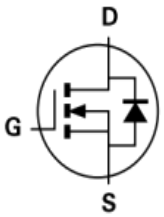
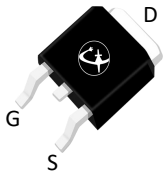
# LSC180M65D

SiC N-Channel MOSFET

## MAIN CHARACTERISTICS

| | |
|---|---|
| $I_D$ | 15A |
| $V_{DS}$ | 800V |
| $R_{DSON}$-typ （@VGS=18V Tc=25°C） | 175mΩ |




TO-252

## Features

- High Speed Switching
- High Blocking Voltage with Low RDS(on)
- Easy to Parallel
- Simple to Drive
- RoHS Compliant

## Benefits

- Increased Power Density
- Faster Operating Frequency
- Reduction of Heat Sink Requirements
- Higher Efficiency
- Reduced EMI

## Application

- Power Factor Correction Modules
- Switch Mode Power Supplies
- DC-AC Inverters
- High Voltage DC/DC Converters

## Product specification classification

| Part Number | Package | Mode Name | Pack |
|---|---|---|---|
| LSC180M65D | TO-252 | LSC180M65D | Tape |

## Maximum Ratings at Tc=25°C unless otherwise specified

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 800 | V |
| Gate-Source Voltage | $V_{GSmax}$ | -8/+22 | V |
| Gate-Source Voltage, max. Transient Voltage（tp≤0.5μs, D<0.001） | $V_{GSmax}$ | -8/+22 | V |
| Recommended Operation Value | $V_{GSop}$ | -4/+18 | V |
| Continue Drain Current TC=25℃ | $I_D$ | 15 | A |
| Continue Drain Current TC=100℃ | | 11 | A |
| Pulsed Drain Current (Note1) | $I_{DM}$ | 30 | A |
| Power Dissipation | $P_D$ | 48 | W |
| Operating Temperature Range | $T_J$ | -40 to +175 | °C |
| Storage Temperature Range | $T_{STG}$ | -40 to +150 | °C |
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 2.1 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 30 | °C/W |

Note1:Pulse test: 300 μs pulse width, 2 % duty cycle

## Electrical Characteristics at Tc=25°C unless otherwise specified

| Parameter | Test Condition | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{GS}$ = 0 V,$I_D$ = 100μA | $BV_{DSS}$ | 800 | - | - | V |
| Drain-Source Leakage Current | VDS = 800 V, VGS = 0 V | $I_{DSS}$ | - | 1 | 10 | μA |
| Gate Leakage Current | $V_{GS}$ = 18 V, $V_{DS}$ = 0 V | $I_{GSS}$ | - | - | 250 | nA |
| Gate-Source Threshold VoltageTc=25°C | $V_{DS}$ = $V_{GS}$ , $I_D$ = 2.5 mA | $V_{GS(th)}$ | 2 | 2.8 | 4 | V |
| Gate-Source Threshold VoltageTc=175°C | | | - | 2 | - | V |
| Drain-Source On-State Resistance | $V_{GS}$ = 15 V, $I_D$ = 10 A | $R_{DS(on)}$ | - | 200 | 290 | mΩ |
| | $V_{GS}$ = 15 V, $I_D$ =10 A, $T_J$ = 175℃ | | - | 208 | - | |
| | $V_{GS}$ = 18 V, $I_D$ = 10 A | | - | 175 | 228 | |
| | $V_{GS}$ = 18 V, $I_D$ =10 A, $T_J$ = 175℃ | | - | 188 | - | |
| Input Capacitance | $V_{GS}$ = 0 V, $V_{DS}$ = 600 V, f = 1MHz | $C_{iss}$ | - | 308 | - | pF |
| Output Capacitance | | $C_{oss}$ | - | 32 | - | pF |
| Reverse Transfer Capacitance | | $C_{rss}$ | - | 4.2 | - | pF |
| Coss Stored Energy | | Eoss | - | 5.3 | - | pF |
| Internal Gate Resistance | f=1MHz | RG(int) | - | 3.9 | - | Ω |
| Total Gate Charge(Note2) | $I_D$ = 10 A, $V_{DD}$ = 400 V, $V_{GS}$ =-4/18 V | $Q_G$ | - | 14 | - | nC |
| Gate to Source Charge(Note2) | | $Q_{GS}$ | - | 2.8 | - | nC |
| Gate to Drain Charge(Note2) | | $Q_{GD}$ | - | 6.4 | - | nC |
| Turn-on Delay Time(Note2) | VDS = 400 V, ID = 10 A, VGS = -4/+18 V, RG =2.5 Ω L=200μH | $t_{d(ON)}$ | - | 6 | - | ns |
| Rise Time(Note2) | | $t_r$ | - | 9 | - | ns |
| Turn-Off Delay Time(Note2) | | $t_{d(OFF)}$ | - | 8 | - | ns |
| Fall Time(Note2) | | $t_f$ | - | 11 | - | ns |
| Turn-on Switching Energy | | Eon | - | 27 | - | μJ |
| Turn-off Switching Energy | | Eoff | - | 6 | - | μJ |

