# Product Information

### Features

- ☑ Advanced trench cell design
- ☑ Low Thermal Resistance

### Applications

- ☑ Motor drivers
- ☑ DC - DC Converter

### Quick reference

- ☑ BV ≧ 100 V
- ☑ $P_{tot}$ ≦ 96 W
- ☑ $I_D$ ≦ 85 A
- ☑ $R_{DS(Typ)}$ 5.5 mΩ @ $V_{GS}$ = 10 V

## Pin Description

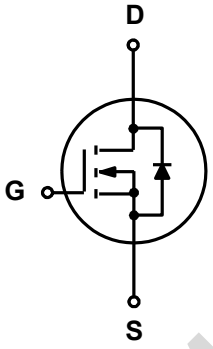
| Pin | Description |
|---|---|
| 1 | Gate(G) |
| 2 | Drain(D) |
| 3 | Source(S) |

Simplified Outline



TO-252

Symbol




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## Limiting Values

| Symbol | Parameter | Conditions | Min | Max | Unit |
|---|---|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | $T_C$ = 25 ℃ | - | 100 | V |
| $V_{GS}$ | Gate-Source Voltage | $T_C$ = 25 ℃ | - | ± 20 | V |
| $I_D$* | Drain Current ( DC ) | $T_C$ = 25 ℃, $V_{GS}$ = 10 V | - | 85 | A |
| | | $T_C$ = 100 ℃, $V_{GS}$ = 10 V | | 52 | A |
| $I_{DM}$*,*** | Drain Current ( Pulsed ) | $T_C$ = 25 ℃, $V_{GS}$ = 10 V | - | 320 | A |
| $P_{tot}$* | Total Power Dissipation | $T_C$ = 25 ℃ | - | 96 | W |
| $T_{stg}$ | Storage Temperature | | - 55 | 150 | ℃ |
| $T_J$ | Junction Temperature | | - | 150 | ℃ |
| $I_S$ | Diode Forward Current | $T_C$ = 25 ℃ | - | 85 | A |
| $E_{AS}$* | Single Pulsed Avalanche Energy | $V_{DD}$= 50V , L= 1 mH | - | 220 | mJ |
| $R_{\theta JA}$* | Thermal Resistance- Junction to Ambient | | - | 42.6 | ℃ / W |
| $R_{\theta JC}$* | Thermal Resistance- Junction to Case | | - | 1.3 | |

Notes：

* Surface Mounted on 1 $in^2$ pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

*** limited by bonding wire

## Marking Information

| Product Name | Marking |
|---|---|
| **WTM055N10JD** | **WPM**<br>**055N10JD**<br>**XXX YYWW**<br>**XXX YYWW: Date Code** |

## Ordering Code

| Product Name | Package | Reel Size | Tape width | Quantity | Note |
|---|---|---|---|---|---|
| **WTM055N10JD** | **TO252** | | | **2500** | |

Note: NHCX defines " Green " as lead-free ( RoHS compliant ) and halogen free ( Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C )

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## Electrical Characteristics ($T_A$ = 25 °C Unless Otherwise Noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V, $I_D$ = 250 μA | 100 | - | - | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_{DS}$ = 250 μA | 2 | - | 4 | V |
| $I_{DSS}$ | Zero Gate Voltage Source Current | $V_{DS}$ = 80 V, $V_{GS}$ = 0 V | - | - | 1 | μA |
| $I_{GSS}$ | Gate Leakage Current | $V_{GS}$ = ± 20 V, $V_{DS}$ = 0 V | - | - | ± 100 | nA |
| $R_{DS(ON)}$[a] | Drain-Source On-State Resistance | $V_{GS}$ = 10 V, $I_D$ = 10 A | - | 5.5 | 6.5 | mΩ |
| **Diode Characteristics** | | | | | | |
| $V_{SD}$[a] | Diode Forward Voltage | $I_{SD}$ = 20 A, $V_{GS}$ = 0 V | - | - | 1.3 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$ = 20 A, $dI_{SD}/dt$ = 100 A/μs | - | 70 | - | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | - | 91 | - | nC |
| **Dynamic Characteristics**[b] | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0 V, $V_{DS}$ = 50 V Frequency = 1 MHz | - | 3152 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 841 | - | |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 8 | - | |
| $t_d$(on) | Turn-on Delay Time | $V_{DS}$ = 50 V, $V_{GEN}$ = 10 V, $R_G$ = 3.9 Ω, $R_L$ = 2.5 Ω, $I_{DS}$ = 20 A | - | 17 | - | nS |
| $t_r$ | Turn-on Rise Time | | - | 12 | - | |
| $t_d$(off) | Turn-off Delay Time | | - | 35 | - | |
| $t_f$ | Turn-off Fall Time | | - | 11 | - | |
| **Gate Charge Characteristics**[b] | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{DS}$ = 50 V, $V_{GS}$ = 10 V, $I_{DS}$ = 20 A | - | 55 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 19 | - | |
| $Q_{gd}$ | Gate-Drain Charge | | - | 14 | - | |

