

## Features

- Halogen Free."Green"Device<sup>(Note1)</sup>
- Excellent Package for Good Heat Dissipation
- Epoxy Meets UL 94 V-0 Flammability Rating
- Moisture Sensitivity Level 3
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings

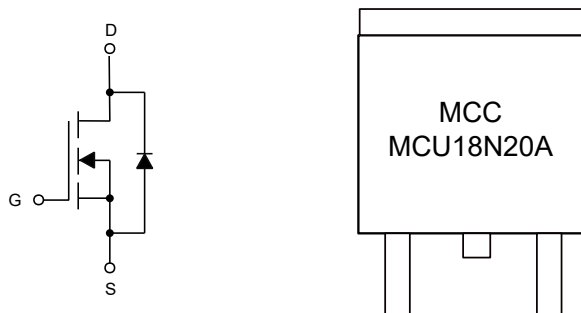
- Operating Junction Temperature Range : -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 1.5°C/W Junction to Case(Steady-State)<sup>(Note2)</sup>

| Parameter                                         | Symbol   | Rating | Unit |
|---------------------------------------------------|----------|--------|------|
| Drain-Source Voltage                              | $V_{DS}$ | 200    | V    |
| Gate-Source Voltage                               | $V_{GS}$ | ±20    | V    |
| Continuous Drain Current                          | $I_D$    | 18     | A    |
|                                                   |          | 11     |      |
| Pulsed Drain Current <sup>(Note3)</sup>           | $I_{DM}$ | 72     | A    |
| Total Power Dissipation <sup>(Note4)</sup>        | $P_D$    | 83.3   | W    |
| Single Pulsed Avalanche Energy <sup>(Note5)</sup> | $E_{AS}$ | 286    | mJ   |

Note:

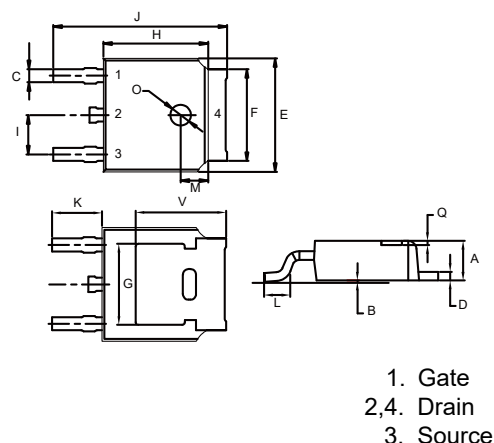
1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
2.  $R_{\theta jc}$  is guaranteed by design while  $R_{\theta ja}$  is determined by the user's board design
3. Repetitive rating; pulse width limited by max. junction temperature.
4.  $P_D$  is based on max. junction temperature, using junction-case thermal resistance.
5.  $T_J=25^\circ\text{C}$ ,  $V_{DD}=150\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=10\text{mH}$

## Internal Structure and Marking Code



## N-CHANNEL MOSFET

### DPAK(TO-252)



| DIMENSIONS |        |       |      |       |      |
|------------|--------|-------|------|-------|------|
| DIM        | INCHES |       | MM   |       | NOTE |
|            | 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 |
|---------------------------------|----------------------|-----------------------------------------------------------------------------------------|-----|------|------|------|
| Static Characteristics          |                      |                                                                                         |     |      |      |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                              | 200 |      |      | 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> =200V, 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   | 2.5  | 4    | V    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =9A                                                |     | 0.1  | 0.15 | Ω    |
| Gate Resistance                 | R <sub>g</sub>       | F=1 MHz, Open drain                                                                     |     | 1.1  |      | Ω    |
| Diode Characteristics           |                      |                                                                                         |     |      |      |      |
| Continuous Body Diode Current   | I <sub>S</sub>       |                                                                                         |     |      | 18   | A    |
| Diode Forward Voltage           | V <sub>SD</sub>      | V <sub>GS</sub> =0V, I <sub>S</sub> =9A                                                 |     |      | 1.4  | V    |
| Reverse Recovery Time           | t <sub>rr</sub>      | I <sub>F</sub> =18A, dI <sub>F</sub> /dt=100A/μs                                        |     | 153  |      | ns   |
| Reverse Recovery Charge         | Q <sub>rr</sub>      |                                                                                         |     | 1107 |      | nC   |
| Dynamic Characteristics         |                      |                                                                                         |     |      |      |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz                                       |     | 894  |      | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                         |     | 167  |      |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                         |     | 90   |      |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =100V, V <sub>GS</sub> =10V, I <sub>D</sub> =18A                        |     | 55   |      | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                         |     | 4.7  |      |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                         |     | 32   |      |      |
| Turn-On Delay Time              | t <sub>d(on)</sub>   | V <sub>DD</sub> =100V, V <sub>GS</sub> =10V, R <sub>GEN</sub> =6Ω, I <sub>DS</sub> =18A |     | 8.6  |      | ns   |
| Turn-On Rise Time               | t <sub>r</sub>       |                                                                                         |     | 51   |      |      |
| Turn-Off Delay Time             | t <sub>d(off)</sub>  |                                                                                         |     | 49   |      |      |
| Turn-Off Fall Time              | t <sub>f</sub>       |                                                                                         |     | 23   |      |      |

