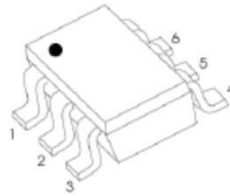


## Features

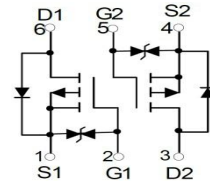
Low On-Resistance  
Low Gate Threshold Voltage  
Low Input Capacitance  
Fast Switching Speed

K84

SOT-363



Equivalent Circuit



## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

**Maximum Ratings** @  $T_A = 25\text{ C}$  unless otherwise specified

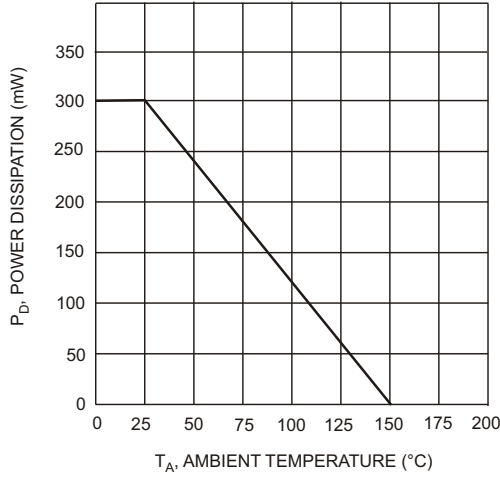
| Characteristic                          | Symbol         | Value       | Units |
|---|----------------|-------------|-------|
| Drain-Source Voltage                    | $V_{DSS}$      | -50         | V     |
| Drain-Gate Voltage (Note 1)             | $V_{DGR}$      | -50         | V     |
| Gate-Source Voltage                     | $V_{GSS}$      | 20          | V     |
| Drain Current (Note 2)                  | $I_D$          | -130        | mA    |
| Total Power Dissipation (Note 2)        | $P_d$          | 300         | mW    |
| Thermal Resistance, Junction to Ambient | $R_{JA}$       | 417         | C/W   |
| Operating and Storage Temperature Range | $T_j, T_{STG}$ | -55 to +150 | C     |

Note: 1.  $R_{GS} = 20K$  .

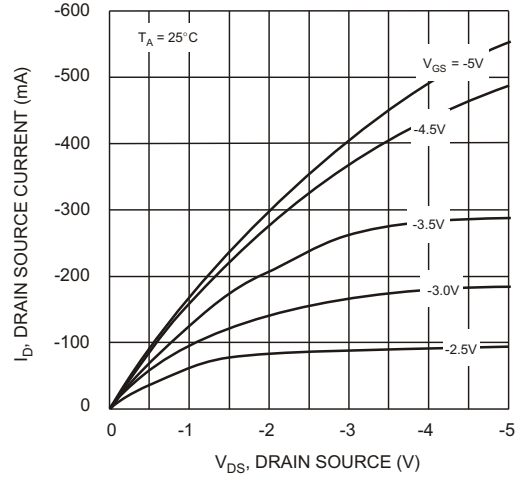
## Electrical Characteristics ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Characteristic                      | Symbol       | Min  | Typ  | Max  | Unit          | Test Condition   |
|-------------------------------------|--------------|------|------|------|---------------|--|
| <b>OFF CHARACTERISTICS (Note 4)</b> |              |      |      |      |               |  |
| Drain-Source Breakdown Voltage      | $BV_{DSS}$   | -50  | -75  |      | V             | $V_{GS} = 0V, I_D = -250\text{ A}$                                     |
| Zero Gate Voltage Drain Current     | $I_{DSS}$    |      |      | -15  | $\mu\text{A}$ | $V_{DS} = -50V, V_{GS} = 0V, T_J = 25\text{ C}$                        |
|                                     |              |      |      | -60  | $\mu\text{A}$ | $V_{DS} = -50V, V_{GS} = 0V, T_J = 125\text{ C}$                       |
| Gate-Body Leakage                   | $I_{GSS}$    |      |      | 10   | $\mu\text{A}$ | $V_{GS} = 20V, V_{DS} = 0V$  |
| <b>ON CHARACTERISTICS (Note 4)</b>  |              |      |      |      |               |  |
| Gate Threshold Voltage              | $V_{GS(th)}$ | -0.8 | -1.6 | -2.0 | V             | $V_{DS} = V_{GS}, I_D = -1\text{mA}$                                   |
| Static Drain-Source On-Resistance   | $R_{DS(ON)}$ |      | 6    | 10   |               | $V_{GS} = -5V, I_D = -0.100\text{A}$                                   |
| Forward Transconductance            | $g_{FS}$     | 0.05 |      |      | S             | $V_{DS} = -25V, I_D = -0.1\text{A}$                                    |
| <b>DYNAMIC CHARACTERISTICS</b>      |              |      |      |      |               |  |
| Input Capacitance                   | $C_{iss}$    |      |      | 45   | pF            | $V_{DS} = -25V, V_{GS} = 0V$<br>$f = 1.0\text{MHz}$                    |
| Output Capacitance                  | $C_{oss}$    |      |      | 25   | pF            |  |
| Reverse Transfer Capacitance        | $C_{rss}$    |      |      | 12   | pF            |  |
| <b>SWITCHING CHARACTERISTICS</b>    |              |      |      |      |               |  |
| Turn-On Delay Time                  | $t_{D(ON)}$  |      | 10   |      | ns            | $V_{DD} = -30V, I_D = -0.27\text{A},$<br>$R_{GEN} = 50, V_{GS} = -10V$ |
| Turn-Off Delay Time                 | $t_{D(OFF)}$ |      | 18   |      | ns            |  |

