

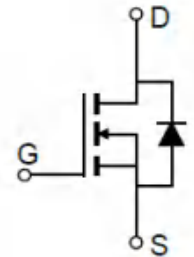
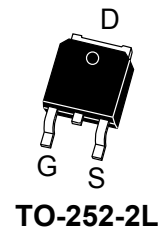
## Features

- Wide Bandgap SiC MOSFET Technology
- Low On-Resistance with High Blocking Voltage
- Low Capacitances with High-Speed Switching
- Low Reverse Recovery (Qrr)
- Easy to Parallel and Simple to Drive
- Robust against Parasitic Turn on Even 0V Turn off Gate Voltage

| Parameter                      | Value | Unit |
|--------------------------------|-------|------|
| $V_{DS}$                       | 650   | V    |
| $R_{DS(on),typ.}$ $V_{GS}=18V$ | 130   | mΩ   |
| $I_D$                          | 20    | A    |

## Benefits

- Reduced Switching Losses
- Increased System Switching Frequency
- Increased Power Density
- Reduction of Heat Sink Requirements
- Reduced EMI



## Application

- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- Battery Chargers
- Motor Drives
- Pulsed Power Applications



**Maximum ratings at  $T_j=25^{\circ}\text{C}$ , Unless otherwise specified**

| Parameter                                       | Symbol            | Test Condition                                       | Value       | Unit               |
|-------------------------------------------------|-------------------|------------------------------------------------------|-------------|--------------------|
| Drain to Source Voltage                         | $V_{DS}$          | $V_{GS} = 0\text{V}$ , $I_D = 500\mu\text{A}$        | 650         | V                  |
| Gate to Source Voltage                          | $V_{GS}$          | Absolute maximum values                              | -10/+22     | V                  |
| Recommended Operation Voltage of Gate to Source | $V_{GSop}$        | Recommended operational values                       | 0/+18       | V                  |
| Continuous Drain Current                        | $I_D$             | $V_{GS}=15\text{V}$ , $T_C=25^{\circ}\text{C}$       | 20          | A                  |
|                                                 |                   | $V_{GS}=15\text{V}$ , $T_C=100^{\circ}\text{C}$      | 18          |                    |
| Pulsed Drain Current                            | $I_{DM}$          | $V_{GS}=15\text{V}$ , $T_C=25^{\circ}\text{C}$       | 40          | A                  |
| Power Dissipation                               | $P_{tot}$         | $T_C=25^{\circ}\text{C}$ , $T_j=175^{\circ}\text{C}$ | 52          | W                  |
| Operating and Storage Temperature               | $T_j$ , $T_{stg}$ |                                                      | -55 to +175 | $^{\circ}\text{C}$ |

**Thermal Characteristics**

| Parameter                                | Symbol        | Value |      |      | Unit                 |
|------------------------------------------|---------------|-------|------|------|----------------------|
|                                          |               | Min.  | Typ. | Max. |                      |
| Thermal Resistance from Junction to Case | $R_{th(j-c)}$ | -     | 2.88 | -    | $^{\circ}\text{C/W}$ |

**Electrical Characteristics**

**Static Characteristics**

| Parameter                         | Symbol        | Test Condition                                                       | Value |      |      | Unit          |
|-----------------------------------|---------------|----------------------------------------------------------------------|-------|------|------|---------------|
|                                   |               |                                                                      | Min.  | Typ. | Max. |               |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0\text{V}$ , $I_D=500\mu\text{A}$                            | 650   |      |      | V             |
| Gate Threshold Voltage            | $V_{GS(th)}$  | $V_{GS}=V_{DS}$ , $I_D=3.5\text{mA}$                                 | 2.7   |      | 4.5  | V             |
| Zero Gate Voltage Drain Current   | $I_{DSS}$     | $V_{GS}=0\text{V}$ , $V_{DS}=650\text{V}$ , $T_j=25^{\circ}\text{C}$ | -     |      | 10   | $\mu\text{A}$ |
| Gate to Source Leakage Current    | $I_{GSS+}$    | $V_{GS}=22\text{V}$ , $V_{DS}=0\text{V}$                             | -     |      | 250  | nA            |
|                                   | $I_{GSS-}$    | $V_{GS}=-10\text{V}$ , $V_{DS}=0\text{V}$                            | -     |      | -250 |               |
| Drain to Source on Resistance     | $R_{DS(on)}$  | $V_{GS}=15\text{V}$ , $I_D=8.5\text{A}$                              | -     | 190  | 250  | m $\Omega$    |
|                                   |               | $V_{GS}=15\text{V}$ , $I_D=8.5\text{A}$ , $T_j=175^{\circ}\text{C}$  |       | 170  |      |               |
|                                   |               | $V_{GS}=18\text{V}$ , $I_D=8.5\text{A}$                              | -     | 130  | 190  |               |
|                                   |               | $V_{GS}=18\text{V}$ , $I_D=8.5\text{A}$ , $T_j=175^{\circ}\text{C}$  |       | 140  |      |               |



