

## Features

- Low  $R_{DS(on)}$  & FOM
- Extremely Low Switching Loss
- Excellent Stability and Uniformity
- Fast Switching and Soft Recovery
- Halogen Free. "Green" Device
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

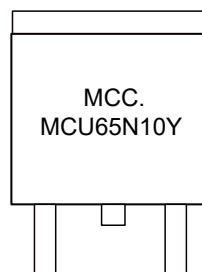
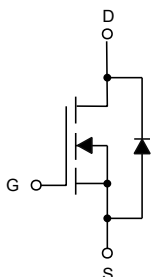
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 1.3°C/W Junction to Case(Steady-State)
- Thermal Resistance: 20°C/W Junction to Ambient ( $t \leq 10s$ )<sup>(1)</sup>
- Thermal Resistance: 55°C/W Junction to Ambient (Steady-State)<sup>(1)</sup>

| Parameter                                     | Symbol   | Rating            | Unit |   |
|---|----------|-------------------|------|---|
| Drain-Source Voltage                          | $V_{DS}$ | 100               | V    |   |
| Gate-Source Voltage                           | $V_{GS}$ | ±20               | V    |   |
| Continuous Drain Current                      | $I_D$    | $T_C=25^\circ C$  | 65   | A |
|   |          | $T_C=100^\circ C$ | 41   | A |
| Pulsed Drain Current <sup>(2)</sup>           | $I_{DM}$ | 260               | A    |   |
| Total Power Dissipation <sup>(3)</sup>        | $P_D$    | 96                | W    |   |
| Single Pulsed Avalanche Energy <sup>(4)</sup> | $E_{AS}$ | 169               | mJ   |   |

Note:

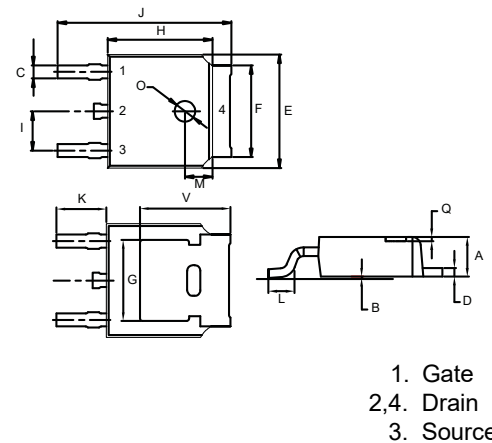
1. The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ C$ . The Power dissipation  $P_{DSM}$  is based on  $R_{\theta JA} t \leq 10s$  and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.
2. Repetitive rating; pulse width limited by max. junction temperature.
3.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
4.  $V_{DD}=50V$ ,  $R_G=25\Omega$ ,  $L=0.5mH$ .

## Internal Structure and Marking Code



# N-CHANNEL MOSFET

## DPAK(TO-252)



| DIM | DIMENSIONS |       |      |       | NOTE |
|-----|------------|-------|------|-------|------|
|     | INCHES     |       | MM   |       |      |
|     | MIN        | MAX   | MIN  | MAX   |      |
| A   | 0.087      | 0.094 | 2.20 | 2.40  |      |
| B   | 0.000      | 0.005 | 0.00 | 0.13  |      |
| C   | 0.026      | 0.034 | 0.66 | 0.86  |      |
| D   | 0.018      | 0.023 | 0.46 | 0.58  |      |
| E   | 0.256      | 0.264 | 6.50 | 6.70  |      |
| F   | 0.201      | 0.215 | 5.10 | 5.46  |      |
| G   | 0.190      |       | 4.83 |       | TYP. |
| H   | 0.236      | 0.244 | 6.00 | 6.20  |      |
| I   | 0.086      | 0.094 | 2.18 | 2.39  |      |
| J   | 0.386      | 0.409 | 9.80 | 10.40 |      |
| K   | 0.114      |       | 2.90 |       | TYP. |
| L   | 0.055      | 0.067 | 1.40 | 1.70  |      |
| M   | 0.063      |       | 1.60 |       | TYP. |
| O   | 0.043      | 0.051 | 1.10 | 1.30  |      |
| Q   | 0.000      | 0.012 | 0.00 | 0.30  |      |
| V   | 0.211      |       | 5.35 |       | TYP. |