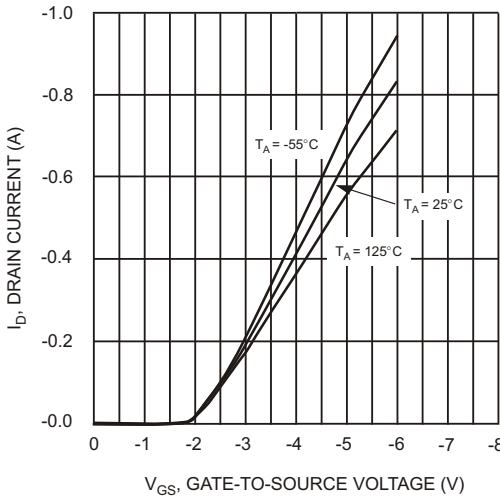
RATING AND CHARACTERISTIC CURVES



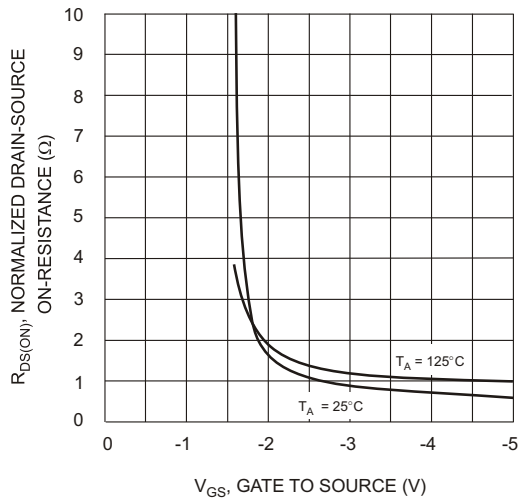
$T_A$ , AMBIENT TEMPERATURE (°C)  
Fig. 1, Max Power Dissipation vs Ambient Temperature



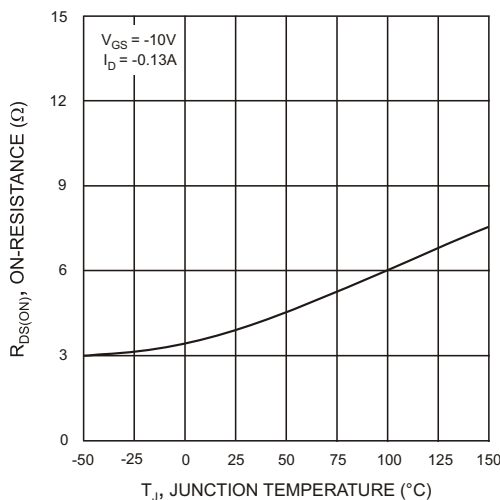
$V_{DS}$ , DRAIN SOURCE (V)  
Fig. 2, Drain Source Current vs. Drain Source Voltage