### Dynamic Characteristics

| Parameter                    | Symbol    | Test Condition                                              | Value |      |      | Unit     |
|------------------------------|-----------|-------------------------------------------------------------|-------|------|------|----------|
|                              |           |                                                             | Min.  | Typ. | Max. |          |
| Input Capacitance            | $C_{iss}$ | $V_{GS}=0V, V_{DS}=500V, f=1MHz,$<br>$T_j=25^{\circ}C$      |       | 491  |      | pF       |
| Output Capacitance           | $C_{oss}$ |                                                             |       | 39   |      |          |
| Reverse Transfer Capacitance | $C_{rss}$ |                                                             |       | 4.2  |      |          |
| Total Gate Charge            | $Q_g$     | $V_{GS}=0/15V, V_{DS}=500V, I_D=8.5A,$<br>$T_j=25^{\circ}C$ |       | 28.6 |      | nC       |
| Gate-Source Charge           | $Q_{gs}$  |                                                             |       | 8.3  |      |          |
| Gate-Drain Charge            | $Q_{gd}$  |                                                             |       | 13.8 |      |          |
| Gate Resistance              | $R_g$     | $V_{AC}=25mV, f=1MHz$                                       |       | 6.5  |      | $\Omega$ |

### Switching Characteristics

| Parameter           | Symbol       | Test Condition                                           | Value |      |      | Unit |
|---------------------|--------------|----------------------------------------------------------|-------|------|------|------|
|                     |              |                                                          | Min.  | Typ. | Max. |      |
| Turn-On Delay Time  | $t_{d(on)}$  | $V_{GS}=0/15V, V_{DS}=500V,$<br>$I_D=8.5A, R_g=10\Omega$ |       | 16   |      | ns   |
| Rise Time           | $t_r$        |                                                          |       | 55   |      |      |
| Turn-Off Delay Time | $t_{d(off)}$ |                                                          |       | 34   |      |      |
| Fall Time           | $t_f$        |                                                          |       | 71   |      |      |

### Reverse Diode Characteristics

| Parameter                        | Symbol    | Test Condition                                                          | Value |      |      | Unit |
|----------------------------------|-----------|-------------------------------------------------------------------------|-------|------|------|------|
|                                  |           |                                                                         | Min.  | Typ. | Max. |      |
| Diode Forward Voltage            | $V_{SD}$  | $V_{GS}=0V, I_{SD}=5A, T_j=25^{\circ}C$                                 | -     | 4.0  |      | V    |
| Continuous Diode Forward Current | $I_S$     | $V_{GS}=0V, T_j=25^{\circ}C$                                            |       | 20   |      | A    |
| Reverse Recovery Time            | $t_{rr}$  | $V_{GS}=0V, I_{SD}=8.5A,$<br>$V_R=500V, di/dt=530A/us, T_j=25^{\circ}C$ |       | 17.6 |      | ns   |
| Reverse Recovery Charge          | $Q_{rr}$  |                                                                         |       | 43   |      | nC   |
| Peak Reverse Recovery Current    | $I_{rrm}$ |                                                                         |       | 4.2  |      | A    |



