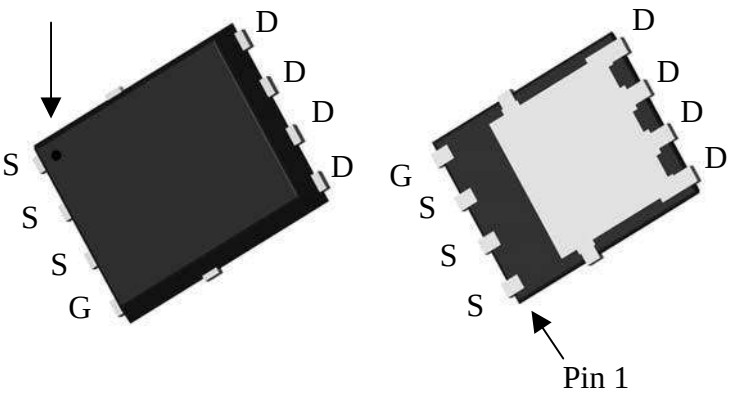
# N-Channel Enhancement Mode Power MOSFET

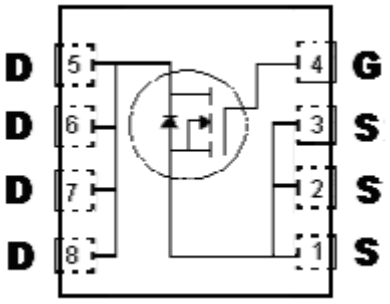
## Features:

- Low On Resistance
- Simple Drive Requirement
- Low Gate Charge
- Fast Switching Characteristic
- Pb-free lead plating and Halogen-free package

DFN5×6




| | |
|---|---|
| **$BV_{DSS}$** | **60V** |
| **$I_D$@$V_{GS}$=10V, $T_C$=25˚C** | **145A(silicon limit)** |
| **$I_D$@$V_{GS}$=10V, $T_C$=25˚C** | **84A(package limit)** |
| **$I_D$@$V_{GS}$=10V, $T_A$=25˚C** | **23A** |
| **$R_{DS(ON)}$@$V_{GS}$=10V, $I_D$=30A** | **2.2mΩ (typ)** |




G：Gate D：Drain S：Source

## Ordering Information

| Device | Package | Shipping |
|---|---|---|
| KPRE2D0N06R | DFN 5 ×6(Pb-free lead plating and halogen -free package) | 3000 pcs / tape & reel |

## Absolute Maximum Ratings ($T_C$=25°C, unless otherwise noted)

| Parameter | | Symbol | Limits | Unit |
|---|---|---|---|---|
| Drain-Source Voltage (Note 1) | | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current @$T_C$=25°C, $V_{GS}$=10V (silicon limit) (Note 5) | | $I_D$ | 145 | A |
| Continuous Drain Current @$T_C$=100°C, $V_{GS}$=10V(silicon limit) (Note 5) | | | 103 | |
| Continuous Drain Current @$T_C$=25°C, $V_{GS}$=10V (package limit) (Note 1) | | | 84 | |
| Continuous Drain Current @$T_A$=25°C, $V_{GS}$=10V (Note 2) | | $I_{DSM}$ | 23 | |
| Continuous Drain Current @$T_A$=70°C, $V_{GS}$=10V (Note 2) | | | 18.4 | |
| Pulsed Drain Current @ $V_{GS}$=10V (Note 3) | | $I_{DM}$ | 350 | |
| Avalanche Current @L=0.1mH (Note 3) | | $I_{AS}$ | 100 | |
| Single Pulse Avalanche Energy @ L=1mH, $I_D$=44Amps, $V_{DD}$=30V (Note 4) | | $E_{AS}$ | 968 | mJ |
| Repetitive Avalanche Energy (Note 3) | | $E_{AR}$ | 12.5 | |
| Power Dissipation | $T_C$=25°C (Note 1) | $P_D$ | 125 | W |
| | $T_C$=100°C (Note 1) | | 62.5 | |
| | $T_A$=25°C (Note 2) | $P_{DSM}$ | 2.5 | |
| | $T_A$=70°C (Note 2) | | 1.6 | |
| Operating Junction and Storage Temperature | | Tj, Tstg | -55~+175 | °C |

*Drain current limited by maximum junction temperature

## Thermal Data

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-case, max | $R_{\theta JC}$ | 1.2 | °C/W |
| Thermal Resistance, Junction-to-ambient, max (Note 2) | $R_{\theta JA}$ | 50 | |

Note : 1.The power dissipation $P_D$ is based on $T_{J(MAX)}$=175°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

2. 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 value in any given application depends on the user's specific board design. The power dissipation $P_{DSM}$ is based on $R_{\theta JA}$and the maximum allowed junction temperature of 150°C, and the maximum temperature of 175°C may be used if the PCB allows it.

3. Pulse width limited by junction temperature $T_{J(MAX)}$=175°C.

4. Ratings are based on low frequency and low duty cycles to k ep initial $T_J$=25°C. 100% tested by conditions of $V_{DD}$=25V, $I_D$=40A, L=0.1mH, $V_{GS}$=10V.

