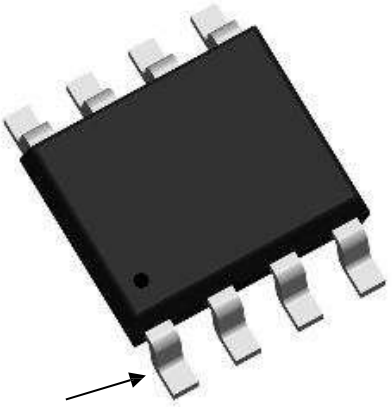
# KSCB3D8N03R

## N-Channel Enhancement Mode Power MOSFET

SOP-8

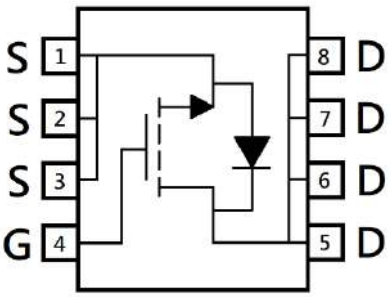


Pin 1

## Features

- Low On Resistance
- Low Gate Charge
- Fast Switching Characteristic

| | |
|---|---|
| $BV_{DSS}$ | 30V |
| $I_D$@$V_{GS}$=10V, $T_C$=25°C (silicon limit) | 43A |
| $I_D$@$V_{GS}$=10V, $T_C$=25°C (package limit) | 26A |
| $I_D$@$V_{GS}$=10V, $T_A$=25°C | 14A |
| $R_{DS(ON)}$@$V_{GS}$=10V, $I_D$=20A | 3.2mΩ |
| $R_{DS(ON)}$@$V_{GS}$=4.5V, $I_D$=20A | 4.8mΩ |




G : Gate S : Source D : Drain

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| KSCTB3D8N03R | SOP-8<br>(Pb-free lead plating and halogen-free package) | 4000 pcs / Tape & Reel |

## Absolute Maximum Ratings ($T_A$=25°C)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current @ $V_{GS}$=10V, $T_C$=25°C (silicon limit) | *a | $I_D$ | 43 | A |
| Continuous Drain Current @ $V_{GS}$=10V, $T_C$=25°C (package limit) | *a | | 26 | |
| Continuous Drain Current @ $V_{GS}$=10V, $T_C$=100°C | *a | | 27.2 | |
| Continuous Drain Current @ $V_{GS}$=10V, $T_A$=25°C | *b | | 14 | |
| Continuous Drain Current @ $V_{GS}$=10V, $T_A$=70°C | *b | | 11.2 | |
| Pulsed Drain Current | *c | $I_{DM}$ | 104 | |
| Continuous Body Diode Forward Current @ $T_C$=25°C | *a | $I_S$ | 14 | |
| Avalanche Current @ L=0.1mH | | $I_{AS}$ | 18 | |
| Avalanche Energy @ L=0.5mH | | $E_{AS}$ | 25 | mJ |
| Total Power Dissipation | $T_C$=25°C *a | $P_D$ | 17.8 | W |
| | $T_C$=100°C *a | | 7 | |
| | $T_A$=25°C *b | | 1.9 | |
| | $T_A$=70°C *b | | 1.2 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55~+150 | °C |

## Thermal Data

| Parameter | | Symbol | Steady State | Unit |
|---|---|---|---|---|
| Thermal Resistance, Junction-to-case | | $R_{\theta JC}$ | 4 | °C/W |
| Thermal Resistance, Junction-to-ambient | *b | $R_{\theta JA}$ | 61 | |

Note:

*a. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

*b. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2 oz. copper, in a still air environment with $T_A$=25°C. The power dissipation $P_D$ is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

*c. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C. Ratings are based on low frequency and low duty cycles to keep initial $T_J$=25°C.