**Typical Performance**

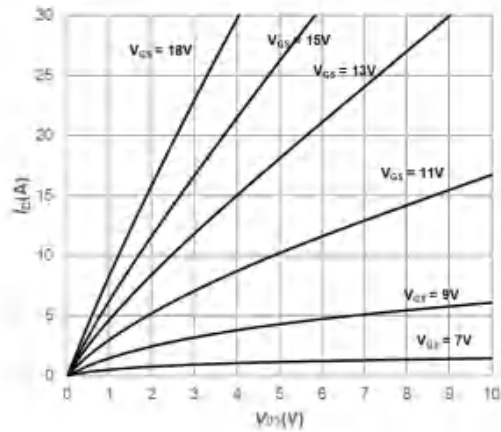


Fig1. Output Characteristics  $T_j=25^{\circ}\text{C}$

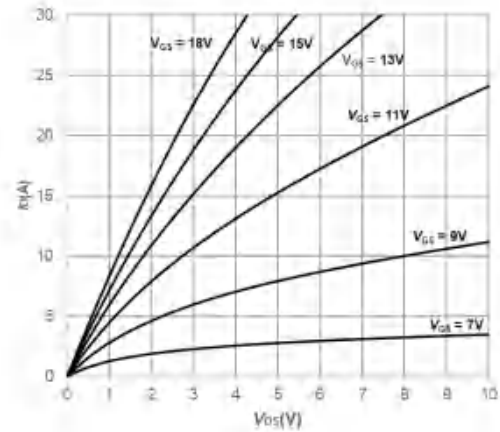


Fig2. Output Characteristics  $T_j=175^{\circ}\text{C}$

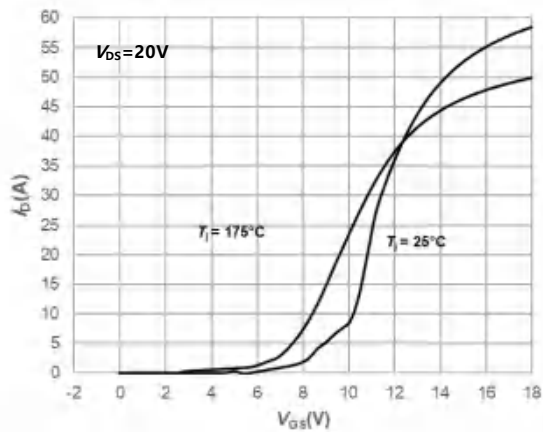


Fig3. Typical Transfer Characteristics

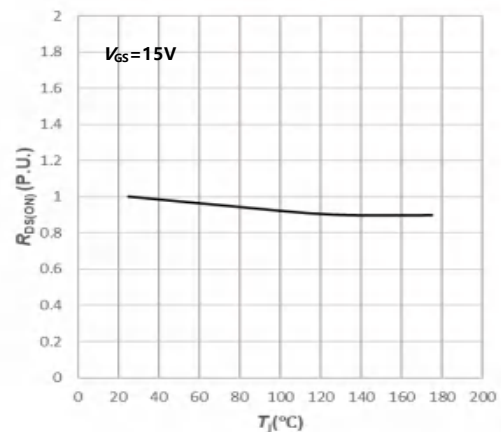


Fig4. Normalized On-Resistance vs. Temperature

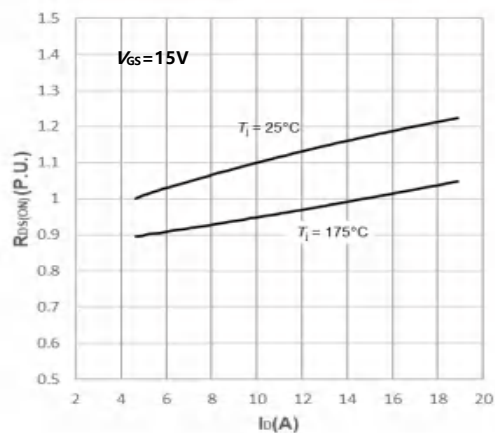


Fig5. Normalized On-Resistance vs. Drain Current For Various Temperatures

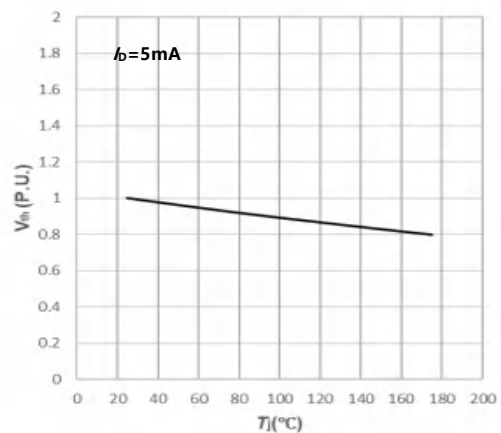


Fig6. Normalized Threshold Voltage vs. Temperature



## Typical Performance

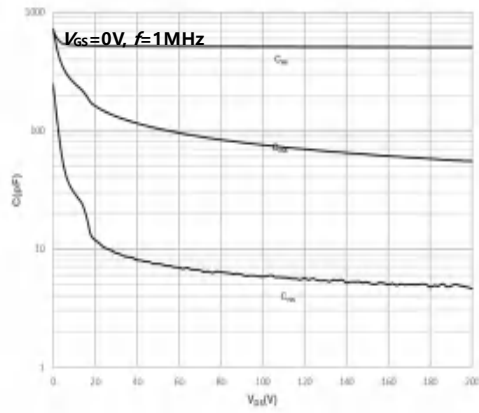


Fig7. Capacitances vs. Drain-Source Voltage (0-200V)

