

## Features

- Split Gate Trench Mosfet Technology
- Excellent Package For Heat Dissipation
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note 1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

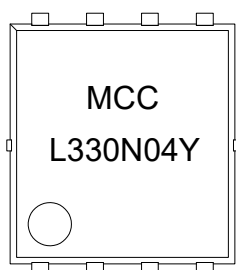
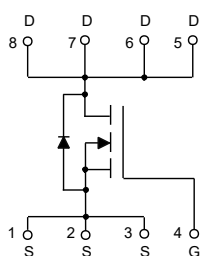
- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 50°C/W Junction to Ambient<sup>(Note 2)</sup>
- Thermal Resistance: 0.6°C/W Junction to Case

| Parameter                                   |                       | Symbol          | Rating | Unit |
|---------------------------------------------|-----------------------|-----------------|--------|------|
| Drain-Source Voltage                        |                       | V <sub>DS</sub> | 40     | V    |
| Gate-Source Voltage                         |                       | V <sub>GS</sub> | ±20    | V    |
| Continuous Drain Current                    | T <sub>C</sub> =25°C  | I <sub>D</sub>  | 330    | A    |
|                                             | T <sub>C</sub> =100°C |                 | 233    |      |
| Pulsed Drain Current <sup>(Note 3)</sup>    |                       | I <sub>DM</sub> | 1320   | A    |
| Total Power Dissipation <sup>(Note 4)</sup> |                       | P <sub>D</sub>  | 250    | W    |
| Avalance Energy <sup>(Note 5)</sup>         |                       | E <sub>AS</sub> | 2000   | mJ   |

Note:

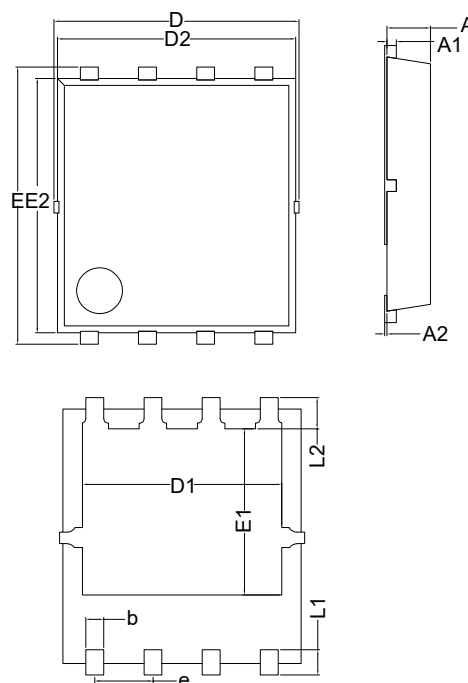
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ\text{C}$ .
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
5.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=40\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=12\text{mH}$ .

## Internal Structure and Marking Code



## N-CHANNEL MOSFET

### DFN5060-C



| DIMENSIONS |        |       |       |      |      |
|------------|--------|-------|-------|------|------|
| DIM        | INCHES |       | MM    |      | NOTE |
|            | MIN    | MAX   | MIN   | MAX  |      |
| D          | 0.203  | 0.218 | 5.15  | 5.55 |      |
| D2         | 0.201  | 0.209 | 5.10  | 5.30 |      |
| E          | 0.234  | 0.242 | 5.95  | 6.15 |      |
| E2         | 0.215  | 0.222 | 5.45  | 5.65 |      |
| A          | 0.033  | 0.041 | 0.85  | 1.05 |      |
| A1         | 0.008  |       | 0.203 |      | BSC  |
| A2         | 0.000  | 0.004 | 0.00  | 0.10 |      |
| D1         | 0.167  | 0.175 | 4.25  | 4.45 |      |
| E1         | 0.139  | 0.147 | 3.52  | 3.73 |      |
| L1         | 0.018  | 0.026 | 0.45  | 0.65 |      |
| L2         | 0.027  |       | 0.68  |      | BSC  |
| b          | 0.012  | 0.020 | 0.30  | 0.50 |      |
| e          | 0.050  |       | 1.27  |      | BSC  |