## Electrical Characteristics ($T_A$=25°C, unless otherwise specified)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| **Static** | | | | | |
| $BV_{DSS}$ | 30 | - | - | V | $V_{GS}$=0V, $I_D$=250μA |
| $V_{GS(th)}$ | 1 | - | 2.5 | | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| $G_{FS}$ | - | 24.4 | - | S | $V_{DS}$=5V, $I_D$=10A |
| $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$=±20V, $V_{DS}$=0V |
| $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$=24V, $V_{GS}$=0V |
| $R_{DS(ON)}$ | - | 3.2 | 4.2 | mΩ | $V_{GS}$=10V, $I_D$=20A |
| | - | 4.8 | 6.7 | | $V_{GS}$=4.5V, $I_D$=20A |
| **Dynamic** | | | | | |
| Ciss | - | 1280 | - | pF | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz |
| Coss | - | 860 | - | | |
| Crss | - | 116 | - | | |
| Rg | - | 1 | - | Ω | f=1MHz |
| Qg *1, 2 | - | 23 | - | nC | $V_{DS}$=15V, $I_D$=20A, $V_{GS}$=10V |
| Qgs *1, 2 | - | 4 | - | | |
| Qgd *1, 2 | - | 4.5 | - | | |
| $t_{d(ON)}$ *1, 2 | - | 12 | - | ns | $V_{DS}$=15V, $I_D$=20A, $V_{GS}$=10V, $R_{GS}$=6Ω |
| tr *1, 2 | - | 14 | - | | |
| $t_{d(OFF)}$ *1, 2 | - | 39 | - | | |
| $t_f$ *1, 2 | - | 10 | - | | |
| **Source-Drain Diode** | | | | | |
| $V_{SD}$ *1 | - | 0.85 | 1.2 | V | $I_S$=20A, $V_{GS}$=0V |
| trr | - | 28 | - | ns | $I_F$=20A, $dI_F/dt$=100A/μs |
| Qrr | - | 14 | - | nC | |

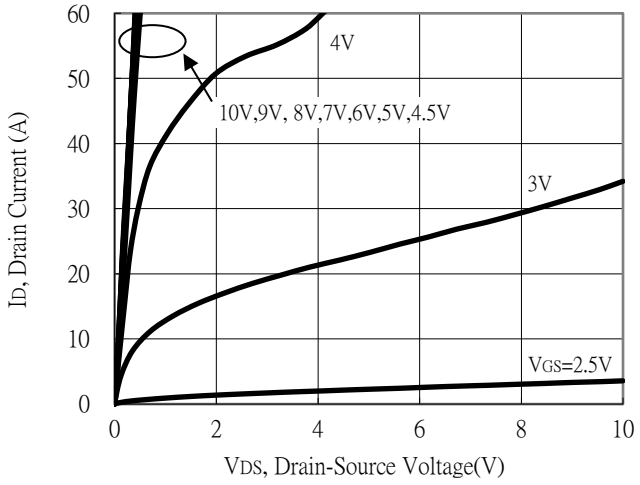
Note:

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

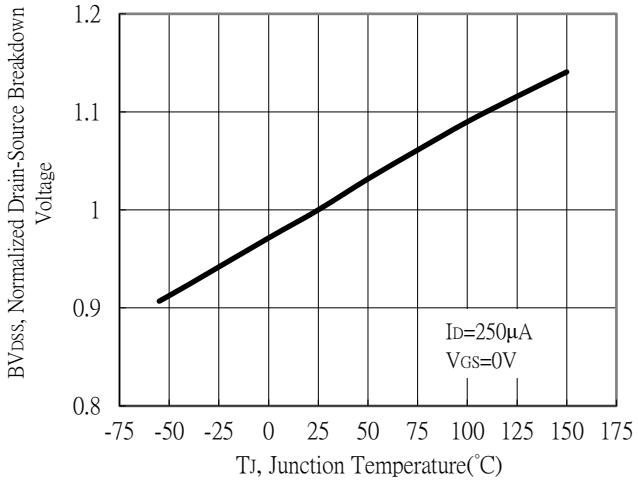
*2. Independent of operating temperature