## Source-Drain Diode Characteristics at Ta=25°C unless otherwise specified

| Parameter | Test Condition | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Maximun Body-Diode Continuous Current | VGS=-4V Tc=25°C | $I_S$ | - | 15 | - | A |
| | VGS=-4V Tc=100°C | | - | 8 | - | A |
| Maximun Body-Diode Pulsed Current(Note2) | | $I_{SM}$ | - | – | 30 | A |
| Drain-Source Diode Forward Voltage | $V_{GS}$=-4V, $I_{SD}$=5A Tj=25° | $V_{SD}$ | - | 4 | - | V |
| | $V_{GS}$=-4V,$I_{SD}$=5A Tj=175° | | - | 3.7 | - | V |
| Reverse Recovery Time(Note2) | VGS=-4V, ISD=5A, VR=400V, di/dt=1400A/μs, Tj=25°C | trr | - | 12 | - | ns |
| Reverse Recovery Charge(Note2) | | Qrr | - | 62 | - | nC |
| Peak Reverse Recovery Current | | Irrm | - | 5 | - | A |

Note2:Pulse test: 300 μs pulse width, 2 % duty cycle

## RATINGS AND CHARACTERISTIC CURVES

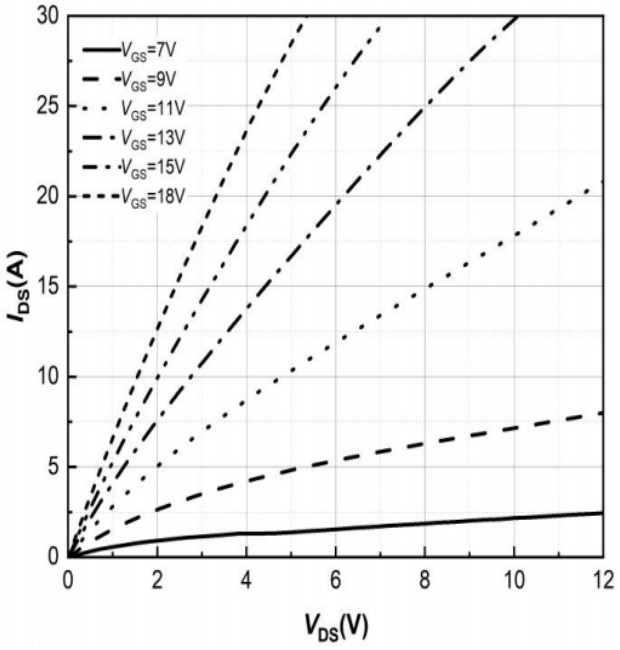



Figure 1. **Output Characteristics $T_j$=25°C**