## Electrical Characteristics @ 25°C (Unless Otherwise Specified)

| Parameter                       | Symbol               | Test Conditions                                                            | Min | Typ  | Max  | Unit |
|---------------------------------|----------------------|----------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics          |                      |                                                                            |     |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =1mA                                   | 40  |      |      | V    |
| Gate-Source Leakage Current     | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                 |     |      | ±100 | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =32V, V <sub>GS</sub> =0V                                  |     |      | 1    | μA   |
| Gate-Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                   | 2.0 | 3.2  | 4.0  | V    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =75A                                  |     | 0.65 | 0.85 | mΩ   |
|                                 |                      | V <sub>GS</sub> =6V, I <sub>D</sub> =20A                                   |     | 2.1  | 2.8  |      |
| Gate Resistance                 | R <sub>g</sub>       | F=1 MHz, Open drain                                                        |     | 1.5  |      | Ω    |
| Diode Characteristics           |                      |                                                                            |     |      |      |      |
| Continuous Body Diode Current   | I <sub>S</sub>       |                                                                            |     |      | 330  | A    |
| Diode Forward Voltage           | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =20A                                   |     |      | 1.3  | V    |
| Reverse Recovery Time           | t <sub>rr</sub>      | I <sub>F</sub> =165A, dI <sub>F</sub> /dt=100A/μs                          |     | 61   |      | ns   |
| Reverse Recovery Charge         | Q <sub>rr</sub>      |                                                                            |     | 66   |      | nC   |
| Dynamic Characteristics         |                      |                                                                            |     |      |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, f=1MHz                          |     | 8098 |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                            |     | 2091 |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                            |     | 246  |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>D</sub> =165A           |     | 133  |      | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                            |     | 45   |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                            |     | 39   |      |      |
| Turn-On Delay Time              | t <sub>d(on)</sub>   | V <sub>DS</sub> =20V, V <sub>GS</sub> =10V, I <sub>DS</sub> =165A, RGEN=6Ω |     | 40   |      | ns   |
| Turn-On Rise Time               | t <sub>r</sub>       |                                                                            |     | 255  |      |      |
| Turn-Off Delay Time             | t <sub>d(off)</sub>  |                                                                            |     | 62   |      |      |
| Turn-Off Fall Time              | t <sub>f</sub>       |                                                                            |     | 71   |      |      |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