Notes :

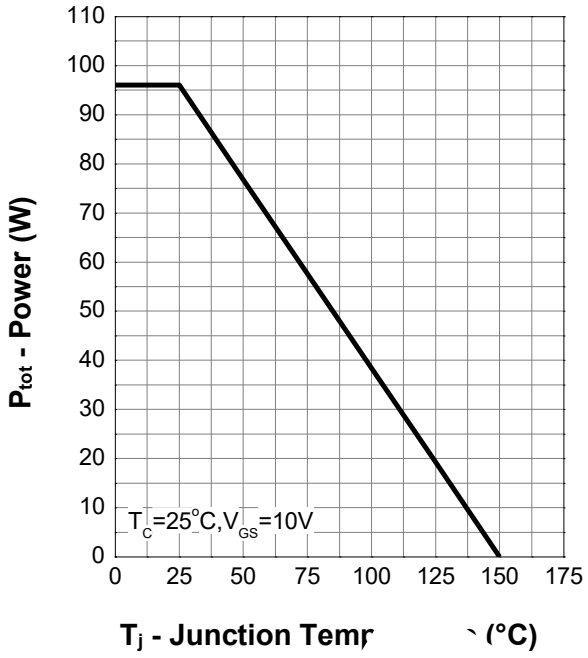
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2 %

b : Guaranteed by design, not subject to production testing

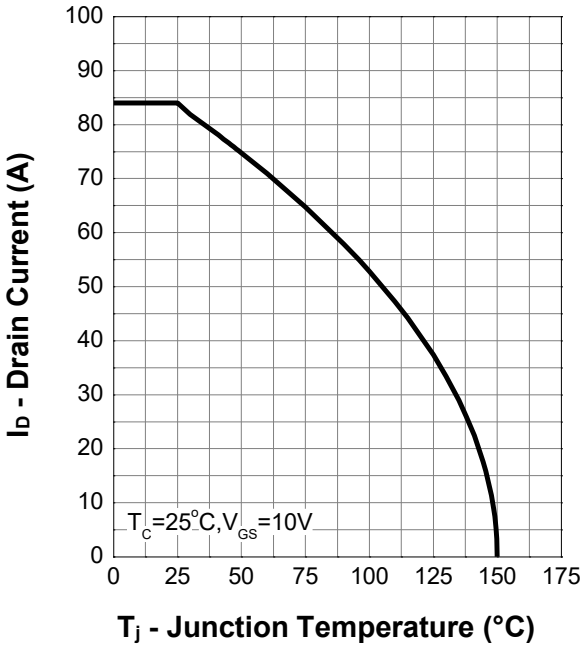
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## Typical Characteristics (Cont.)