5. Calculated continuous drain current based on maximum allowable junction temperature.

6. The static characteristics are obtained using <300μs pulses, du y cycle 0.5% maximum.

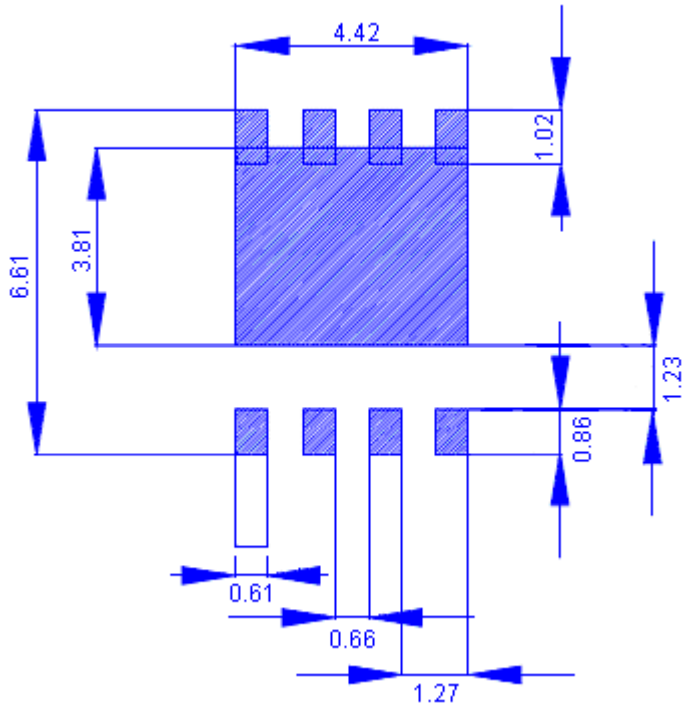
7. The $R_{\theta JA}$ is the sum of thermal resistance from junction to cas $R_{\theta JC}$ and case to ambient.

## Characteristics (Tj=25°C, unless otherwise specified)

| Symbol | Min. | Typ. | Max. | Unit | Test Conditions |
|---|---|---|---|---|---|
| **Static** | | | | | |
| $BV_{DSS}$ | 60 | - | - | V | $V_{GS}$=0V, $I_D$=250μA |
| $\Delta BV_{DSS}/\Delta Tj$ | - | 0.04 | - | V/°C | Reference to 25°C, $I_D$=250μA |
| $V_{GS(th)}$ | 2 | - | 4 | V | $V_{DS}$ = $V_{GS}$, $I_D$=250μA |
| *$G_{FS}$ | - | 35 | - | S | $V_{DS}$ =10V, $I_D$=20A |
| $I_{GSS}$ | - | - | ±100 | nA | $V_{GS}$=±20V, $V_{DS}$=0V |
| $I_{DSS}$ | - | - | 1 | μA | $V_{DS}$ =48V, $V_{GS}$ =0V |
| | - | - | 5 | | $V_{DS}$ =48V, $V_{GS}$ =0V, Tj=55°C |
| *$R_{DS(ON)}$ | - | 2.2 | 2.9 | mΩ | $V_{GS}$ =10V, $I_D$=30A |
| **Dynamic** | | | | | |
| *Qg | - | 143.8 | - | nC | $V_{DS}$=48V, $I_D$=60A, $V_{GS}$=10V |
| *Qgs | - | 30.5 | - | | |
| *Qgd | - | 43.1 | - | | |
| *$t_{d(ON)}$ | - | 47.4 | - | ns | $V_{DS}$=30V, $I_D$=30A, $V_{GS}$=10V, $R_G$=4.7Ω |
| *tr | - | 45.4 | - | | |
| *$t_{d(OFF)}$ | - | 127.8 | - | | |
| *$t_f$ | - | 46.2 | - | | |
| Ciss | - | 8054 | - | pF | $V_{GS}$=0V, $V_{DS}$=30V, f=1MHz |
| Coss | - | 1096 | - | | |
| Crss | - | 70 | - | | |
| Rg | - | 1.2 | - | Ω | f=1MHz |
| **Source-Drain Diode** | | | | | |
| *$I_S$ | - | - | 84 | A | |
| *$I_{SM}$ | - | - | 350 | | |
| *$V_{SD}$ | - | 0.81 | 1.2 | V | $I_S$=20A, $V_{GS}$=0V |
| *trr | - | 46 | - | ns | $V_{GS}$=0, $I_F$=20A, $dI_F/dt$=100A/μs |
| *Qrr | - | 53 | - | nC | |