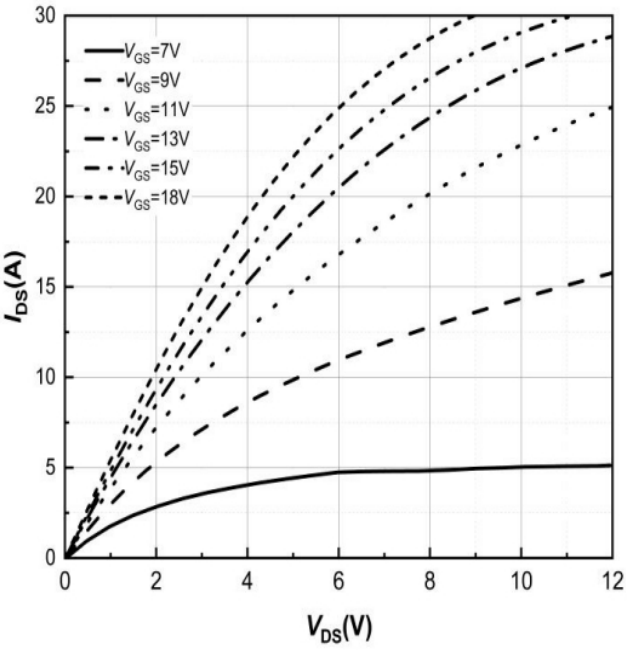



Figure 2. **Output Characteristics $T_j$=175°C**

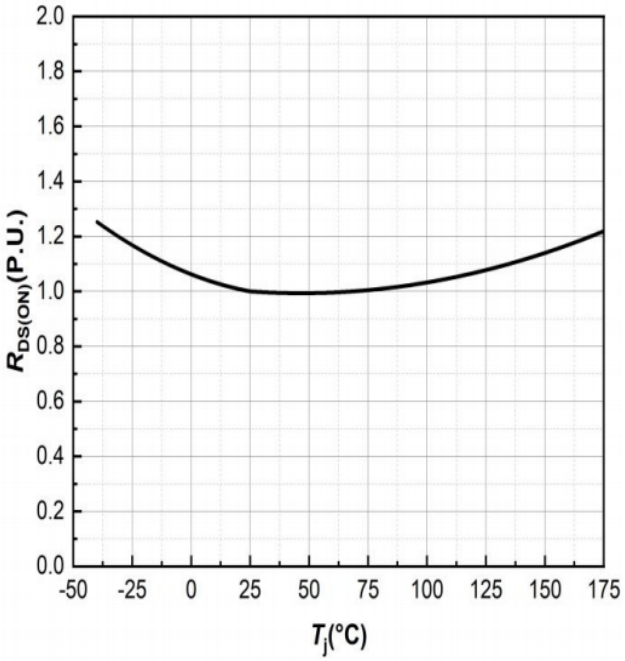



Figure 3. **Normalized On-Resistance vs. Temperature**

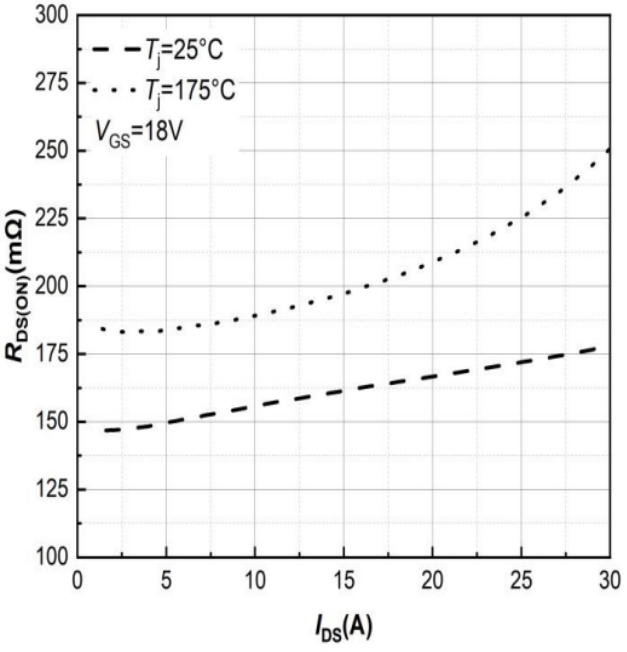



Figure 4. **On-Resistance vs. Drain Current For Various Temperatures**

## RATINGS AND CHARACTERISTIC CURVES

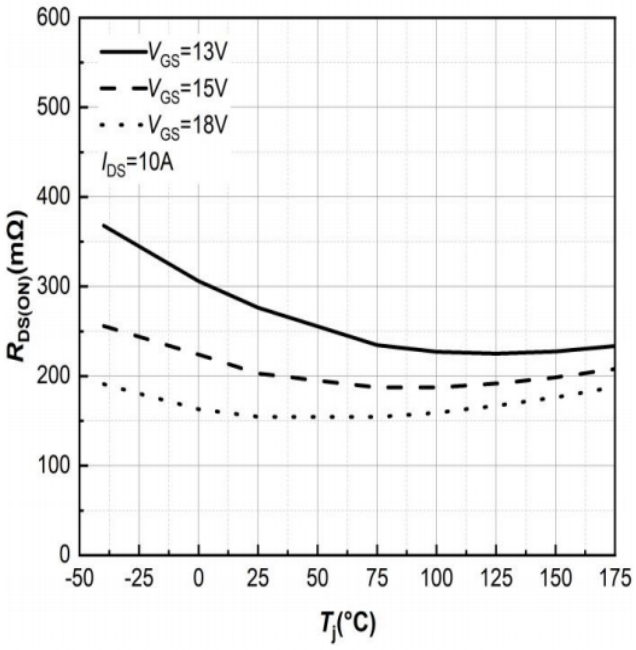



Figure 5. **On-Resistance vs. Temperature For Various Gate Voltage**