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

| Parameter                       | Symbol        | Test Conditions  | Min | Typ  | Max       | Unit       |
|---------------------------------|---------------|--|-----|------|-----------|------------|
| <b>Static Characteristics</b>   |               |  |     |      |           |            |
| Drain-Source Breakdown Voltage  | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$                                | 100 |      |           | V          |
| Gate-Source Leakage Current     | $I_{GSS}$     | $V_{DS}=0V, V_{GS}=\pm 20V$                              |     |      | $\pm 100$ | nA         |
| Zero Gate Voltage Drain Current | $I_{DSS}$     | $V_{DS}=100V, V_{GS}=0V$                                 |     |      | 1         | $\mu A$    |
| Gate-Threshold Voltage          | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                            | 1.3 | 1.8  | 2.5       | V          |
| Drain-Source On-Resistance      | $R_{DS(on)}$  | $V_{GS}=10V, I_D=20A$                                    |     | 7.5  | 8.6       | m $\Omega$ |
|                                 |               | $V_{GS}=4.5V, I_D=20A$                                   |     | 9    | 11.5      | m $\Omega$ |
| Gate Resistance                 | $R_g$         | f=1MHz, Open drain                                       |     | 0.68 |           | $\Omega$   |
| <b>Diode Characteristics</b>    |               |  |     |      |           |            |
| Continuous Body Diode Current   | $I_S$         |  |     |      | 65        | A          |
| Diode Forward Voltage           | $V_{SD}$      | $V_{GS}=0V, I_S=20A$                                     |     |      | 1.3       | V          |
| Reverse Recovery Time           | $t_{rr}$      | $I_S=20A, dI_F/dt=100A/\mu s$                            |     | 51.5 |           | ns         |
| Reverse Recovery Charge         | $Q_{rr}$      |  |     | 64   |           | nC         |
| <b>Dynamic Characteristics</b>  |               |  |     |      |           |            |
| Input Capacitance               | $C_{iss}$     | $V_{DS}=50V, V_{GS}=0V, f=1MHz$                          |     | 2270 |           | pF         |
| Output Capacitance              | $C_{oss}$     |  |     | 797  |           |            |
| Reverse Transfer Capacitance    | $C_{riss}$    |  |     | 36   |           |            |
| Total Gate Charge               | $Q_g$         | $V_{DS}=50V, V_{GS}=10V, I_D=25A$                        |     | 32   |           | nC         |
| Gate-Source Charge              | $Q_{gs}$      |  |     | 11.1 |           |            |
| Gate-Drain Charge               | $Q_{gd}$      |  |     | 4.78 |           |            |
| Turn-On Delay Time              | $t_{d(on)}$   | $V_{GS}=10V, V_{DD}=50V, I_D=25A$<br>$R_{GEN}=2.2\Omega$ |     | 9.3  |           | ns         |
| Turn-On Rise Time               | $t_r$         |  |     | 34.8 |           |            |
| Turn-Off Delay Time             | $t_{d(off)}$  |  |     | 24.6 |           |            |
| Turn-Off Fall Time              | $t_f$         |  |     | 71   |           |            |