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

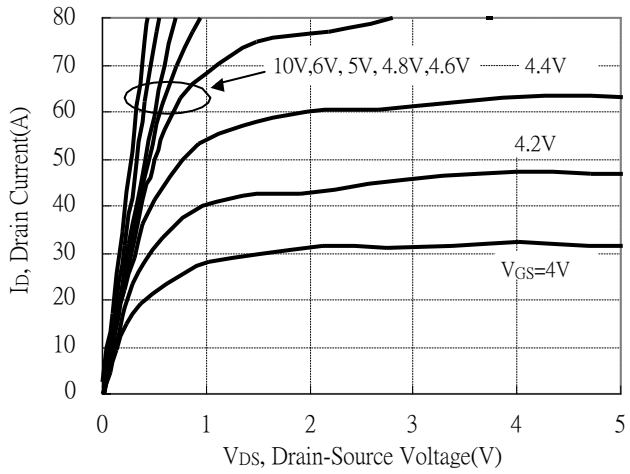
## Recommended Soldering Footprint



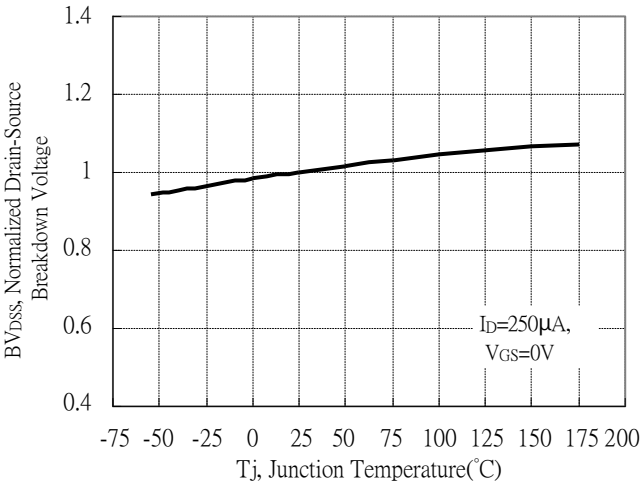

unit : mm

## Typical Characteristics

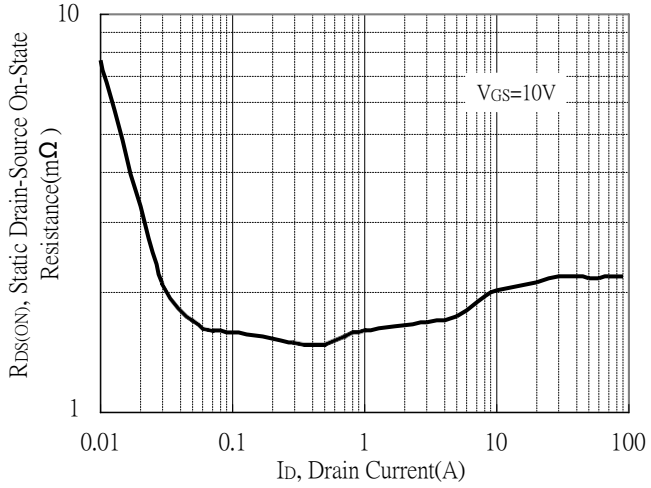
Typical Output Characteristics



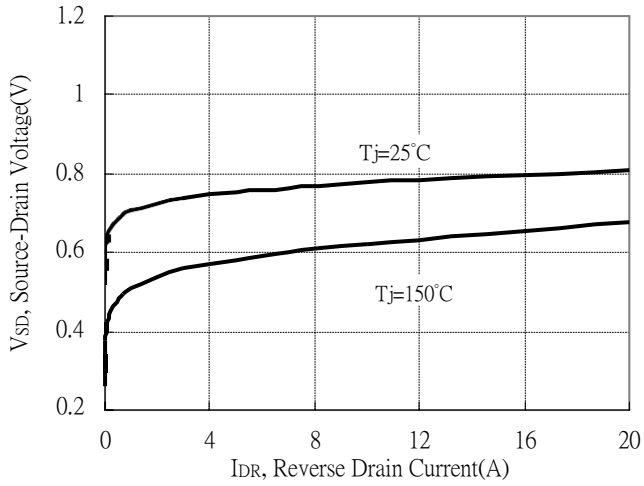

Brekdown Voltage vs Ambient Temperature



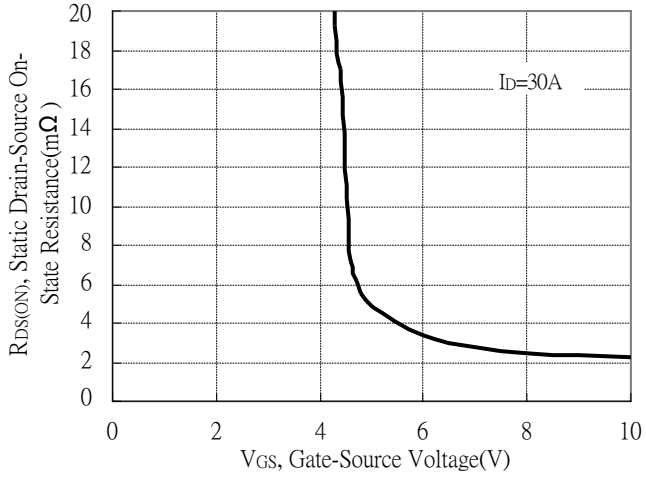