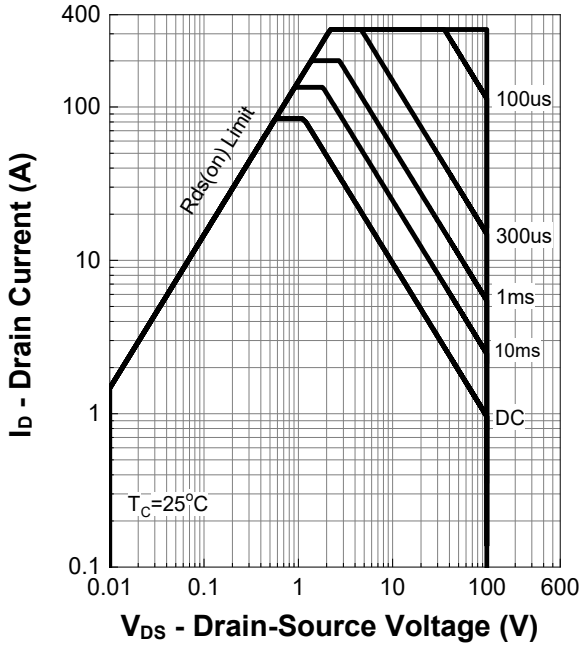
**Power Capability**



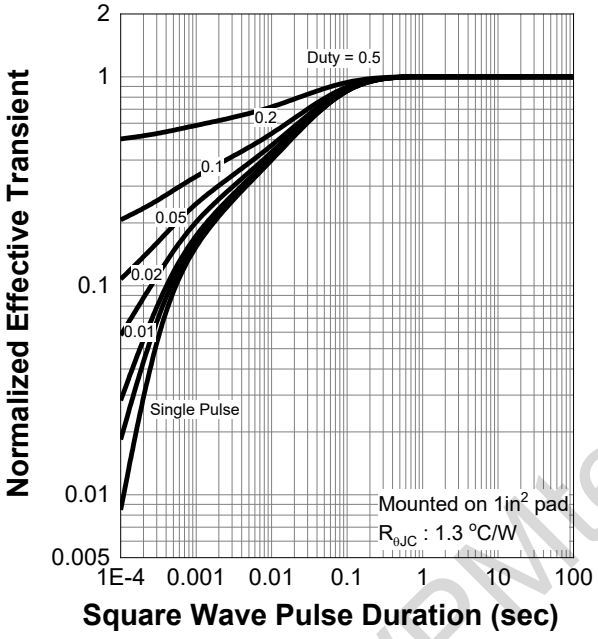

**Current Capability**




**Safe Operation A. a**



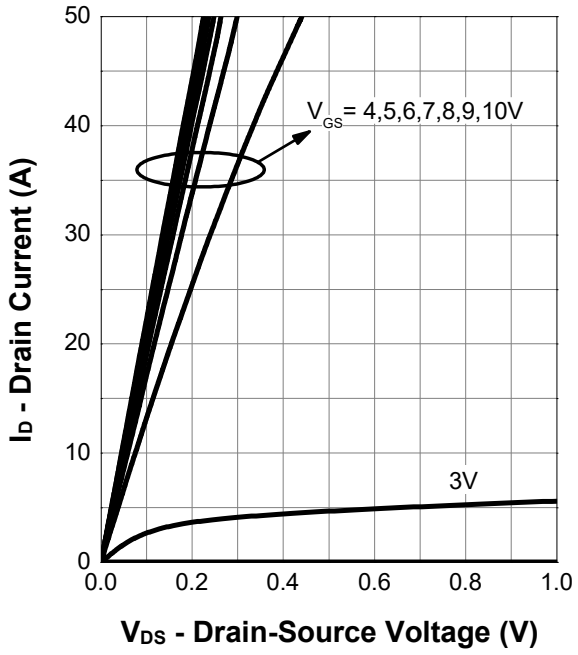

**Transient Thermal Impedance**



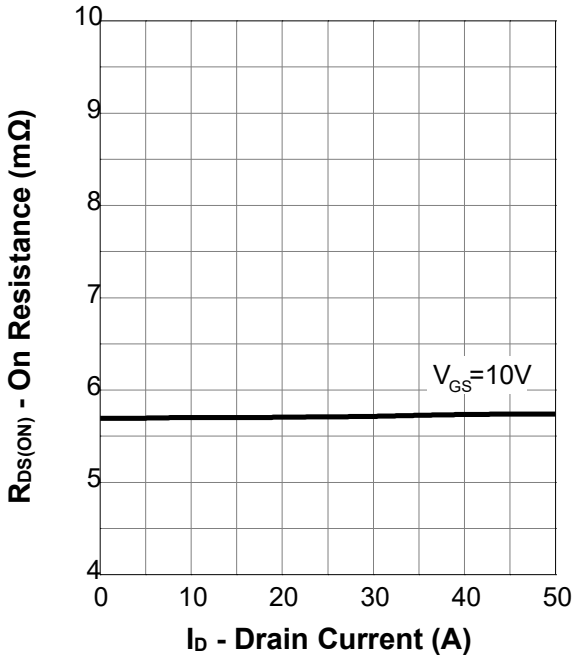

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## Typical Characteristics (Cont.)