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

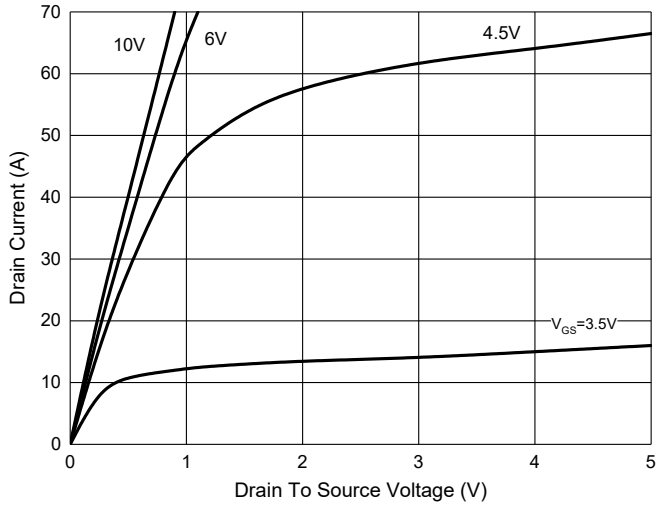


Fig. 2 - Transfer Characteristics

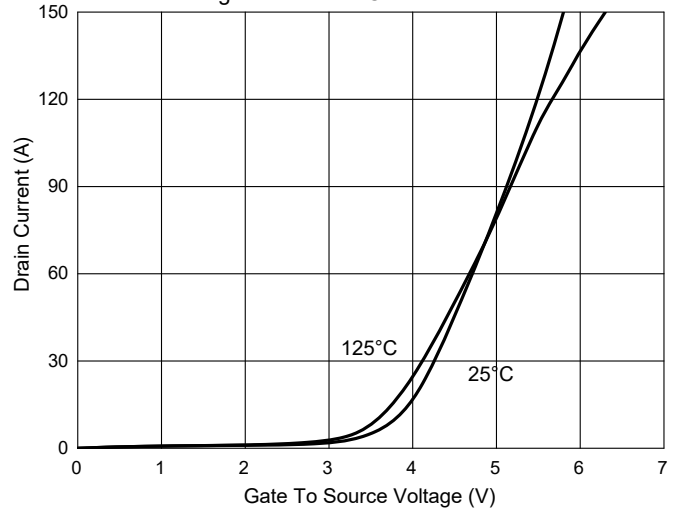


Fig. 3 -  $R_{DS(ON)} - I_D$

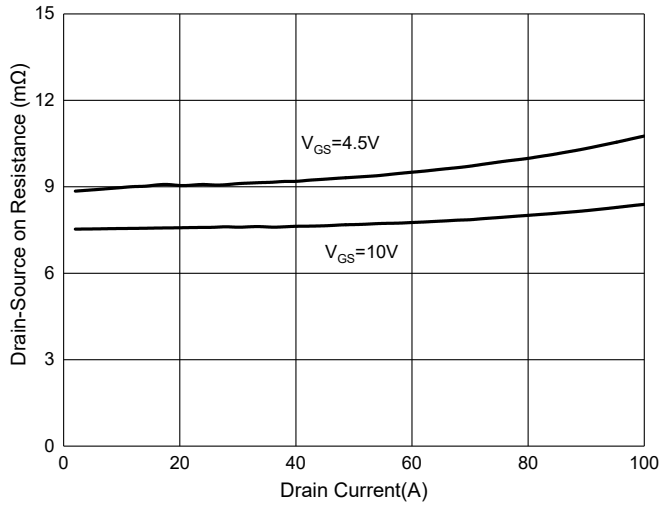


Fig. 4 - Normalized On Resistance Characteristics

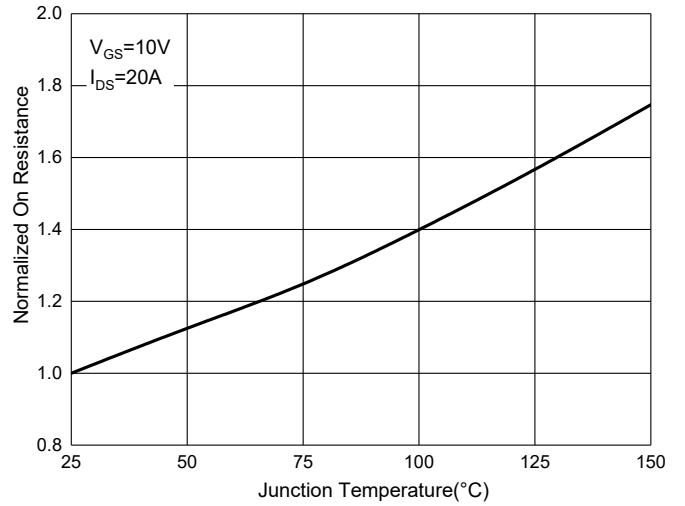


Fig. 5 - Capacitance Characteristics

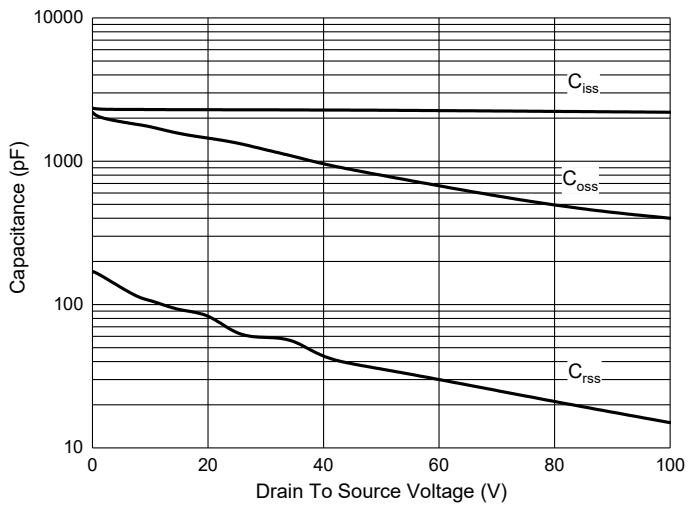
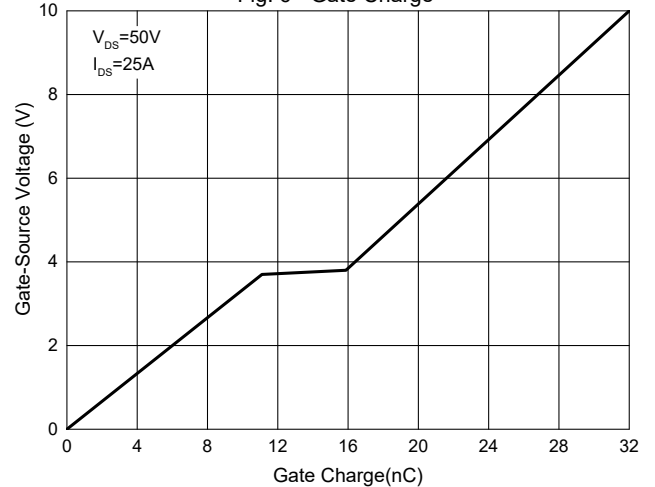