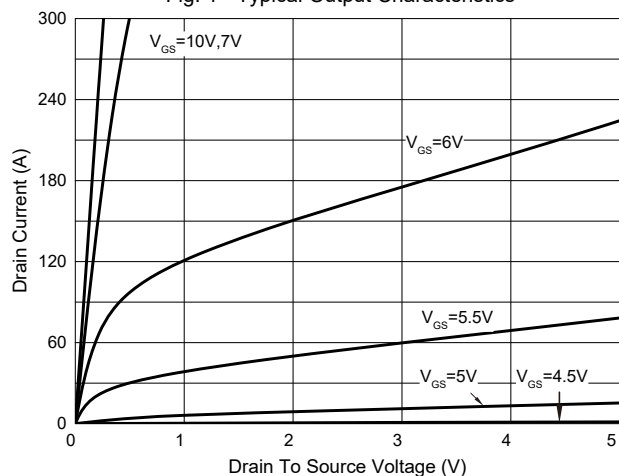


Fig. 2 - Transfer Characteristics

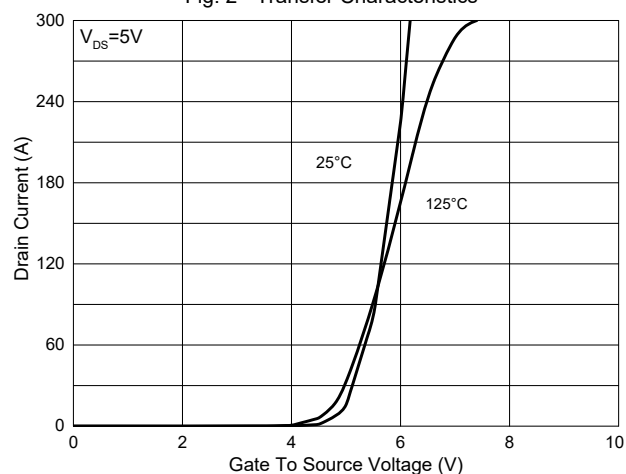


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

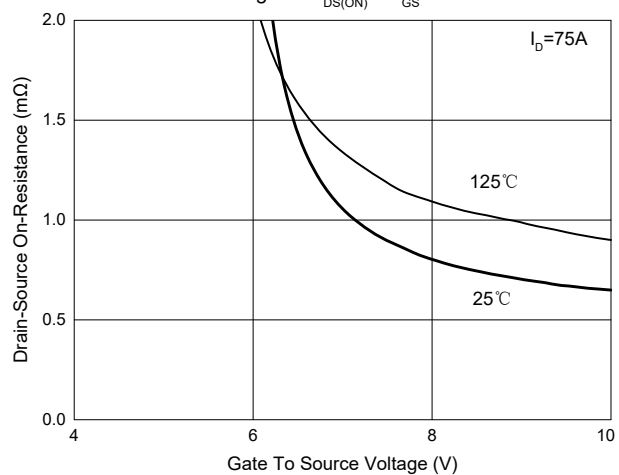


Fig. 4 -  $R_{DS(ON)} - I_D$

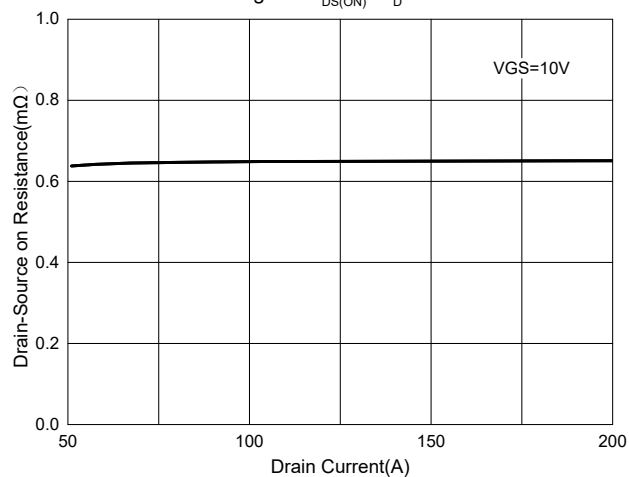


Fig. 5 - Capacitance Characteristics

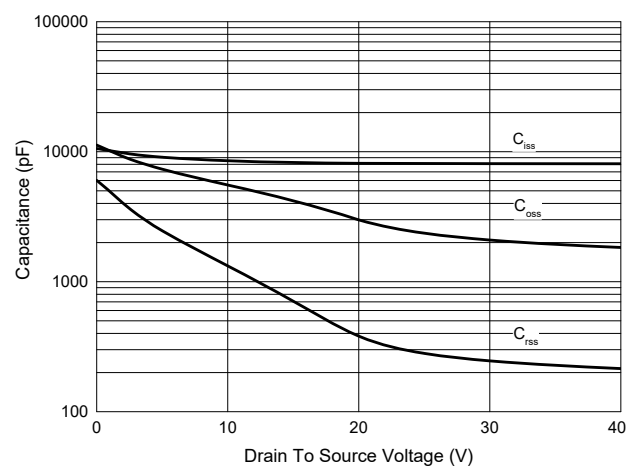
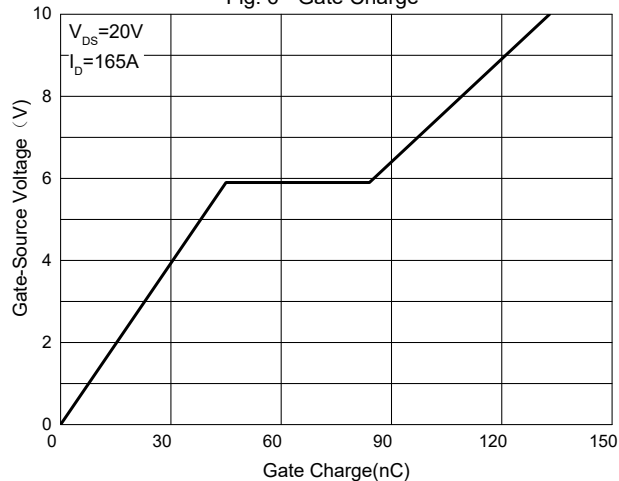


Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Normalized Threshold Voltage

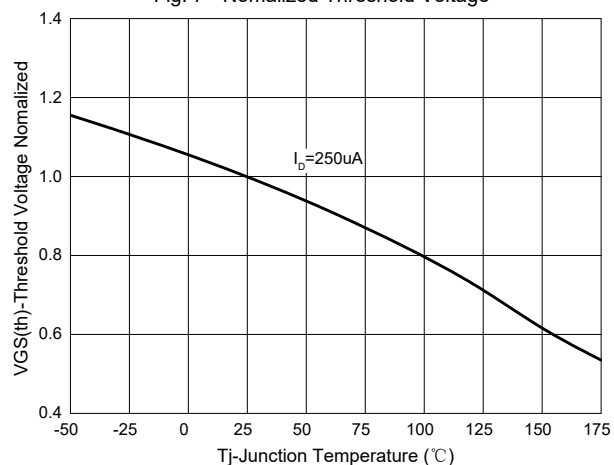


Fig.8-Normalized On Resistance Characteristics

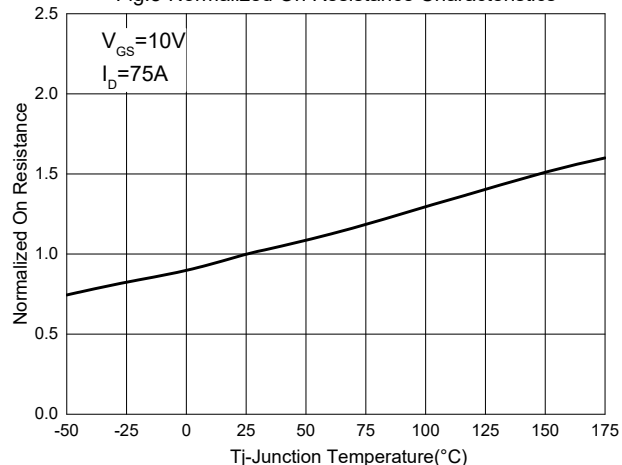


Fig.9 - I<sub>S</sub>—V<sub>SD</sub>

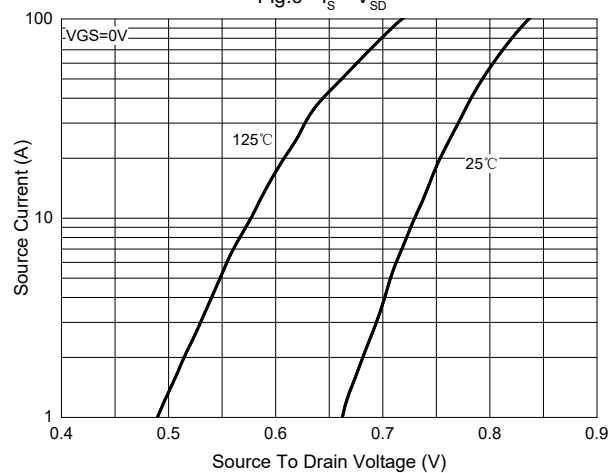


Fig. 10 - Drain Current