## Curve Characteristics

Fig. 1 - Typical Output Characteristics

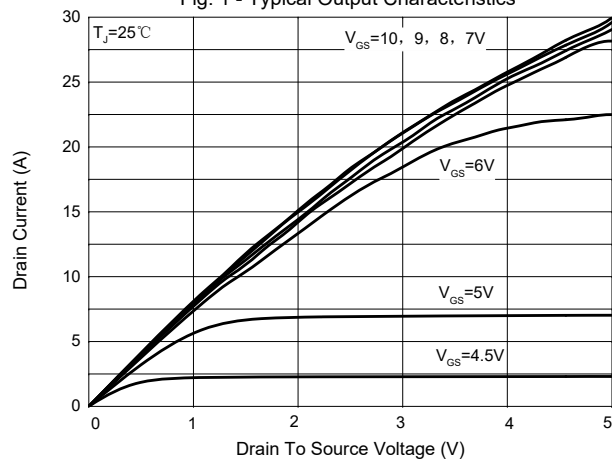


Fig. 2 - Transfer Characteristics

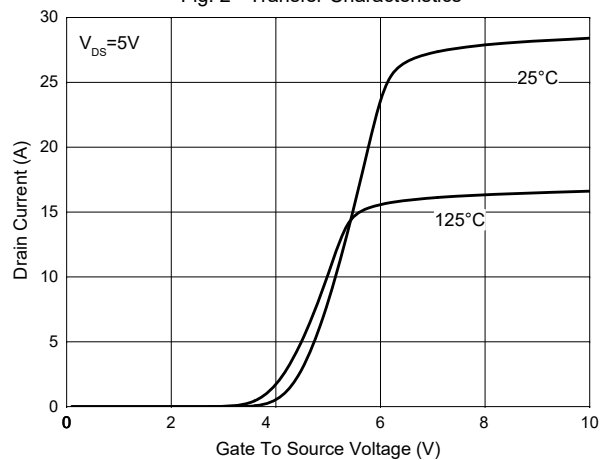


Fig. 3 -  $R_{DS(ON)} - I_D$