## Typical Characteristics

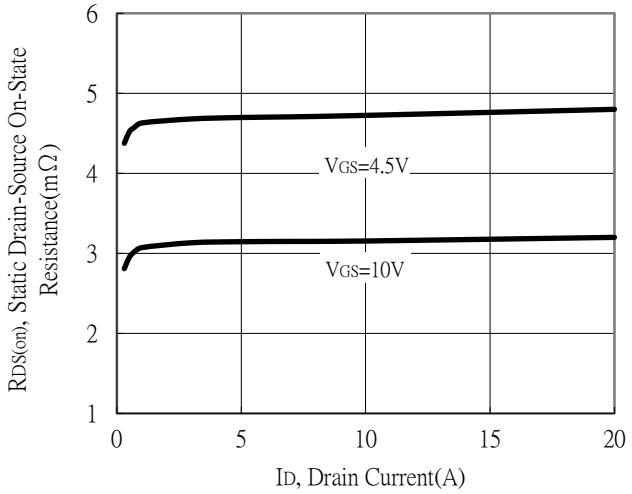
Typical Output Characteristics



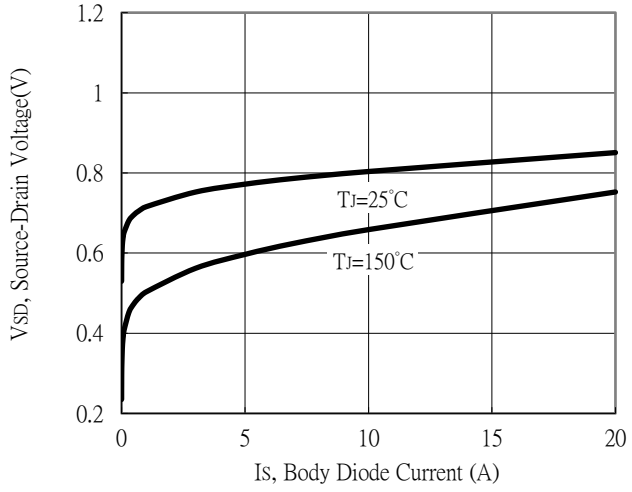

Breakdown Voltage vs Ambient Temperature



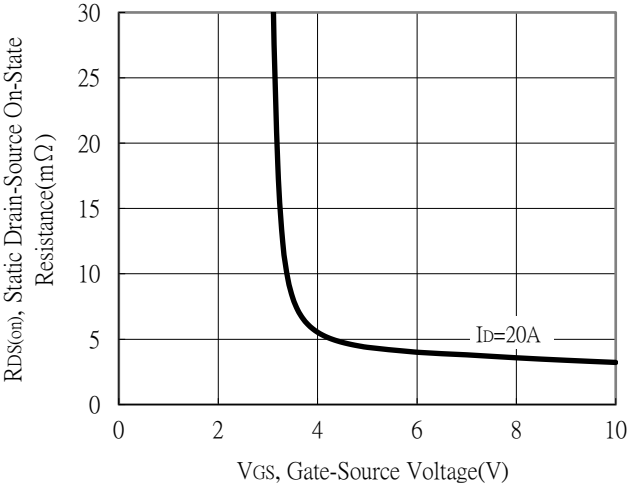

Static Drain-Source On-State resistance vs Drain Current