Fig. 6 - Gate Charge



## Curve Characteristics

Fig. 7 - Safe Operation Area

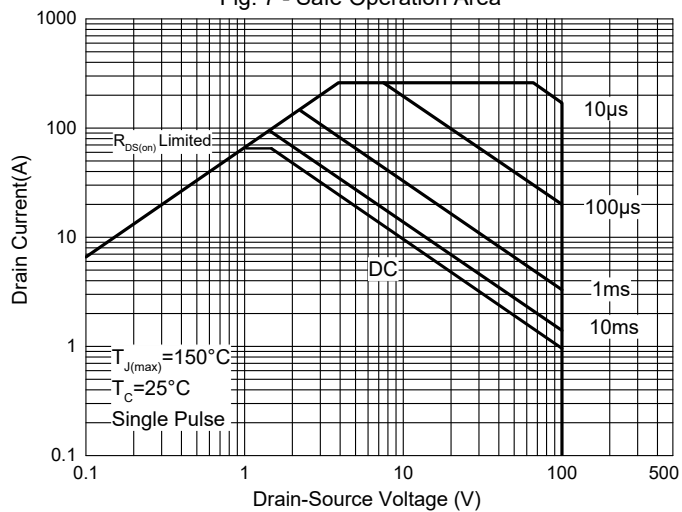
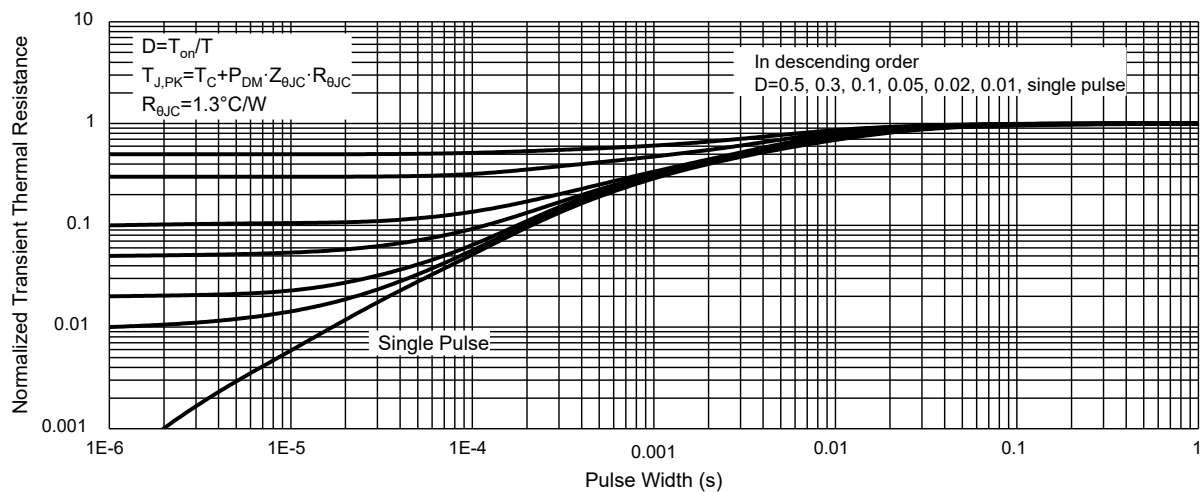


Fig. 8 - Normalized Transient Thermal Impedance



## Ordering Information

| Device         | Packing                 |
|----------------|-------------------------|
| Part Number-TP | Tape&Reel: 2.5Kpcs/Reel |

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