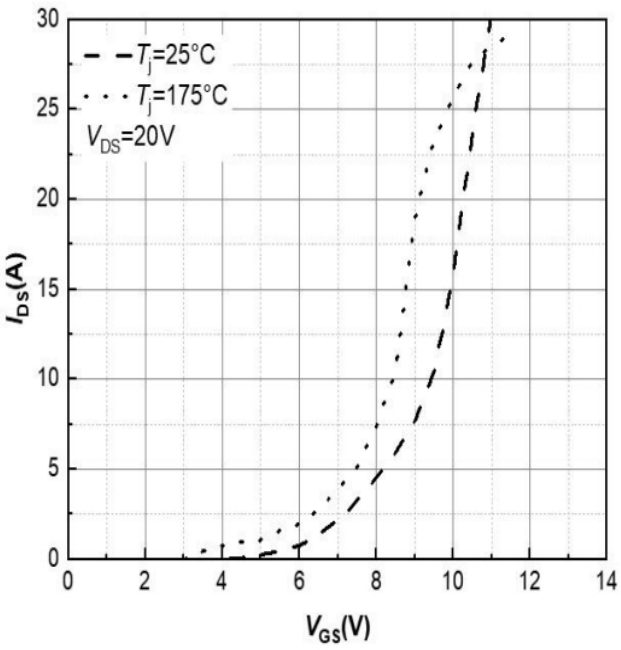



Figure 6. **Transfer Characteristic for Various Junction Temperatures**

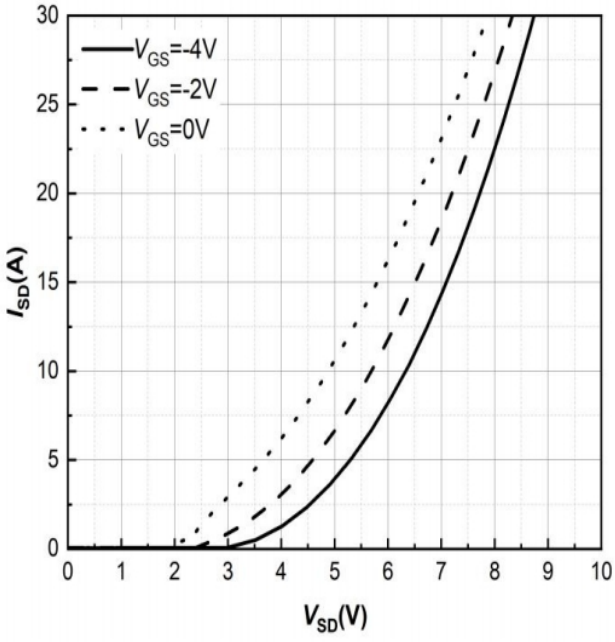



Figure 7. **Body Diode Characteristic $T_j$=25°C**

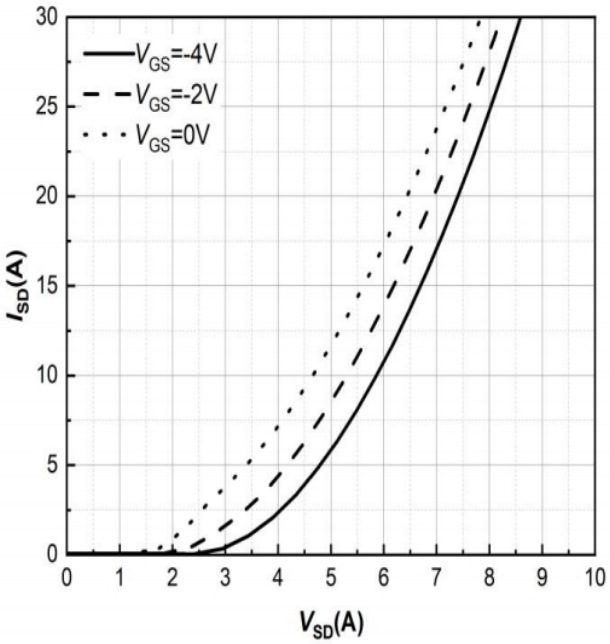



Figure 8. **Body Diode Characteristic $T_j$=175°C**

## RATINGS AND CHARACTERISTIC CURVES

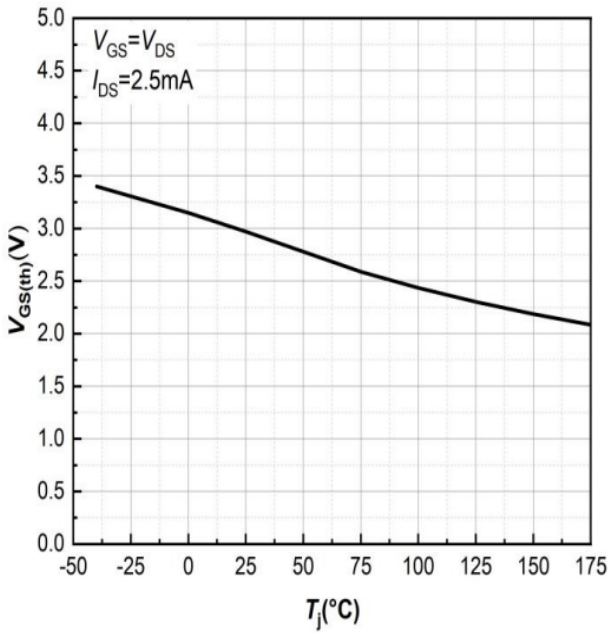



Figure 9. **Threshold Voltage vs. Temperature**

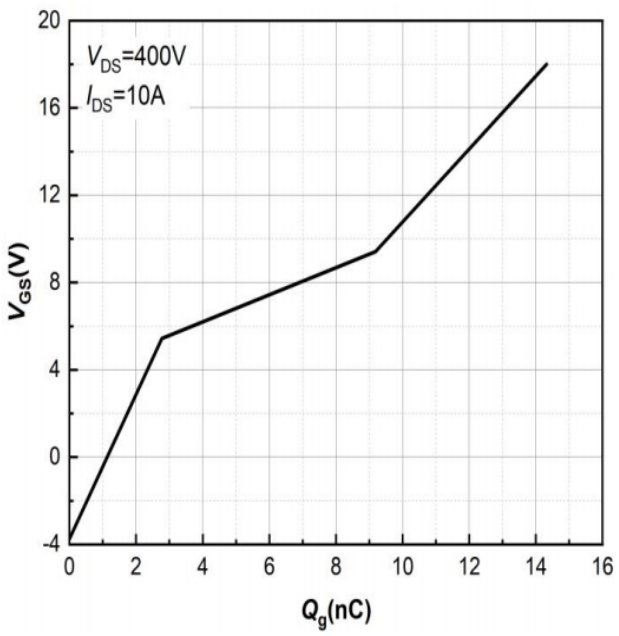