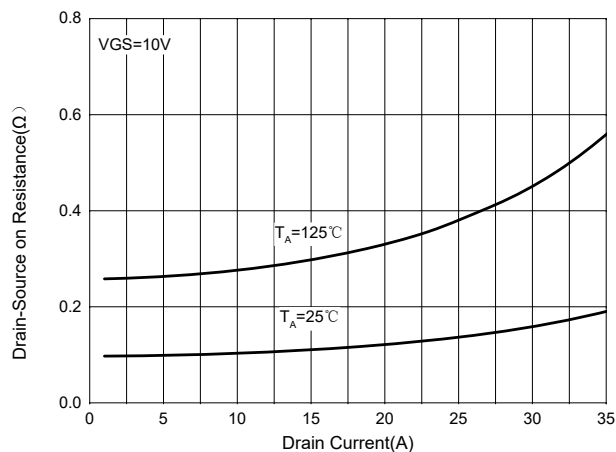


Fig. 4 -  $R_{DS(ON)} - V_{GS}$

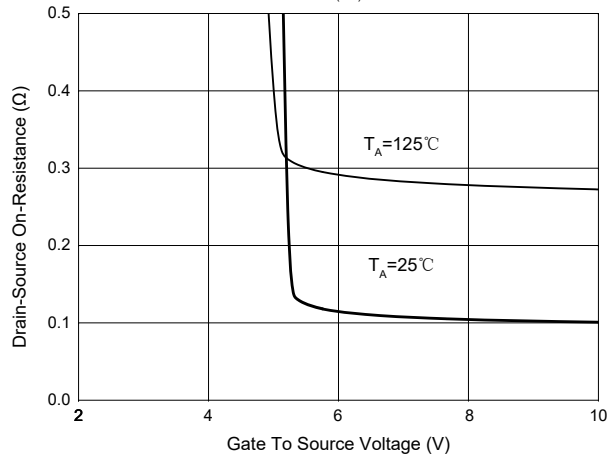


Fig. 5 - Capacitance Characteristics

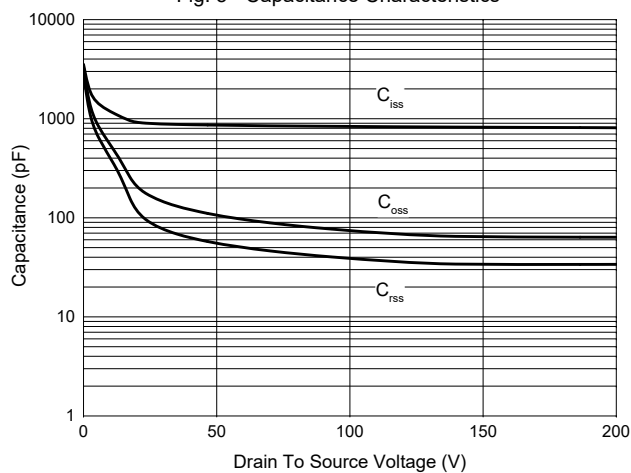
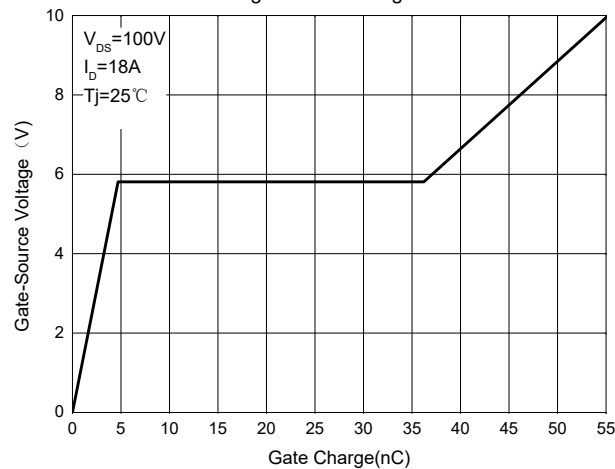