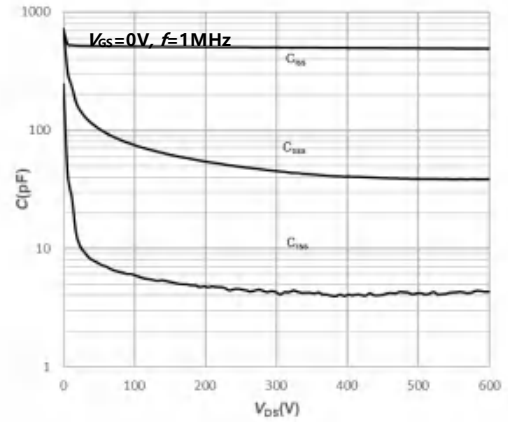


Fig8. Capacitances vs. Drain-Source Voltage (0-600V)

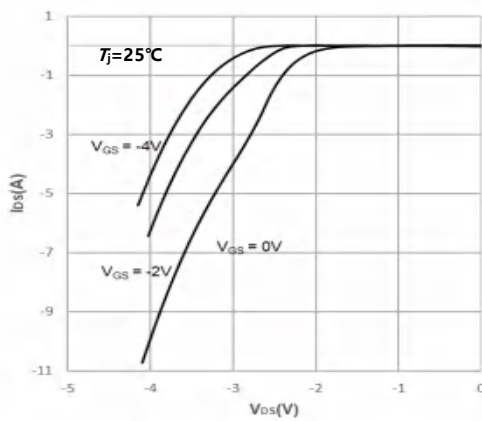
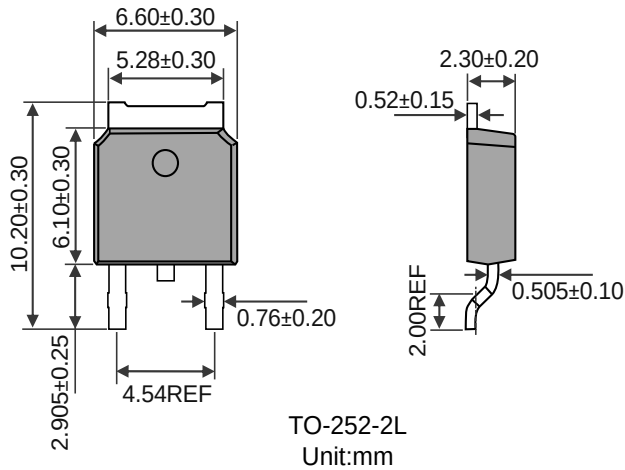