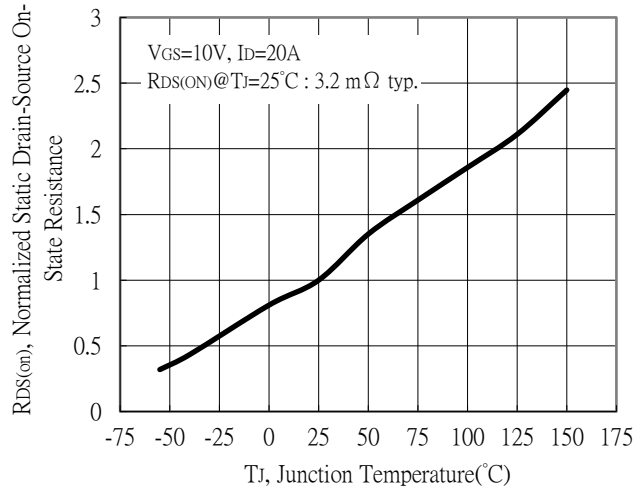

Body Diode Current vs Source-Drain Voltage




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

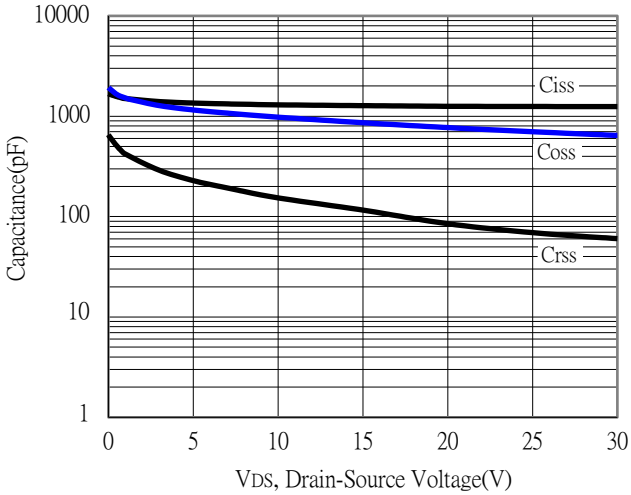



Drain-Source On-State Resistance vs Junction Temperature

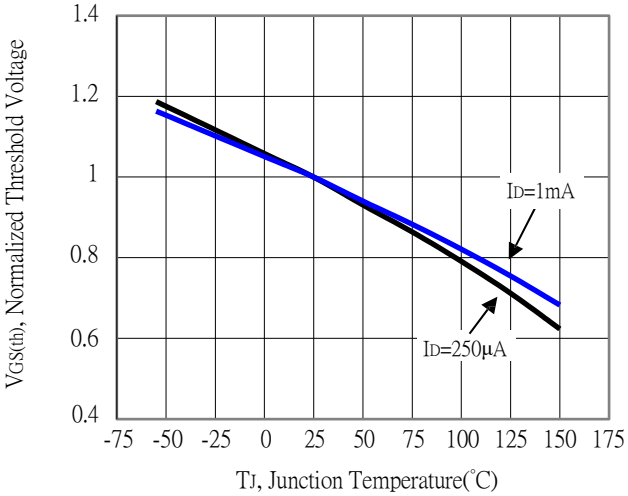


## Typical Characteristics (Cont.)

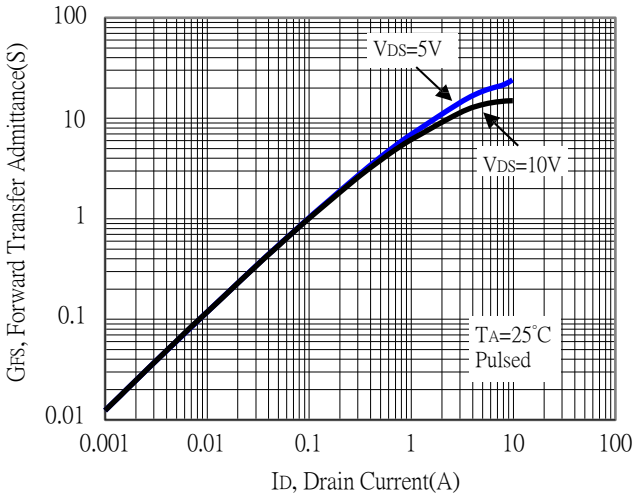