Static Drain-Source On-State resistance vs Drain Current



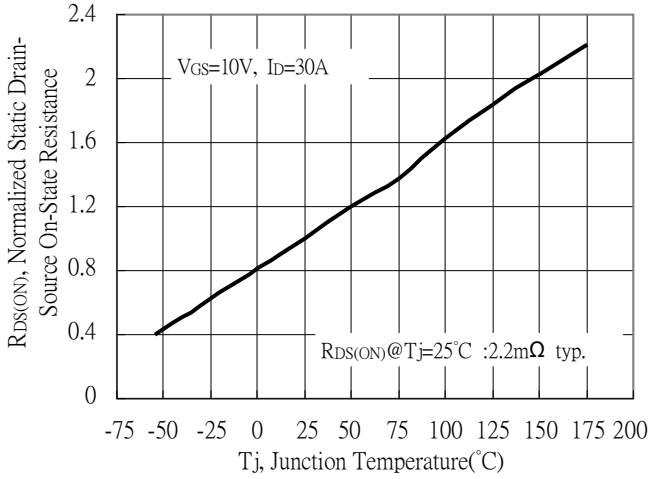

Reverse Drain Current vs Source-Drain Voltage




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

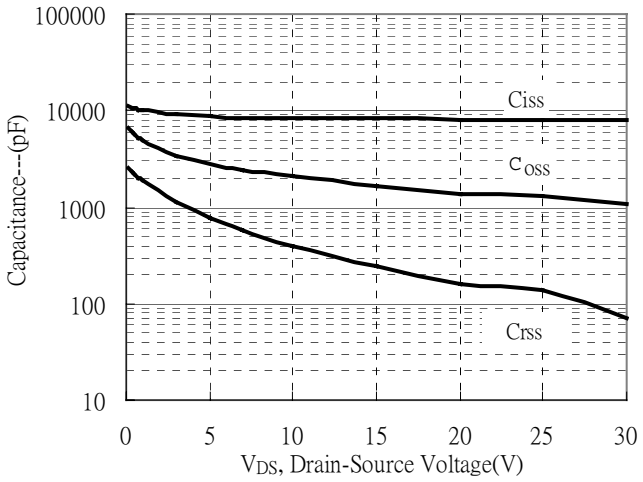



Drain-Source On-State Resistance vs Junction Tempearture

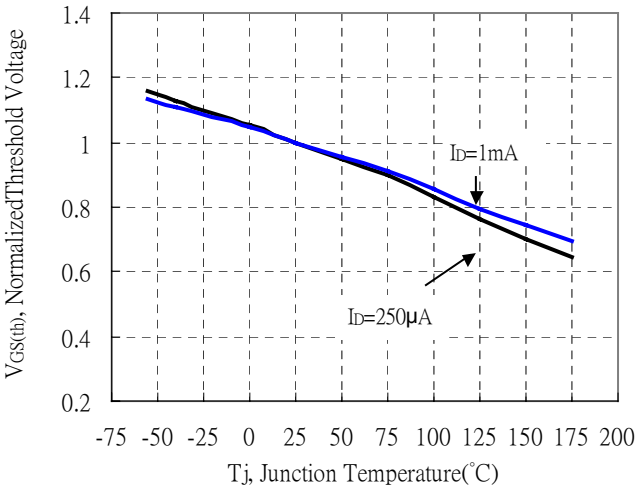


## Typical Characteristics(Cont.)

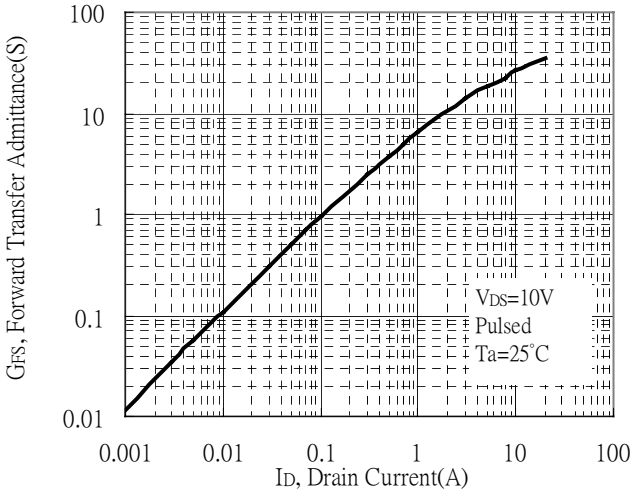