Figure 10. **Gate Charge Characteristics**

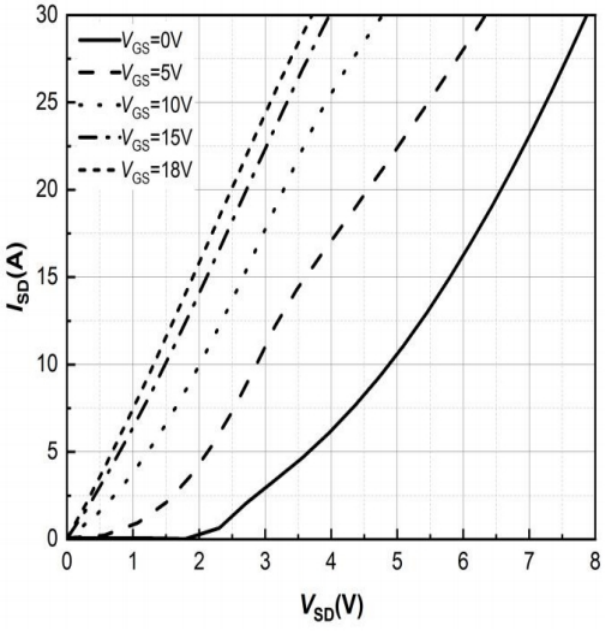



Figure 11. **3rd Quadrant Characteristic $T_j$=25°C**

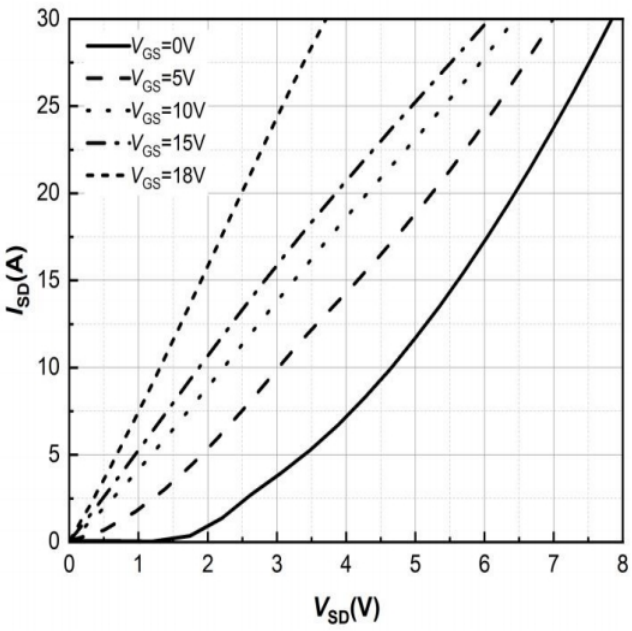



Figure 12. **3rd Quadrant Characteristic $T_j$=175°C**

## RATINGS AND CHARACTERISTIC CURVES

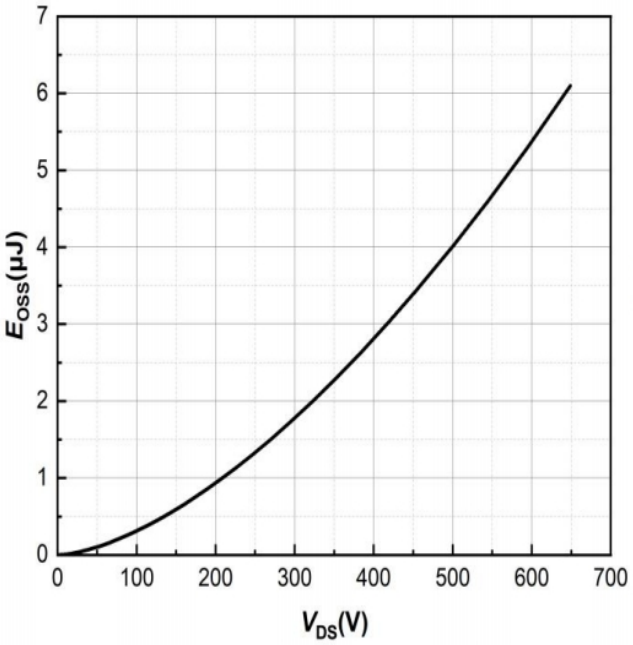



Figure 13. **Output Capacitor Stored Energy**

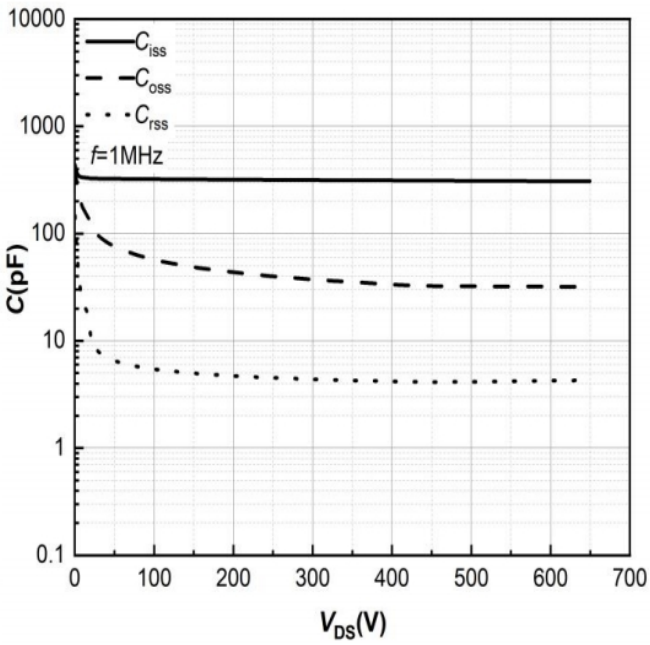



Figure 14. **Capacitances vs. Drain-Source**