Capacitance vs Drain-to-Source Voltage



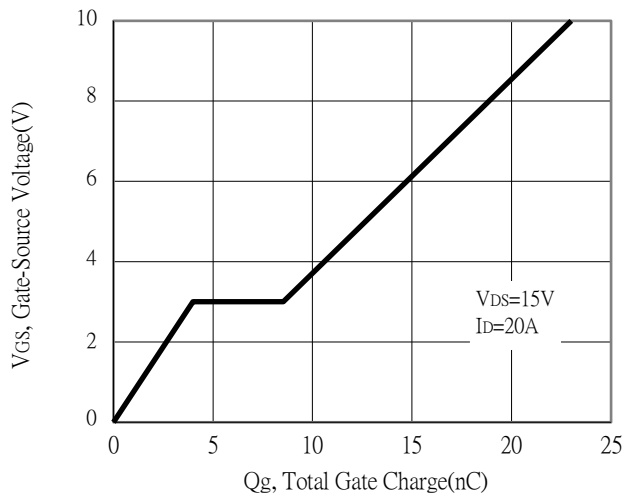

Threshold Voltage vs Junction Temperature



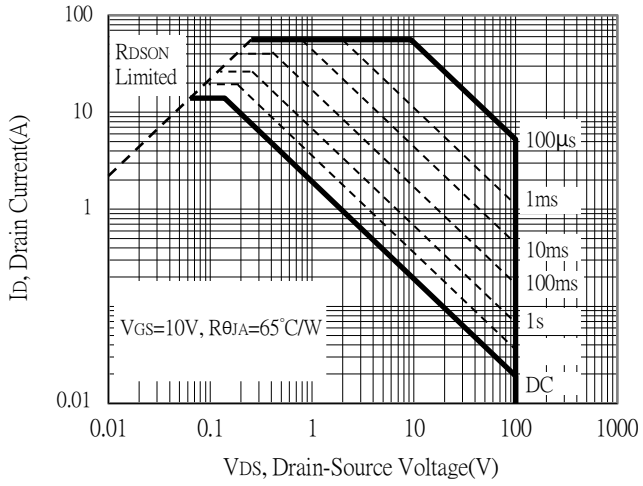

Forward Transfer Admittance vs Drain Current



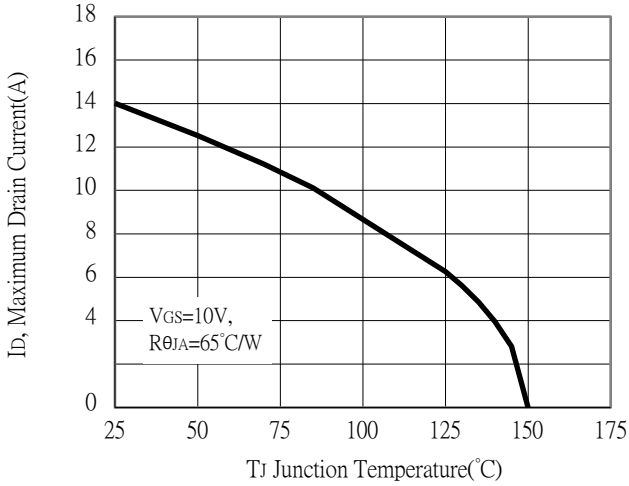