Capacitance vs Drain-to-Source Voltage



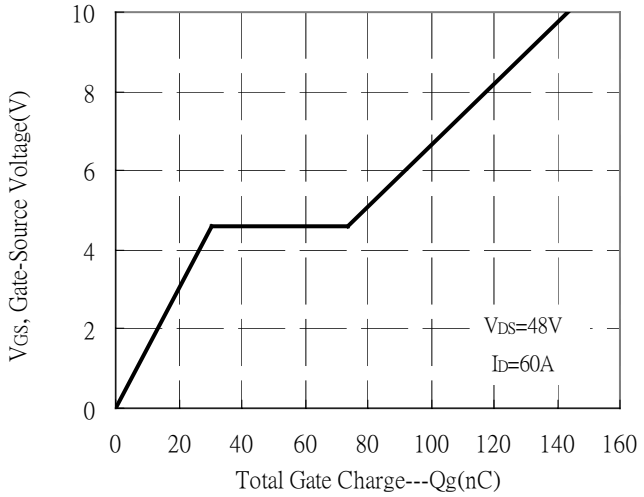

Threshold Voltage vs Junction Tempearture



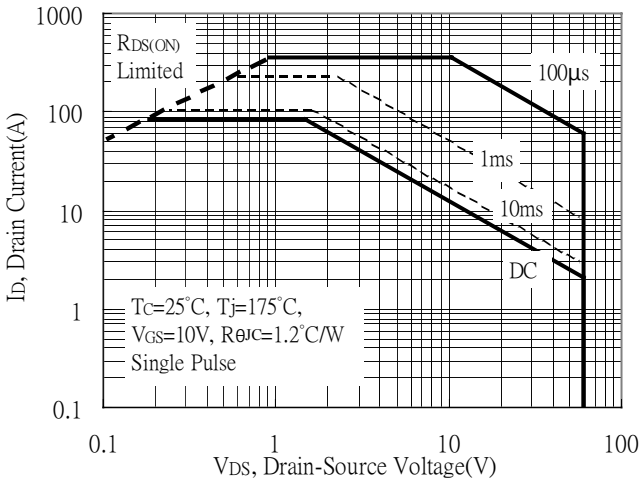

Forward Transfer Admittance vs Drain Current



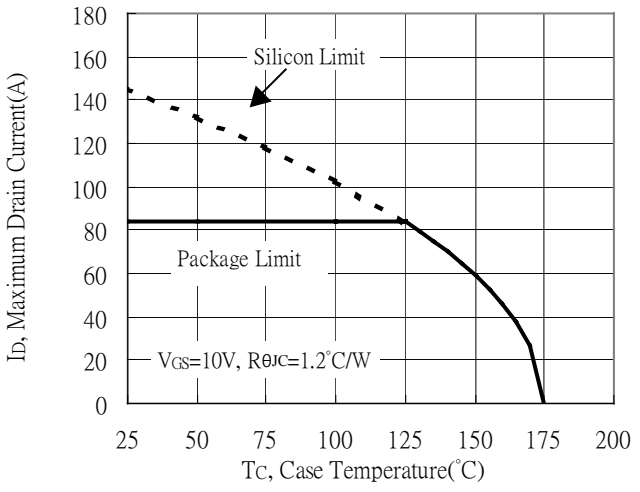

Gate Charge Characteristics




Maximum Safe Operating Area

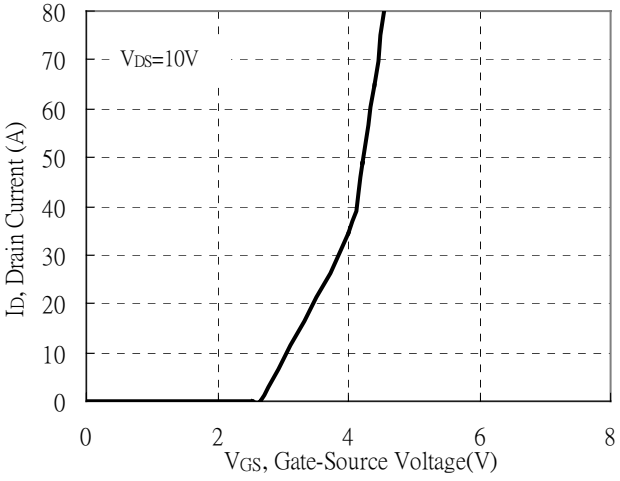



Maximum Drain Current vs Case Temperature