Fig. 6 - GateCharge



## Curve Characteristics

Fig.7-NormalizedOnResistanceCharacteristics

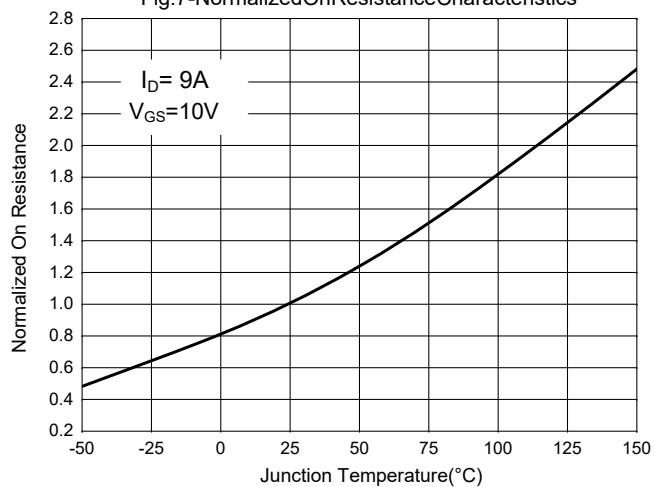


Fig. 8 - Normalized Threshold voltage

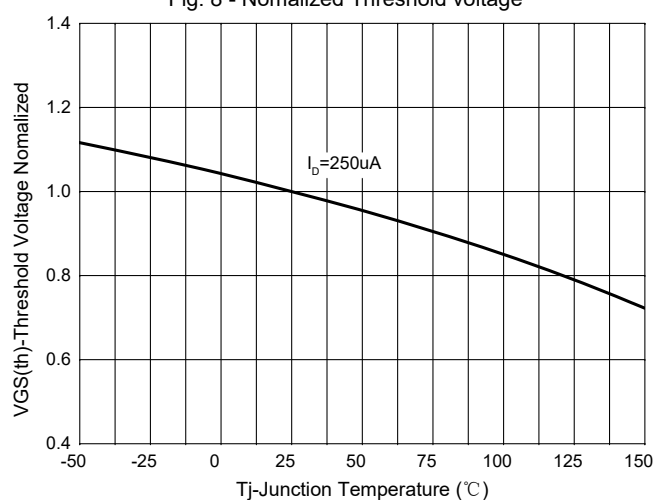


Fig. 9 -  $I_S - V_{SD}$

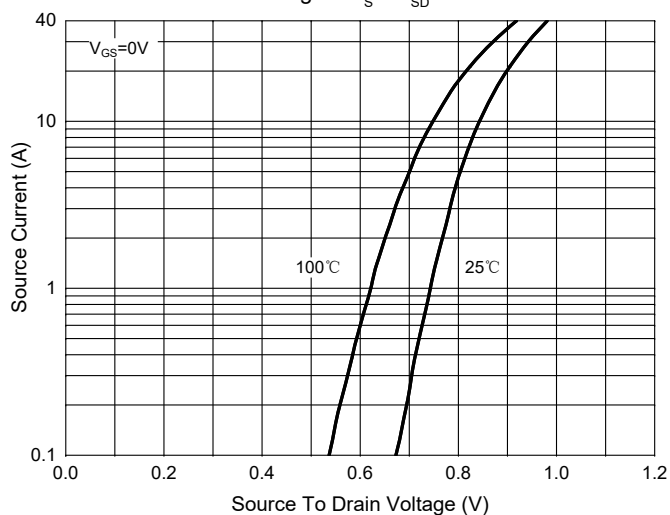


Fig. 10 - Current dissipation

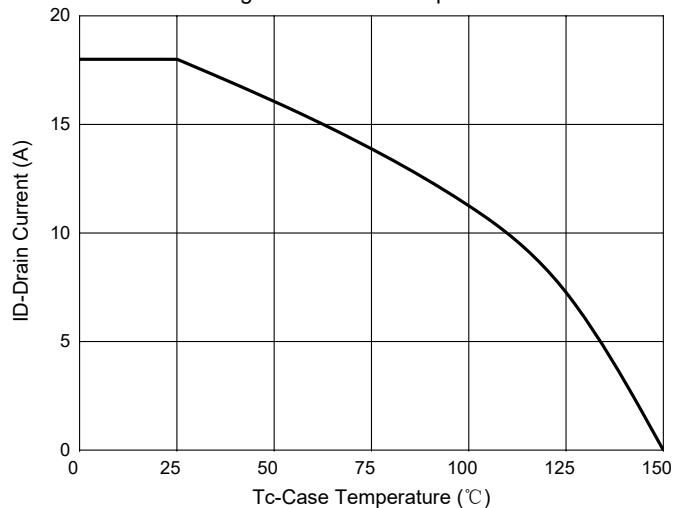
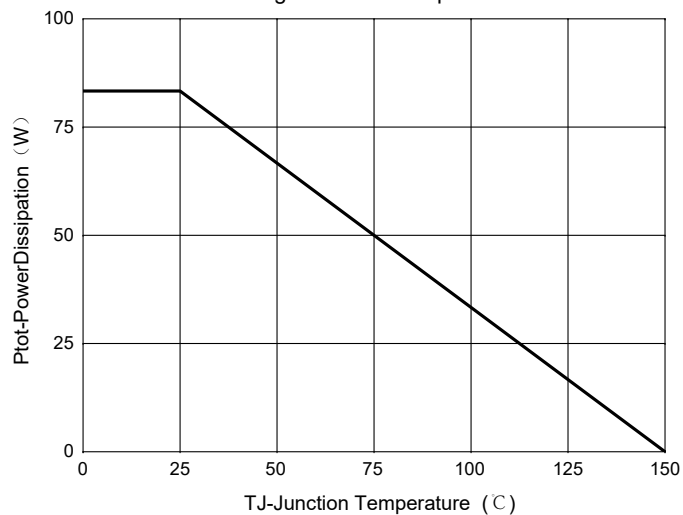


