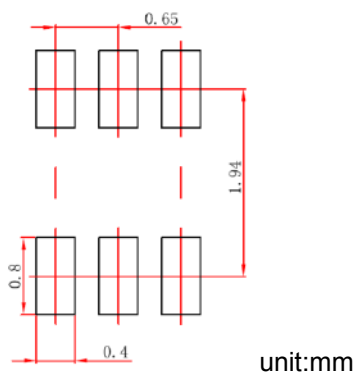
Single Pulse Power Rating, Junction to Ambient



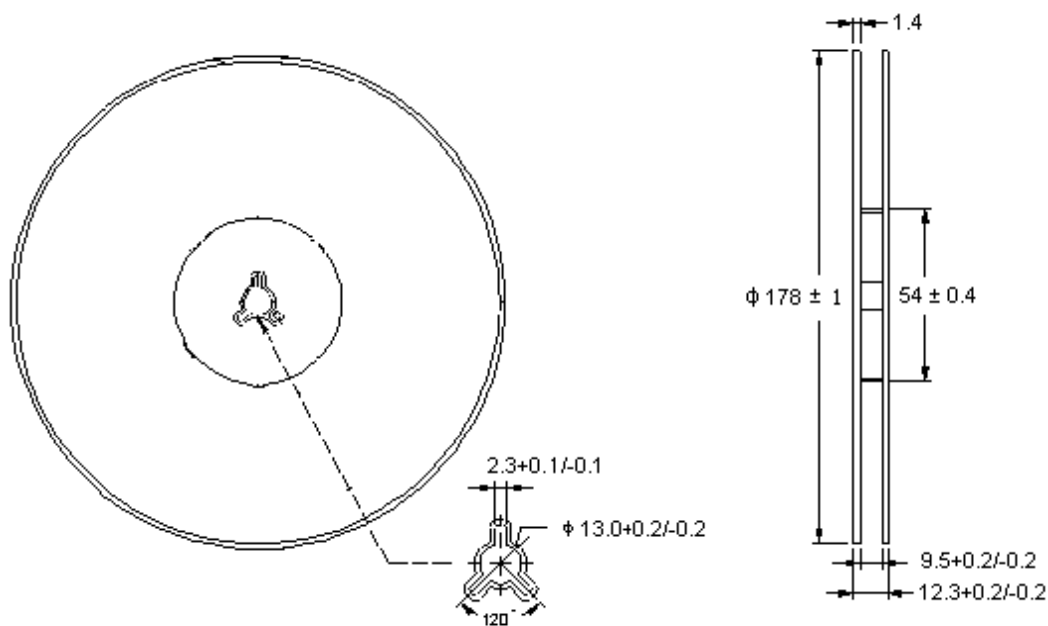
Transient Thermal Response Curves



## Recommended Soldering Footprint

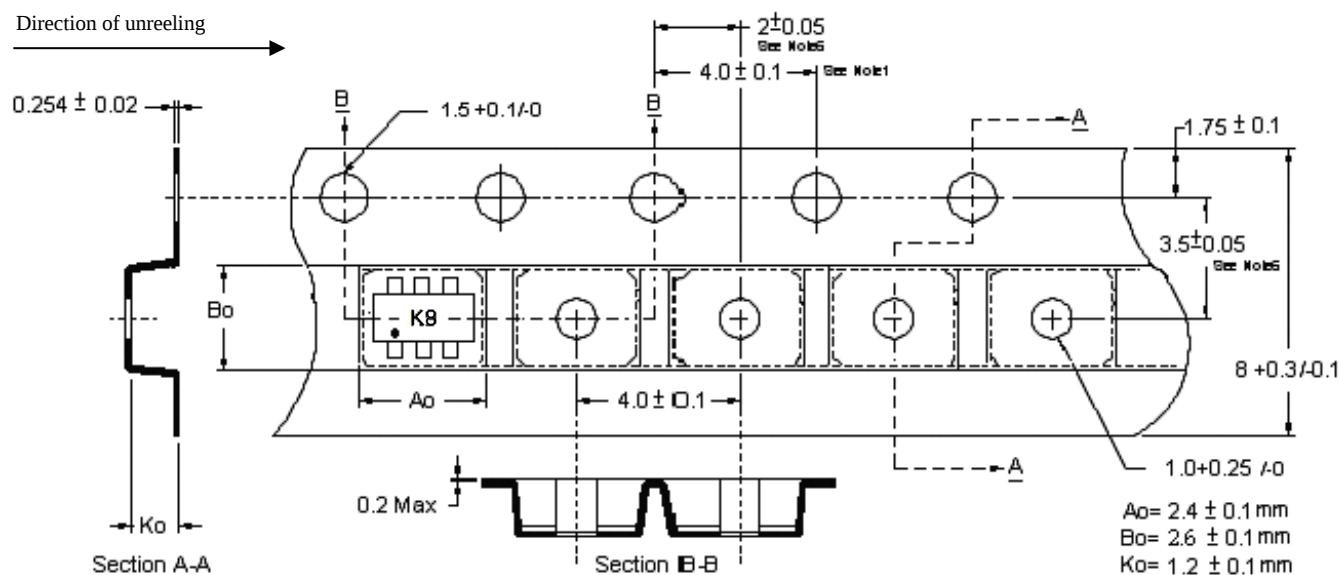


## Reel Dimension

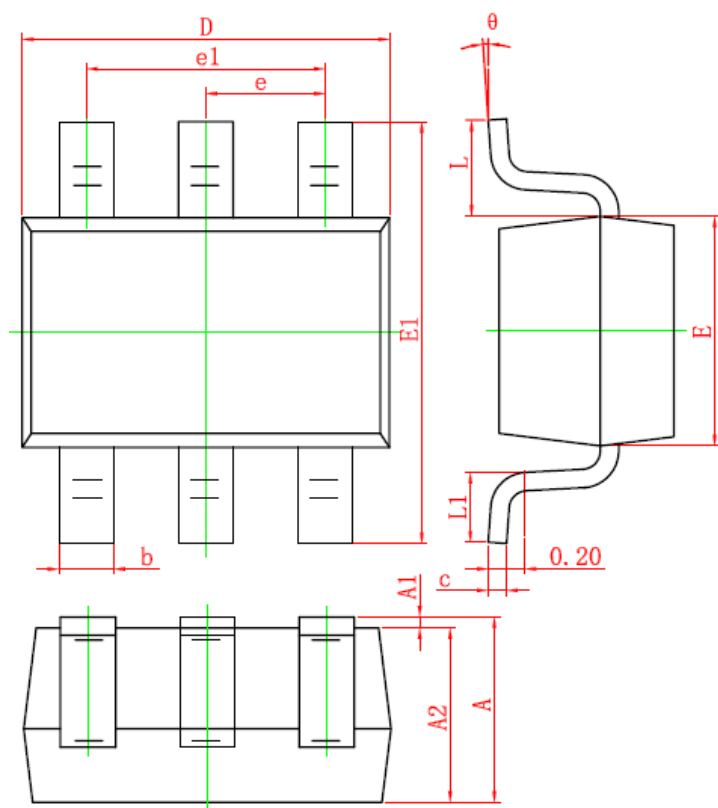


Unit: millimeter

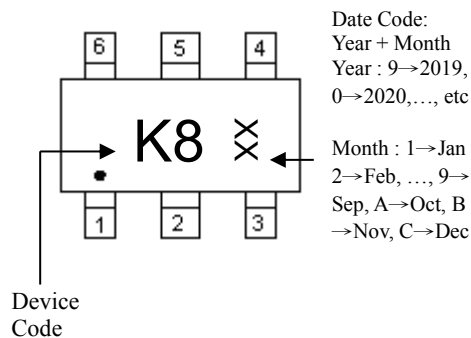
## Carrier Tape Dimension



## SOT-363 Dimension



### Marking:



### 6-Lead SOT-363 Plastic Surface Mounted Package

#### Style:

- Pin 1. Source1 (S1)
- Pin 2. Gate1 (G1)
- Pin 3. Drain2 (D2)
- Pin 4. Source2 (S2)
- Pin 5. Gate2 (G2)
- Pin 6. Drain1 (D1)

| DIM | Millimeters |       | Inches |       | DIM | Millimeters |       | Inches |       |
|-----|-------------|-------|--------|-------|-----|-------------|-------|--------|-------|
|     | Min.        | Max.  | Min.   | Max.  |     | Min.        | Max.  | Min.   | Max.  |
| A   | 0.900       | 1.100 | 0.035  | 0.043 | E1  | 2.150       | 2.450 | 0.085  | 0.096 |
| A1  | 0.000       | 0.100 | 0.000  | 0.004 | e   | 0.650       | TYP   | 0.026  | TYP   |
| A2  | 0.900       | 1.000 | 0.035  | 0.039 | e1  | 1.200       | 1.400 | 0.047  | 0.055 |
| b   | 0.150       | 0.350 | 0.006  | 0.014 | L   | 0.525       | REF   | 0.021  | REF   |
| c   | 0.080       | 0.150 | 0.003  | 0.006 | L1  | 0.260       | 0.460 | 0.010  | 0.018 |
| D   | 2.000       | 2.200 | 0.079  | 0.087 | θ   | 0°          | 8°    | 0°     | 8°    |
| E   | 1.150       | 1.350 | 0.045  | 0.053 |     |             |       |        |       |