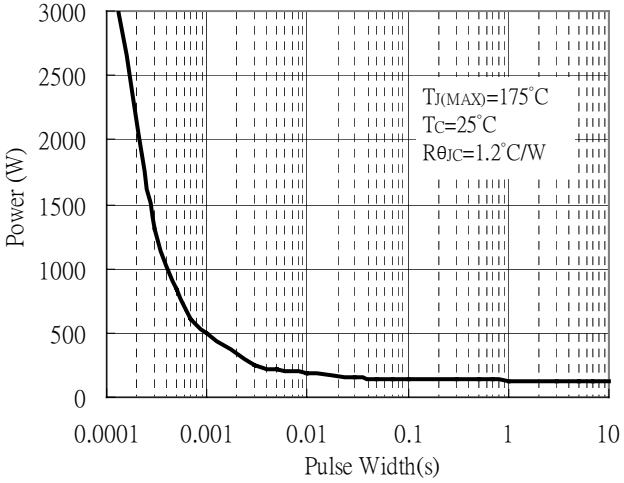


## Typical Characteristics(Cont.)

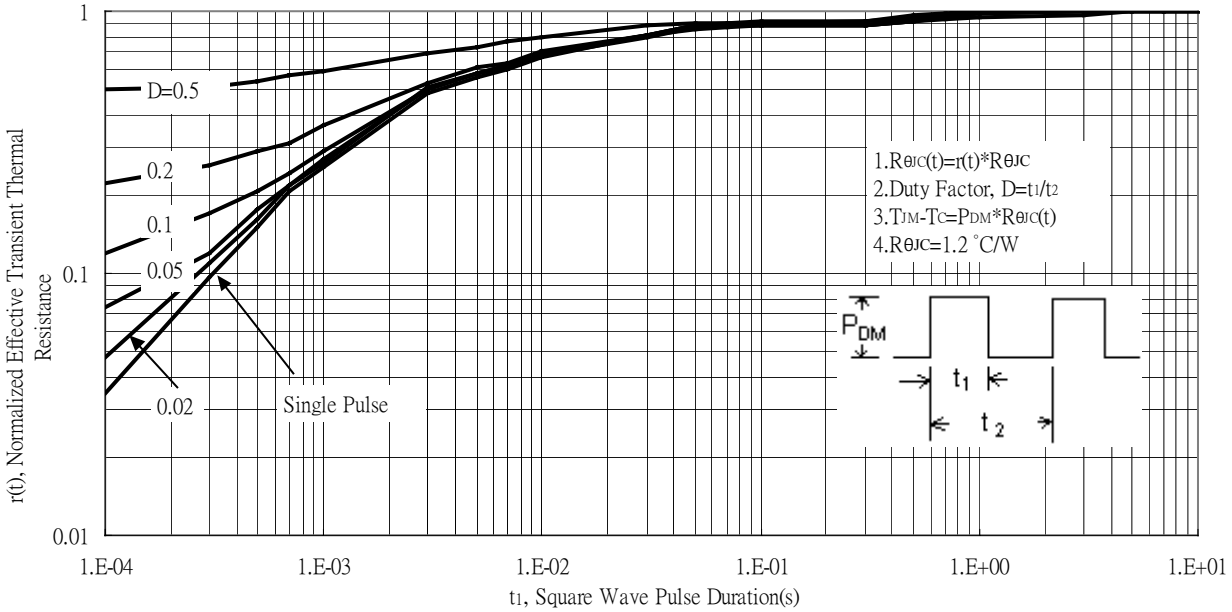
Typical Transfer Characteristics



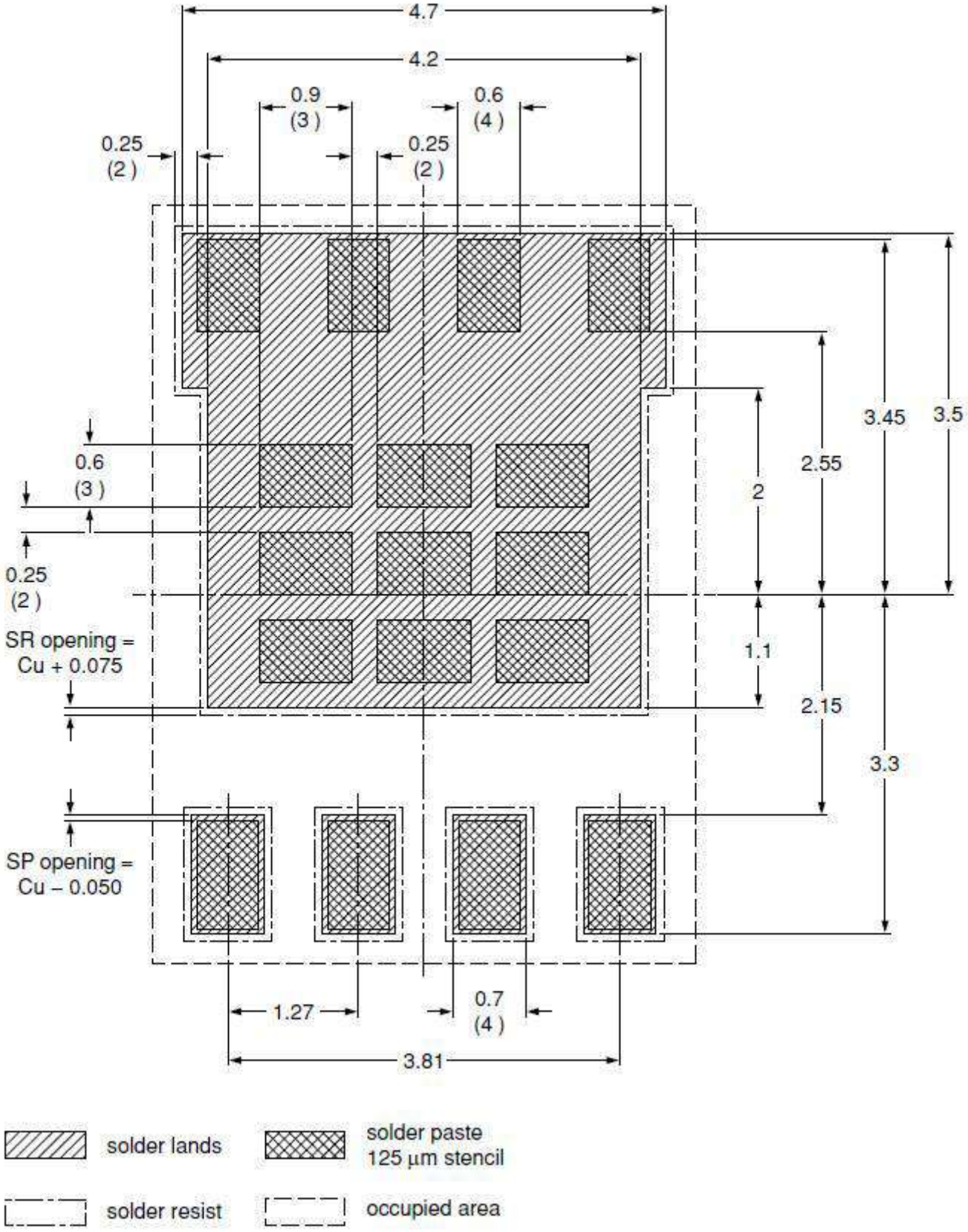

Single Pulse Maximum Power Dissipation




Transient Thermal Response Curves

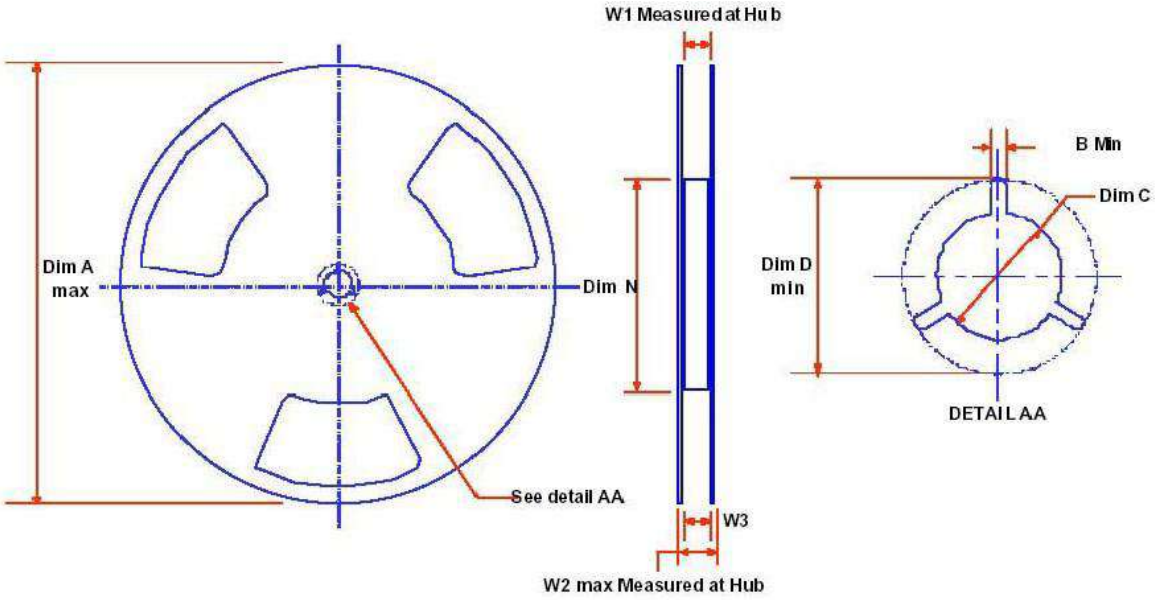


## Recommended Soldering Footprint & Stencil Design




unit : mm

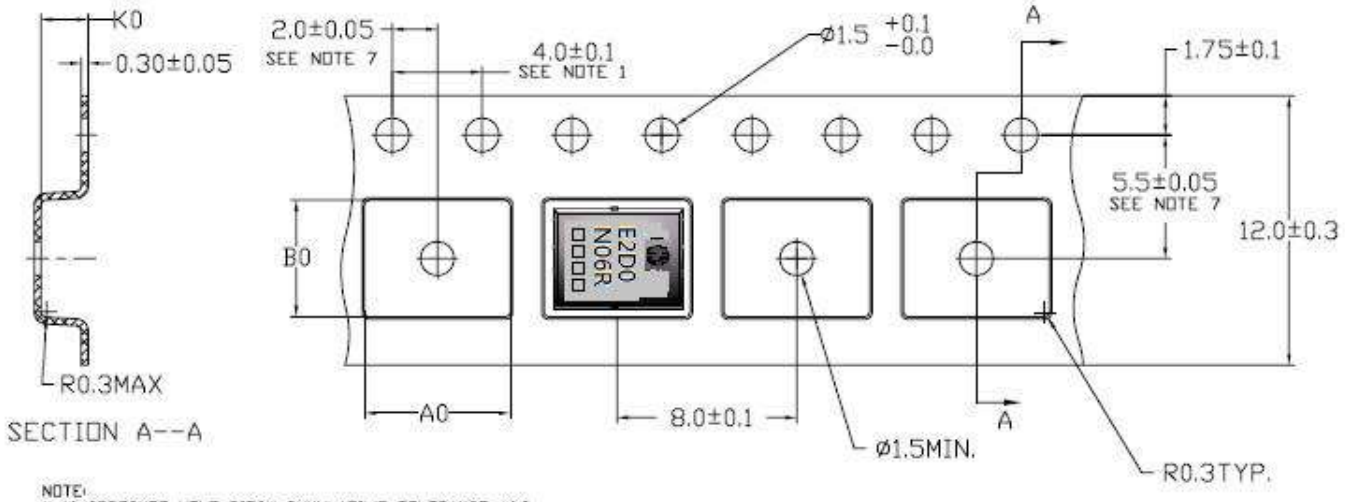
## Reel Dimension




Dimensions are in inches and millimeters

| Tape Size | Reel Option | Dim A | Dim B | Dim C | Dim D | Dim N | Dim W1 | Dim W2 | Dim W3 (LSL-USL) |
|---|---|---|---|---|---|---|---|---|---|
| 12mm | 13" Dia (STD/L99Z) | 13.00 330+/-1 | 0.059 1.5 Min. | 0.512 13.0 Min. | 0.795 20.2(ref.) | 7.00 178+0/-2 | 0.488 +0.078/-0.000 12.4 +2/0 | 0.724 18.4(ref.) | 0.469 – 0.606 11.9 – 15.4 |