Fig.11-PowerDissipation



## Curve Characteristics

Fig. 12 - Safe Operation Area

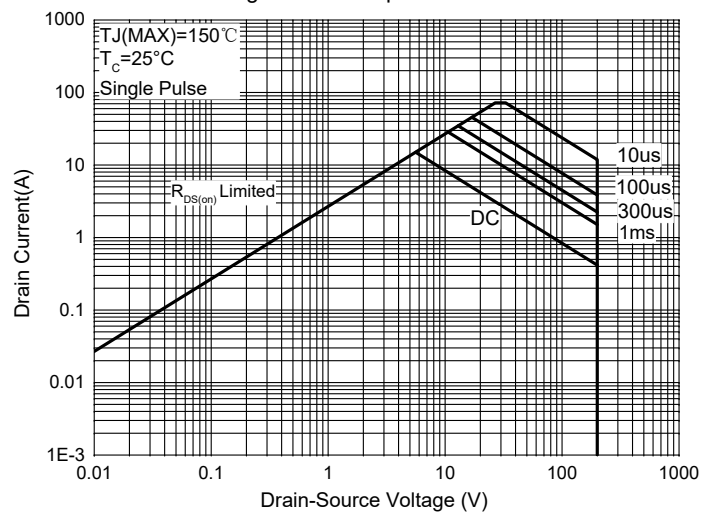
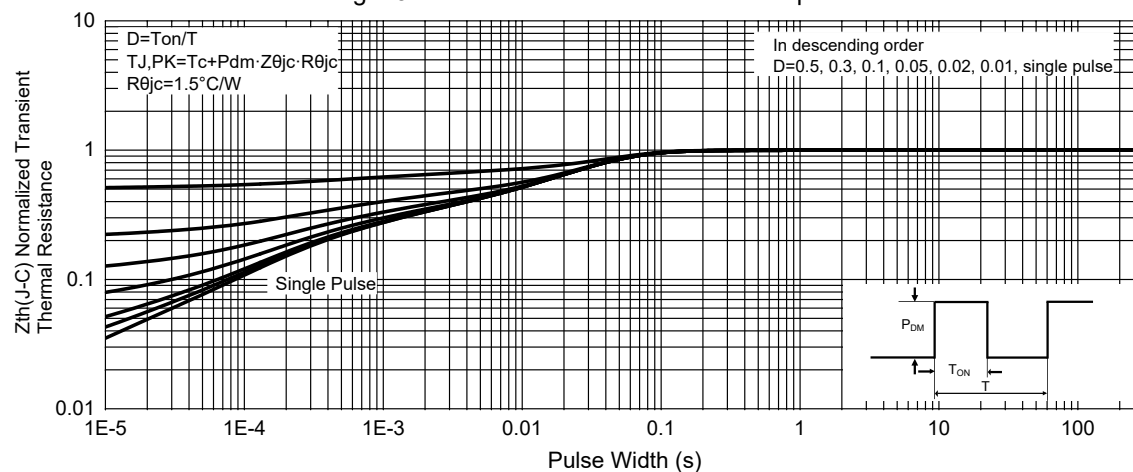


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

| Device       | Packing                 |
|--------------|-------------------------|
| MCU18N20A-TP | Tape&Reel: 2.5Kpcs/Reel |

## Revision History

| Datasheet status      | Version No | Release date | Update content |
|-----------------------|------------|--------------|----------------|
| New product datasheet | Rev4-1     | 20230103     |                |

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