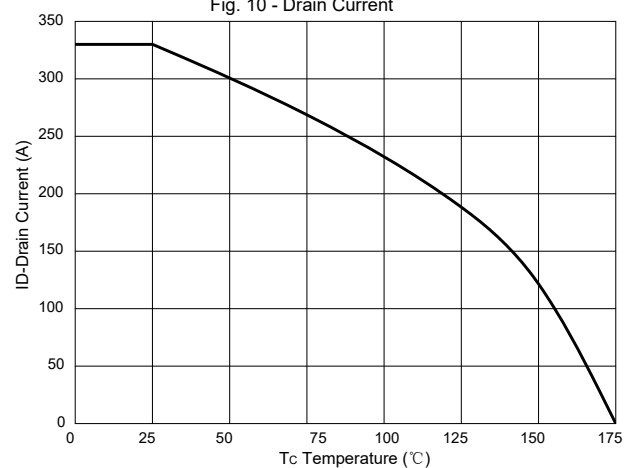
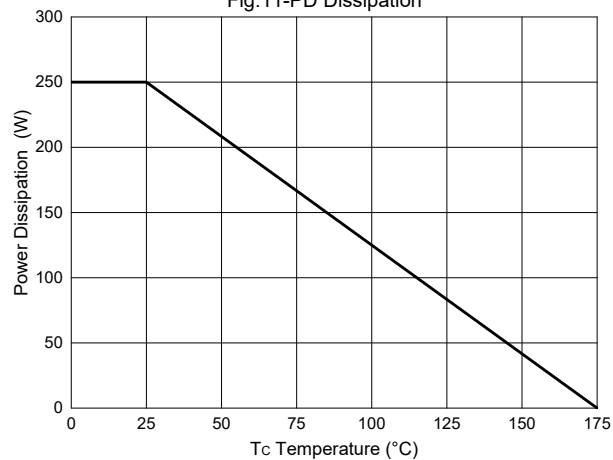


Fig.11-PD Dissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

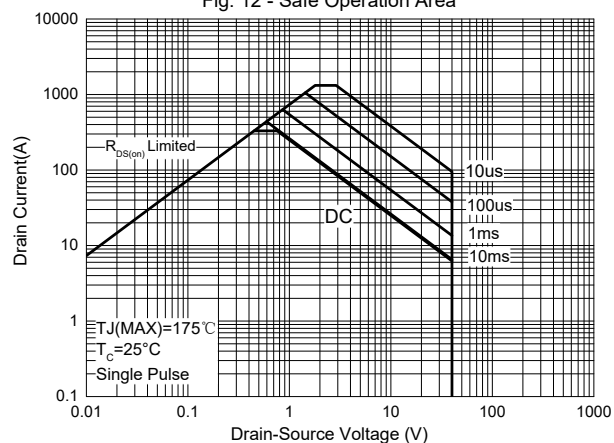
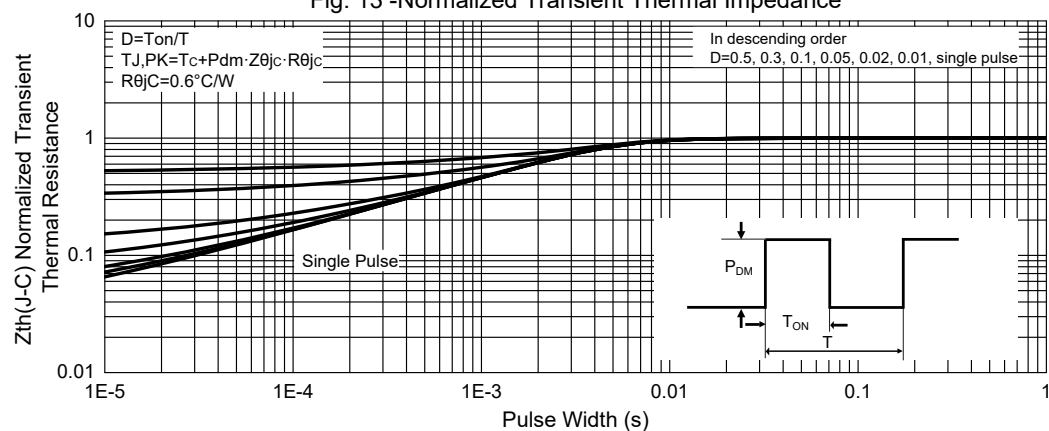


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 5Kpcs/Reel |

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