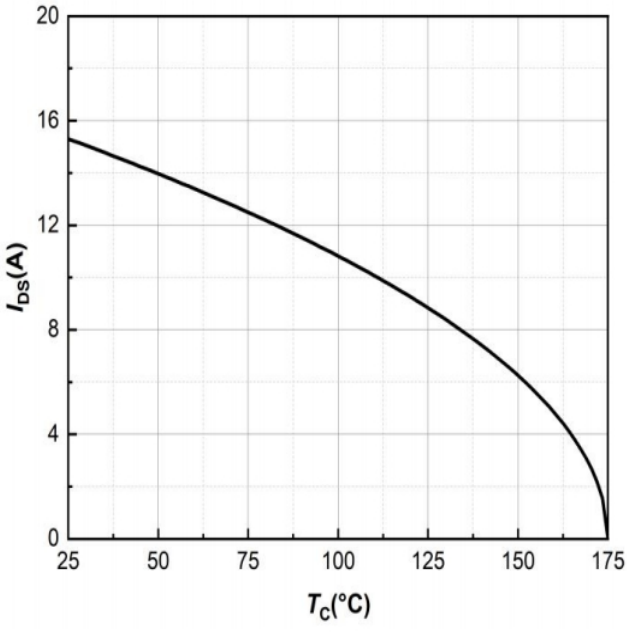



Figure 15. **Continuous Drain Current Derating vs. Case Temperature**

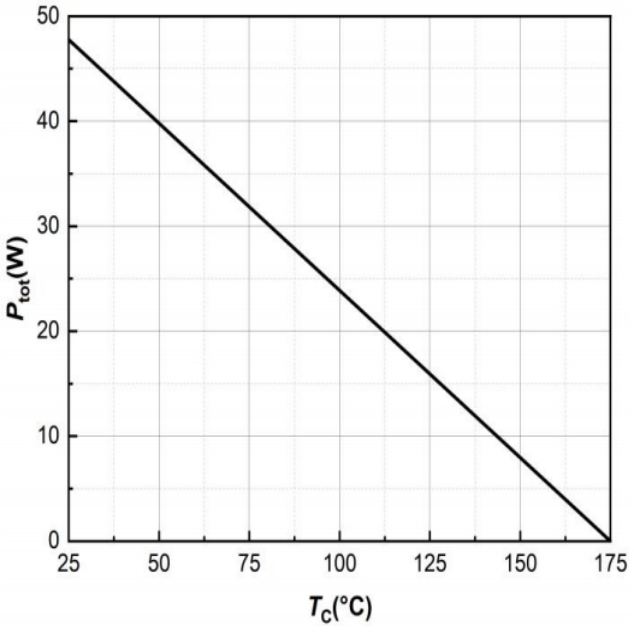



Figure 16. **Maximum Power Dissipation Derating vs. Case Temperature**

## RATINGS AND CHARACTERISTIC CURVES

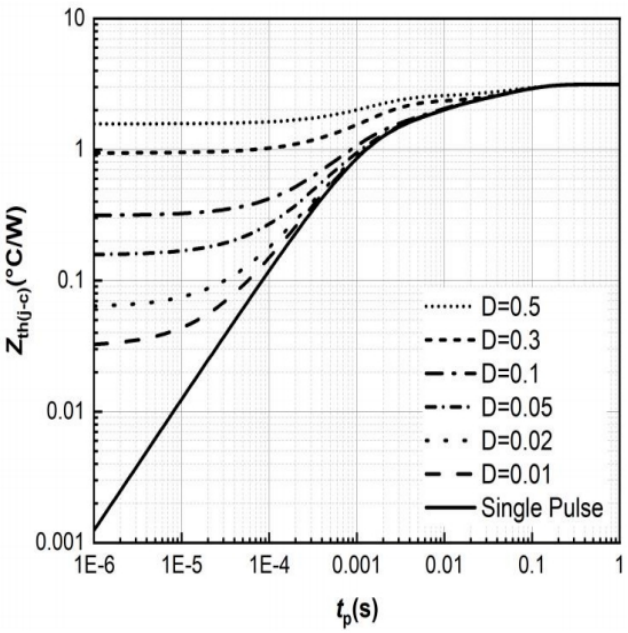



Figure 17. **Transient Thermal Impedance**

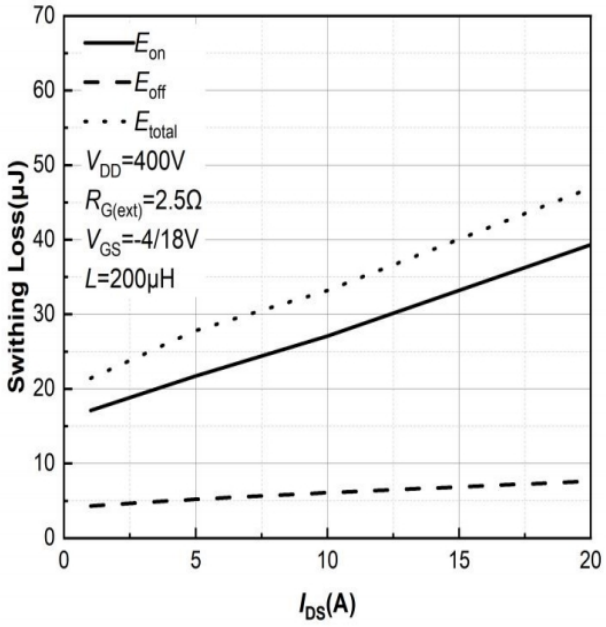



Figure 18. **Clamped Inductive Switching Energy vs. Drain Current**
**$T_j$=25°C**