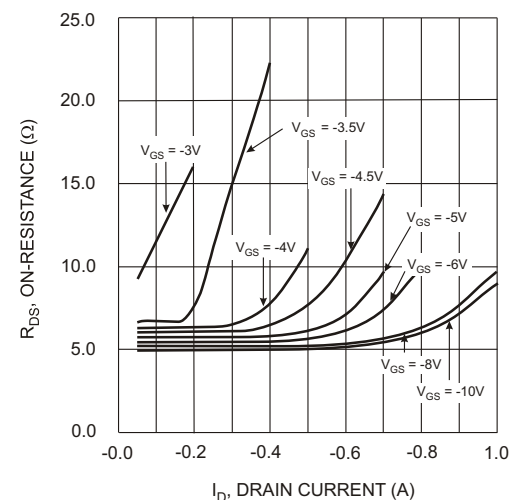
$V_{GS}$ , GATE-TO-SOURCE VOLTAGE (V)  
Fig. 3, Drain Current vs. Gate Source Voltage



$V_{GS}$ , GATE TO SOURCE (V)  
Fig. 4, On Resistance vs. Gate Source Voltage



$T_J$ , JUNCTION TEMPERATURE (°C)  
Fig. 5, On-Resistance vs. Junction Temperature



$I_D$ , DRAIN CURRENT (A)  
Fig. 6, On-Resistance vs. Drain Current

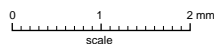
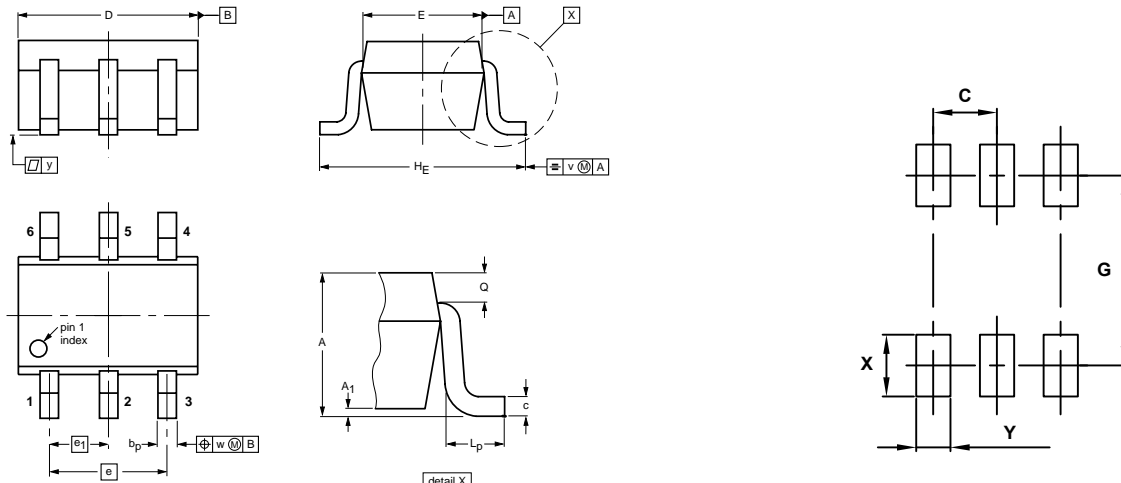
Soldering parameters