Gate Charge Characteristics




Maximum Safe Operating Area

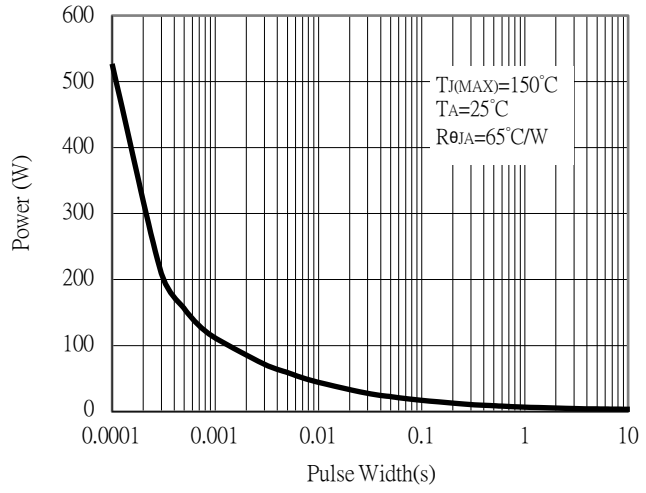



Maximum Drain Current vs Junction Temperature

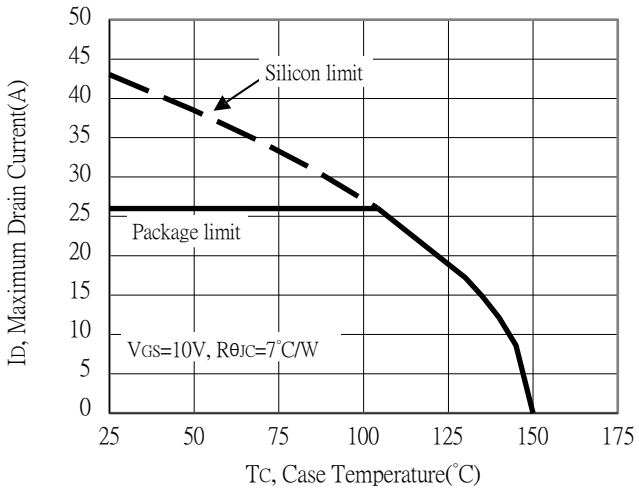


## Typical Characteristics (Cont.)

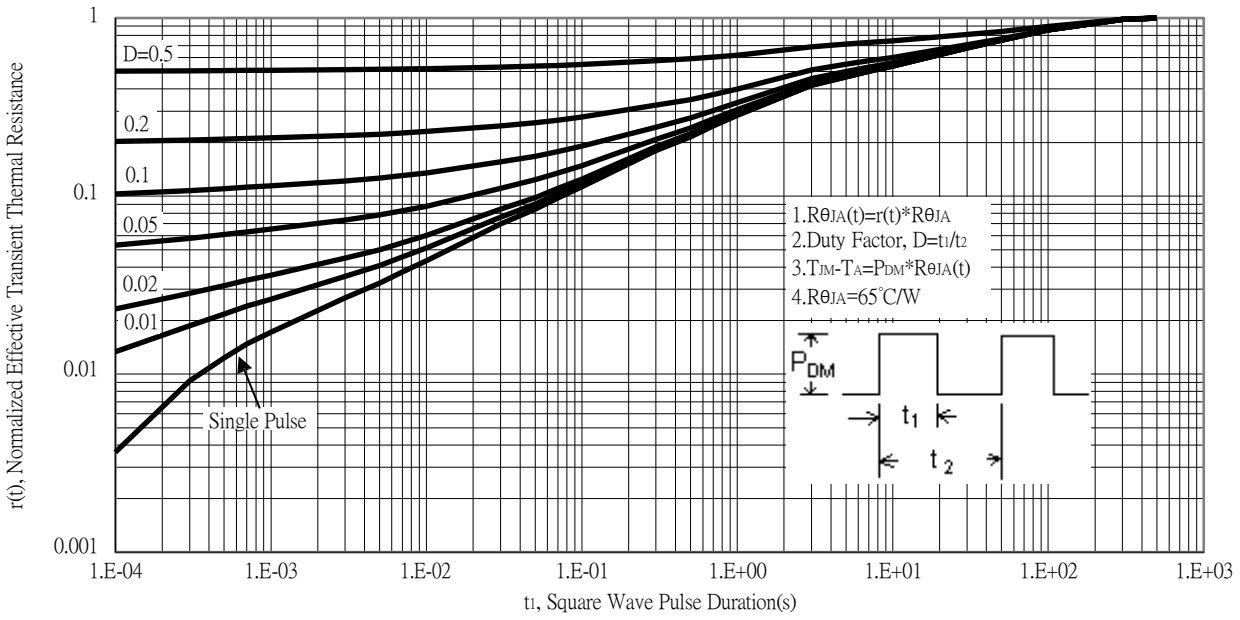
Single Pulse Power Rating, Junction to Ambient