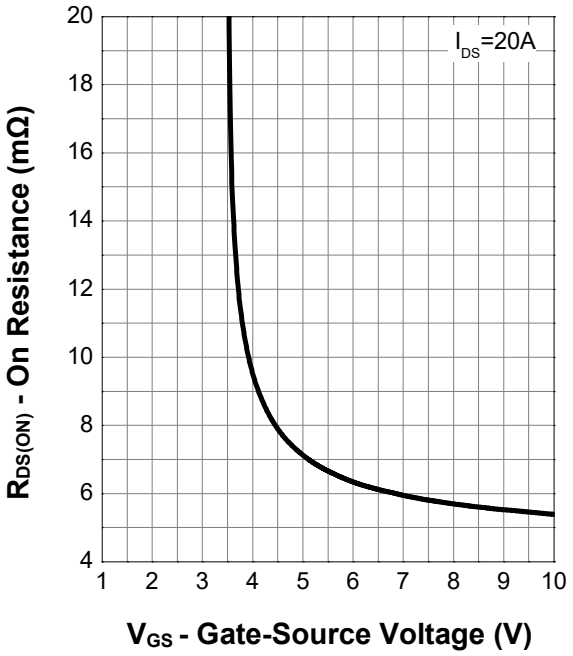
Output Characteristics



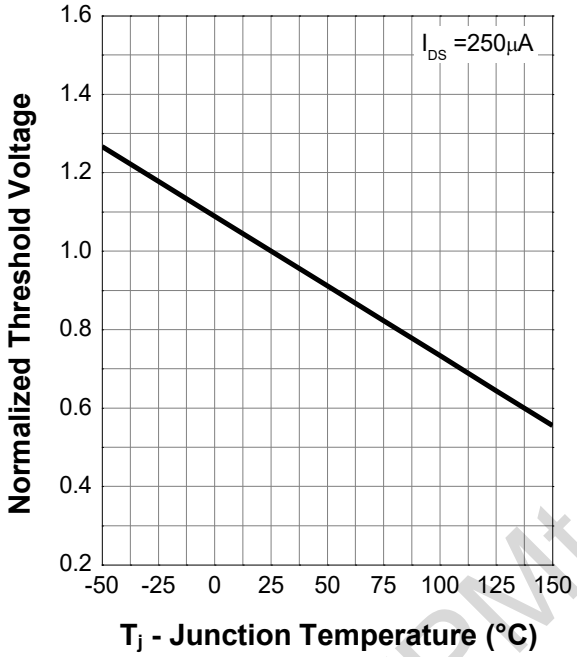

On Resistance




Transfer Characteristics



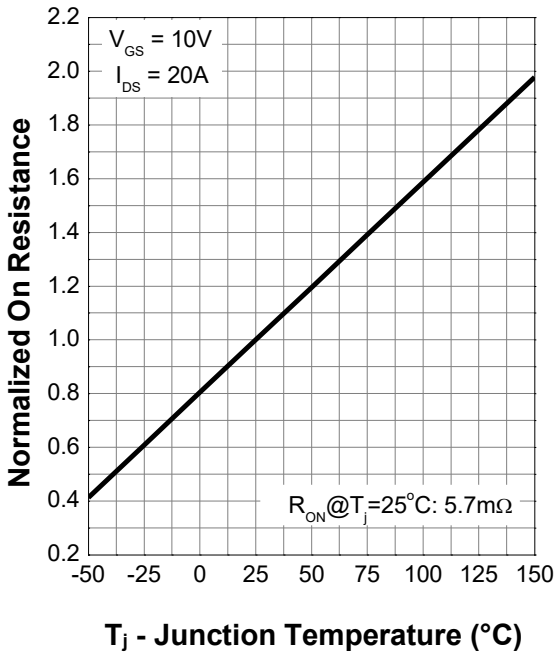

Normalized Threshold Voltage



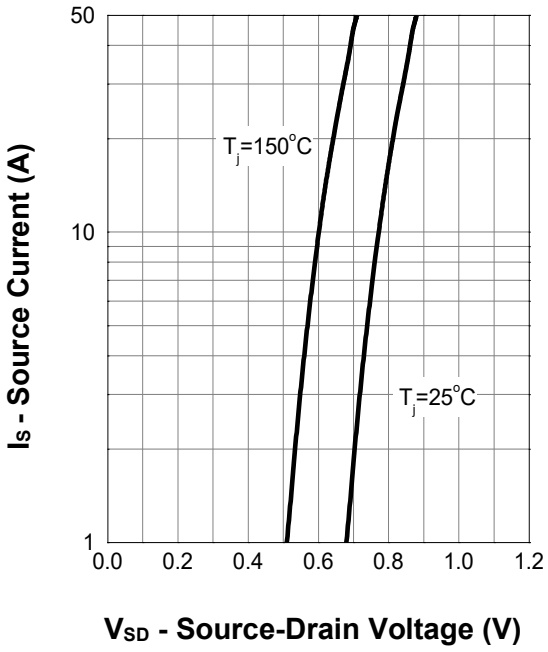

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## Typical Characteristics (Cont.)