Fig9. Body Diode Characteristics

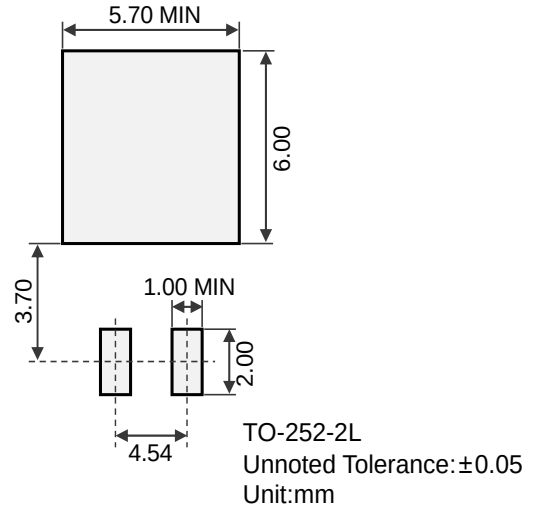


## Package Outline Dimensions & Suggested Solder Pad Layout

### Package Outline Dimensions



### Suggested Solder Pad Layout



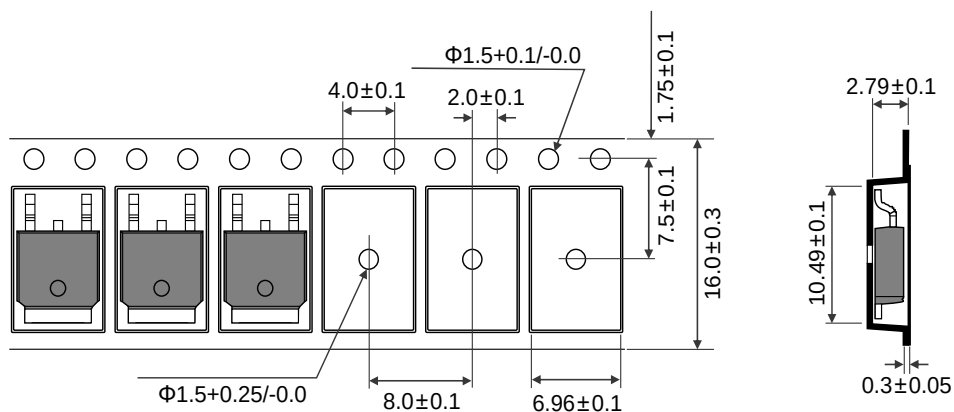
## Marking Information



“MHCHXM”= Product Logo  
“Marking Code”= The Following  
“XXXX”= Date Code Marking

| Marking Code | Part Number  |
|--------------|--------------|
| 65N130S1     | HXMC65N130S1 |

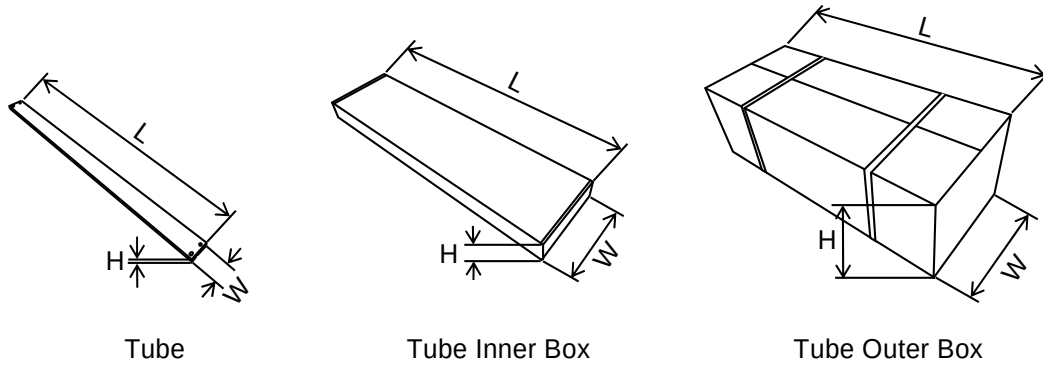
## Reel Tape Dimensions (Dimensions in mm)



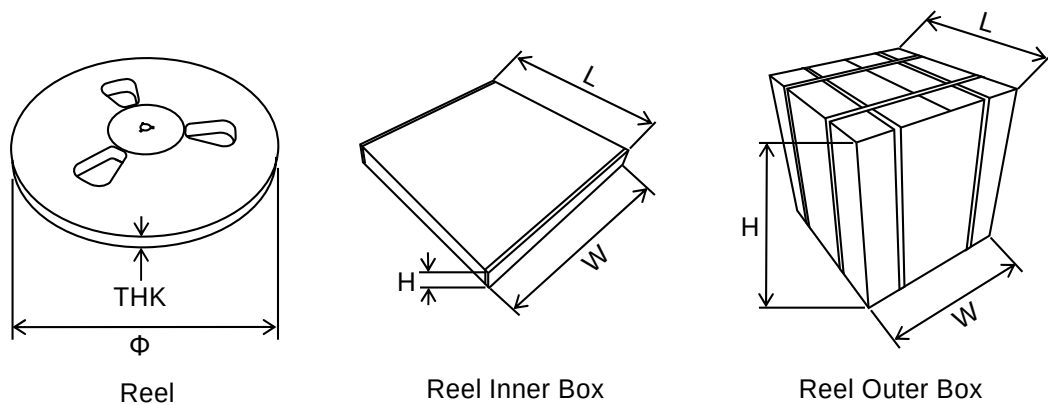
### Packing Information

| Packaging | Part Number | Quantity(pcs) | Size(mm)       |
|-----------|-------------|---------------|----------------|
| Tube      | Tube        | 80            | L540×W20×H5    |
|           | Inner Box   | 4000          | L570×W115×H55  |
|           | Outer Box   | 20000         | L595×W320×H135 |
| Reel      | Reel        | 3000          | Φ330×THK17     |
|           | Inner Box   | 3000          | L350×W340×H25  |
|           | Outer Box   | 30000         | L355×W300×H360 |

#### Packaging:Tube



#### Packaging:Reel



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