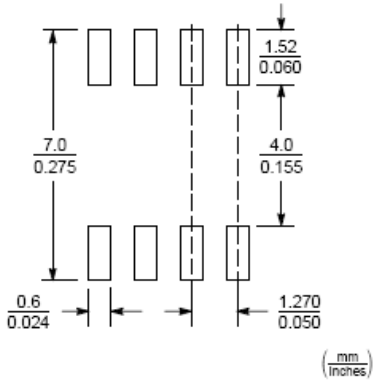

Maximum Drain Current vs Case Temperature



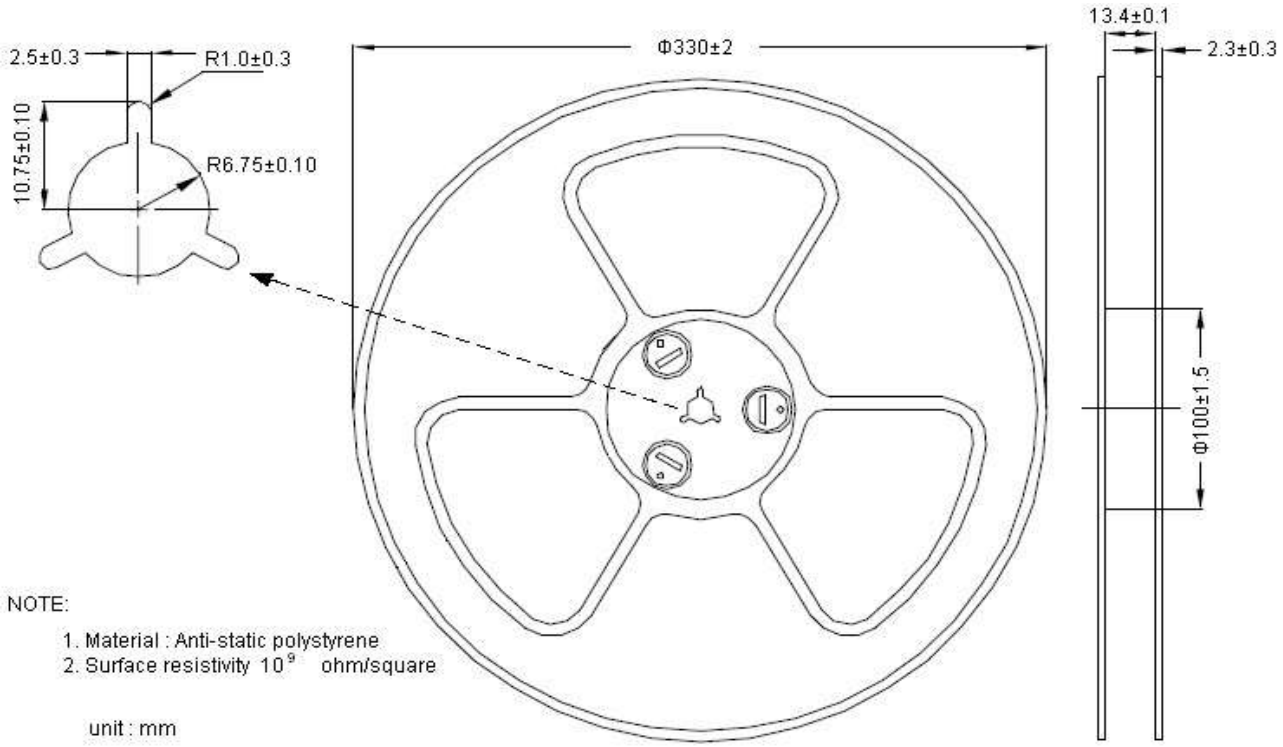

Transient Thermal Response Curves




## Recommended Soldering Footprint



## Reel Dimension

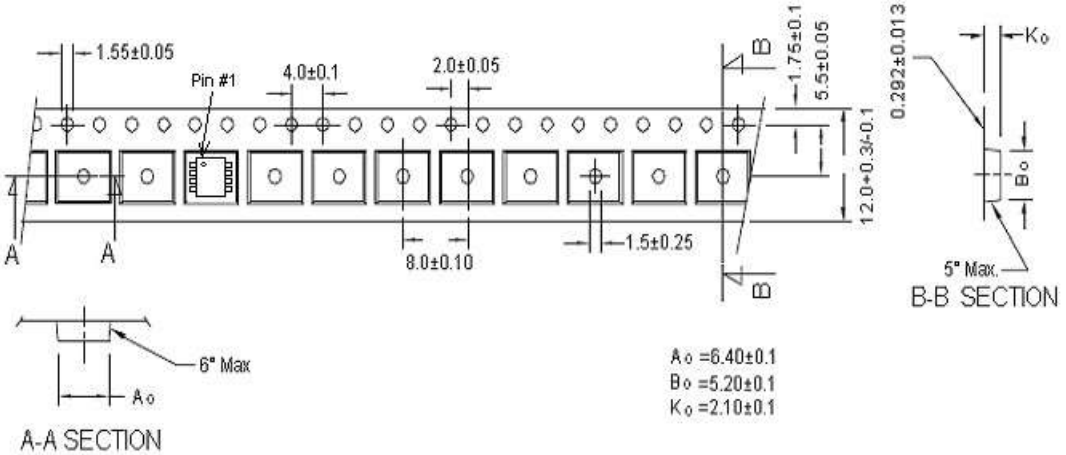



NOTE:

1. Material : Anti-static polystyrene
2. Surface resistivity $10^9$ ohm/square

unit : mm

## Carrier Tape Dimension

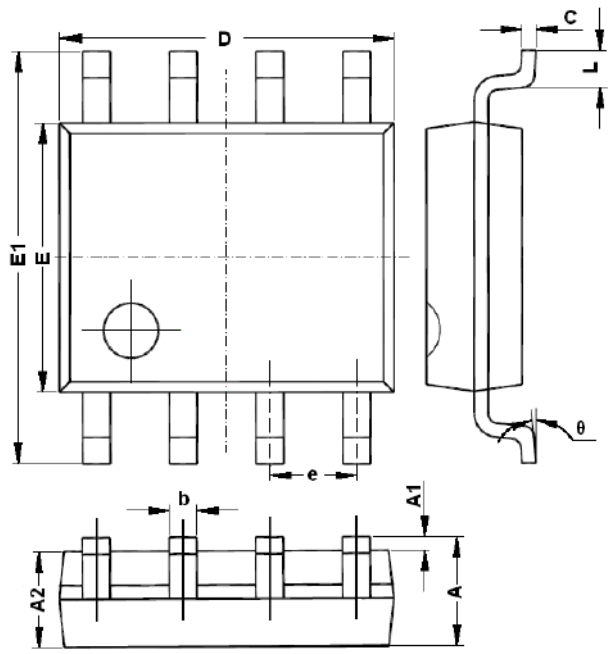



Notes:

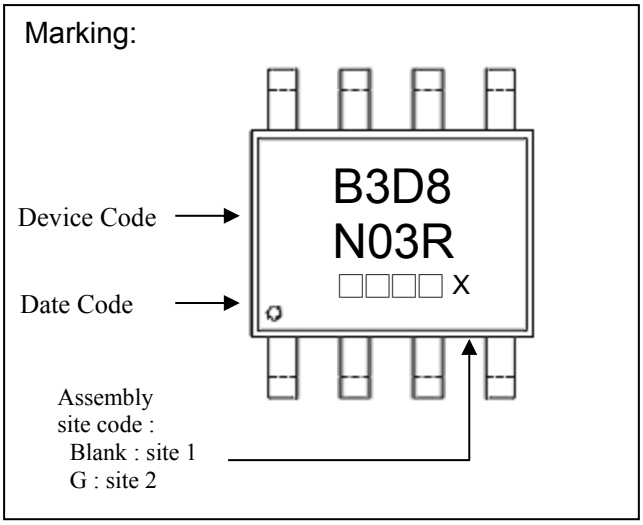
1. 10 sprocket hole pitch cumulative tolerance ±0.2.
2. Camber not to exceed 1mm in 100mm.
3. Material: conductive black polystyrene
4. Ao & Bo measured on a plane 0.3mm above the bottom of the pocket.
5. Ko measured from a plane on the inside bottom of the pocket to the top surface of the carrier.
6. Pocket position relative to sprocket hole measured as true position of pocket, not pocket hole.

Uni : millimeter

## SOP-8 Dimension




8-Lead SOP-8 Plastic Package




Date Code(counting from left to right) :
1st code: year code, the last digit of Christian year
2nd code : month code, Jan→A, Feb→B, Mar→C, Apr→D
May→E, Jun→F, Jul→G, Aug→H, Sep→J,
Oct→K, Nov→L, Dec→M
3rd and 4th codes : production serial number, 01~99

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 1.350 | 1.750 | 0.053 | 0.069 | E | 3.800 | 4.000 | 0.150 | 0.157 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 | E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 | e | 1.270 | (BSC) | 0.050 | (BSC) |
| b | 0.330 | 0.510 | 0.013 | 0.020 | L | 0.400 | 1.270 | 0.015 | 0.050 |
| c | 0.170 | 0.250 | 0.006 | 0.010 | θ | 0 | 8° | 0 | 8° |
| D | 4.700 | 5.100 | 0.185 | 0.200 | | | | | |