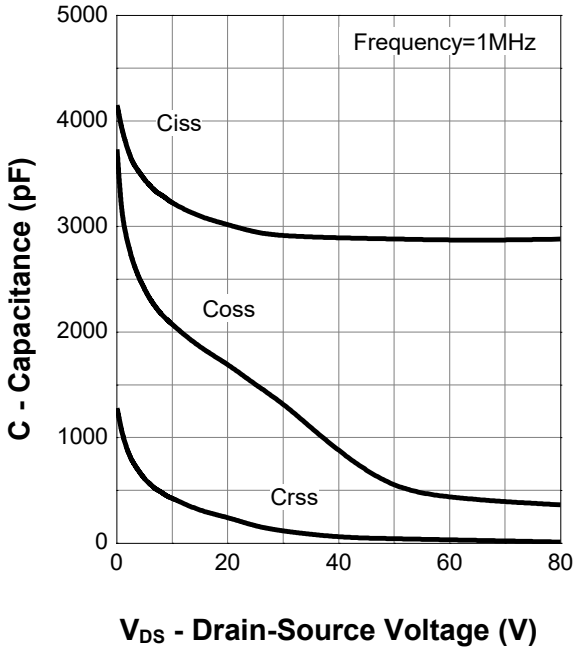
**Normalized On Resistance**



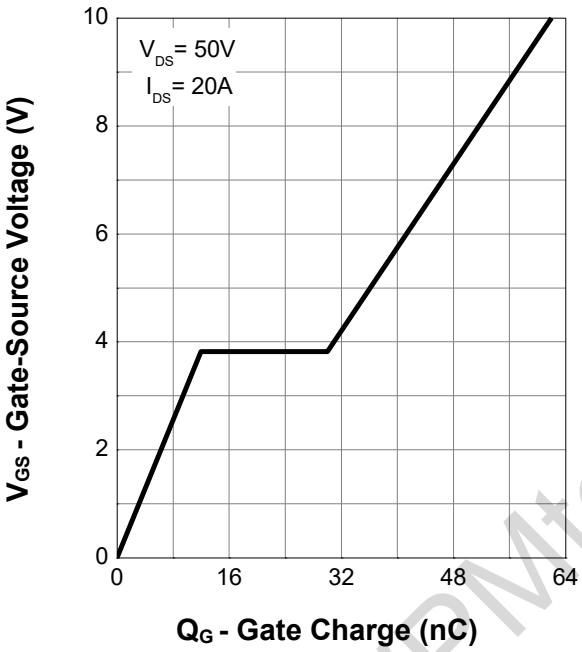

**Diode Forward Current**




**Capacitance**



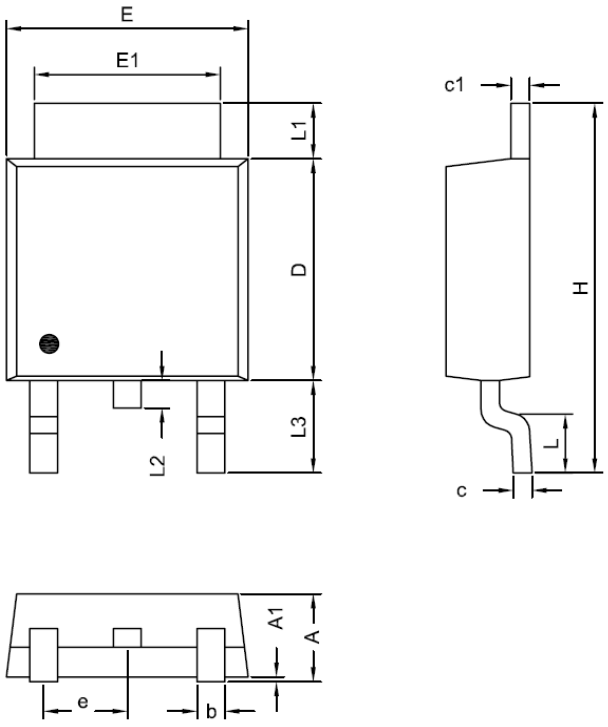

**Gate Charge**




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# Package Dimensions

## TO252-3L




| Symbol | Dimensions In Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 2.19 | 2.38 |
| A1 | 0.02 | 0.13 |
| D | 5.30 | 6.40 |
| E | 6.35 | 6.80 |
| E1 | 5.20 | 5.50 |
| c | 0.40 | 0.60 |
| c1 | 0.40 | 0.60 |
| b | 0.55 | 0.85 |
| e | 2.30 BCS | |
| L | 1.00 | 1.80 |
| L1 | 0.70 | 1.80 |
| L2 | 0.70 BCS | |
| L3 | 2.40 | 2.80 |
| H | 9.20 | 10.40 |

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