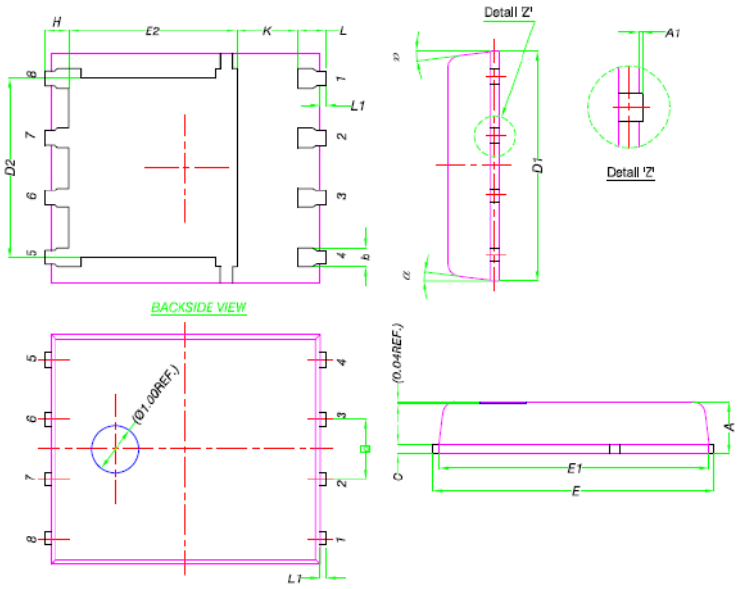
## Carrier Tape Dimension



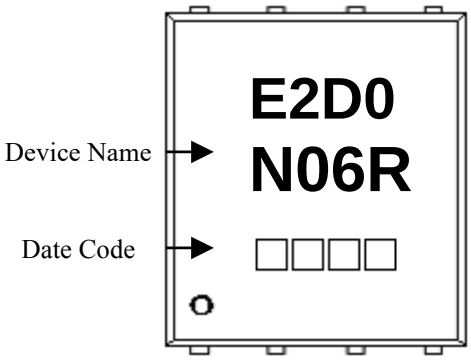

NOTE:
1. 10 SPROCKET HOLE PITCH CUMULATIVE TOLERANCE ±0.2
2. CAMBER NOT TO EXCEED 1mm IN 100mm, NONCUMULATIVE OVER 250mm
3. MATERIAL: BLACK STATIC DISSIPATIVE PS.(POLYSTYRENE)
4. ALL DIMENSIONS ARE IN MILLIMETERS (UNLESS OTHERWISE SPECIFIED)
5. A0 AND B0 MEASURED ON A PLANE 0.3mm ABOVE THE BOTTOM OF THE POCKET
6. K0 MEASURED FROM A PLANE ON THE INSIDE BOTTOM OF THE POCKET TO THE TOP SURFACE OF THE CARRIER
7. POCKET POSITION RELATIVE TO SPROCKET HOLE MEASURED AS TRUE POSITION OF POCKET, NOT POCKET HOLE
8. SURFACE RESISTIVITY
   *1X10E4~1X10E11 OHMS/SQ*
   1X10E4~1X10E6 OHMS/SQ. for Fairchild Only

A0=6.5±0.1
B0=5.3±0.1
K0=1.4±0.1

## DFN5x6 Dimension




Marking:




8-Lead DFN5x6 Plastic Package

| DIM | Millimeters | | Inches | | DIM | Millimeters | | Inches | |
|---|---|---|---|---|---|---|---|---|---|
| | Min. | Max. | Min. | Max. | | Min. | Max. | Min. | Max. |
| A | 0.90 | 1.10 | 0.035 | 0.043 | E2 | 3.38 | 3.78 | 0.133 | 0.149 |
| A1 | 0.00 | 0.05 | 0.000 | 0.002 | e | 1.27 BSC | | 0.050 BSC | |
| b | 0.33 | 0.51 | 0.013 | 0.020 | H | 0.41 | 0.61 | 0.016 | 0.024 |
| C | 0.20 | 0.30 | 0.008 | 0.012 | K | 1.10 | - | 0.043 | - |
| D1 | 4.80 | 5.00 | 0.189 | 0.197 | L | 0.51 | 0.71 | 0.020 | 0.028 |
| D2 | 3.61 | 3.96 | 0.142 | 0.156 | L1 | 0.06 | 0.20 | 0.002 | 0.008 |
| E | 5.90 | 6.10 | 0.232 | 0.240 | θ | 8° | 12° | 8° | 12° |
| E1 | 5.70 | 5.80 | 0.224 | 0.228 | | | | | |