| Reflow Condition  |                                    | Pb-Free assembly<br>(see as below) |
|---|------------------------------------|------------------------------------|
| Pre Heat  | -Temperature Min ( $T_{s(min)}$ )  | +150 °C                            |
|   | -Temperature Max ( $T_{s(max)}$ )  | +200 °C                            |
|   | -Time (Min to Max) (ts)            | 60-180 secs.                       |
| Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak) |                                    | 3 °C/sec. Max                      |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                    |                                    | 3 °C/sec. Max                      |
| Reflow  | -Temperature ( $T_L$ ) (Liquid us) | +217 °C                            |
|   | -Temperature ( $t_L$ )             | 60-150 secs.                       |
| Peak Temp ( $T_P$ )                                     |                                    | +260(+0/-5) °C                     |
| Time within 5 °C of actual Peak Temp ( $t_p$ )          |                                    | 30 secs. Max                       |
| Ramp-down Rate  |                                    | 6 °C/sec. Max                      |
| Time 25 °C to Peak Temp ( $T_P$ )                       |                                    | 8 min. Max                         |
| Do not exceed   |                                    | +260 °C                            |



Package Dimensions & Suggested Pad Layout

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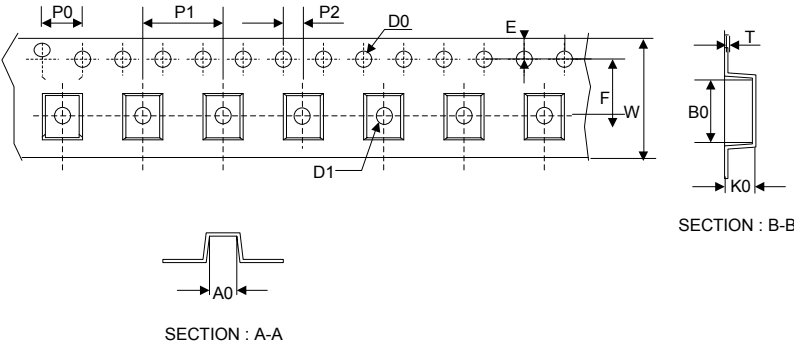
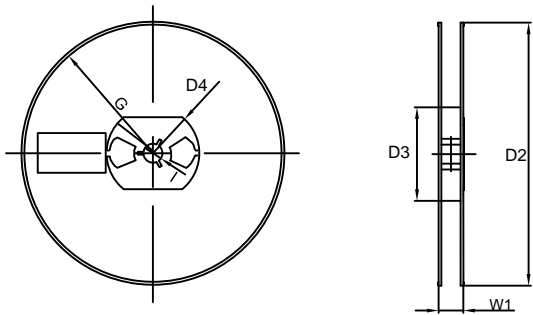


| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.65          |
| G          | 1.90          |
| X          | 0.85          |
| Y          | 0.40          |

DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A1 max | bp           | c            | D          | E            | e   | e1   | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   | y   |
|------|------------|--------|--------------|--------------|------------|--------------|-----|------|----------------|----------------|--------------|-----|-----|-----|
| mm   | 1.1<br>0.8 | 0.1    | 0.30<br>0.20 | 0.25<br>0.10 | 2.2<br>1.8 | 1.35<br>1.15 | 1.3 | 0.65 | 2.2<br>2.0     | 0.45<br>0.15   | 0.25<br>0.15 | 0.2 | 0.2 | 0.1 |

Tape & reel specification

| Tape  | Symbol   | Dimension (mm) |           |
|---|--|----------------|-----------|
|  | P0   | 4.00±0.20      |           |
|   | P1   | 4.00±0.20      |           |
|   | P2   | 2.00±0.20      |           |
|   | D0   | 1.55±0.20      |           |
|   | D1   | 1.00±0.20      |           |
|   | E  | 1.55±0.25      |           |
|   | F  | 3.60±0.20      |           |
|   | W  | 8.00±0.20      |           |
|   | A0   | 3.00±0.20      |           |
|   | B0   | 3.00±0.20      |           |
|   | K0   | 1.30±0.20      |           |
|   | T  | 0.20±0.20      |           |
|   | <p>7" Reel</p>  | D2             | 177.0±5.0 |
|   |  | D3             | 55Min.    |
|   |  | D4             | R24.6±2.0 |
| G   |  | R82.0±2.0      |           |
| I   |  | 13.0±2.0       |           |
| W1  |  | 10.20±3.0      |           |
| Quantity: 3000PCS   |  |                |           |