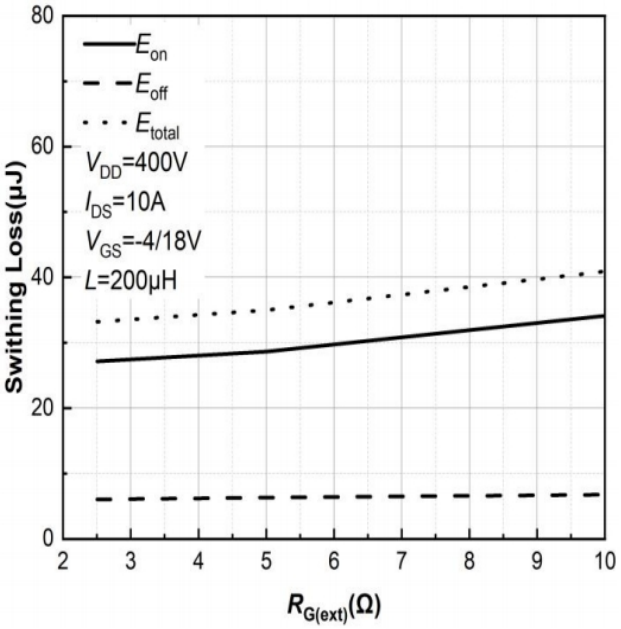



Figure 19. **Clamped Inductive Switching Energy vs. $R_{G(ext)}$**
**$T_j$=25°C**

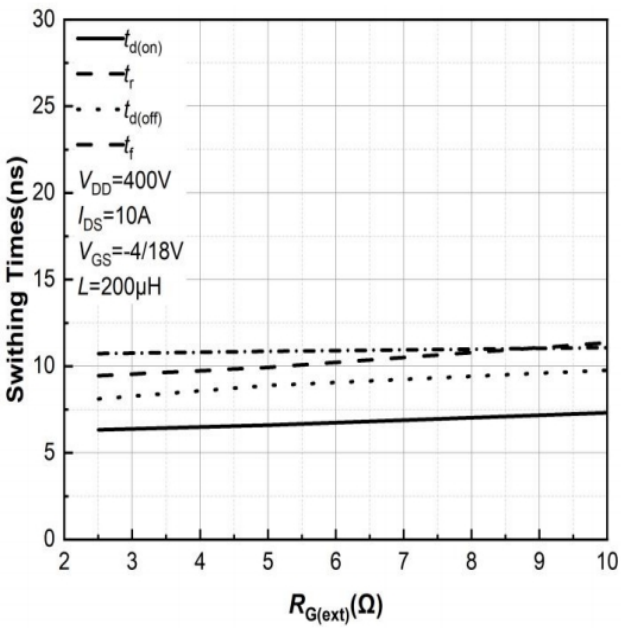



Figure 20. **Switching Times vs. $R_{G(ext)}$**
**$T_j$=25°**

## RATINGS AND CHARACTERISTIC CURVES

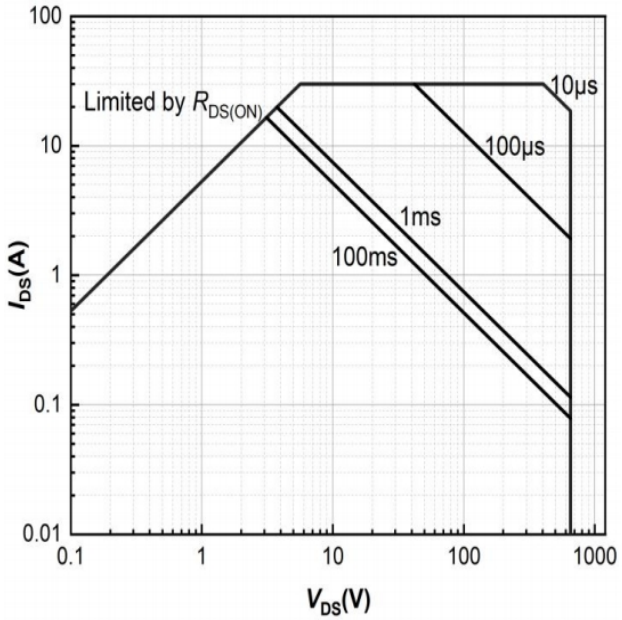
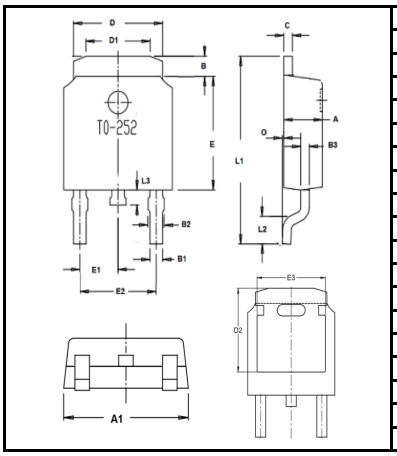



Figure 21. **Safe Operating Area**

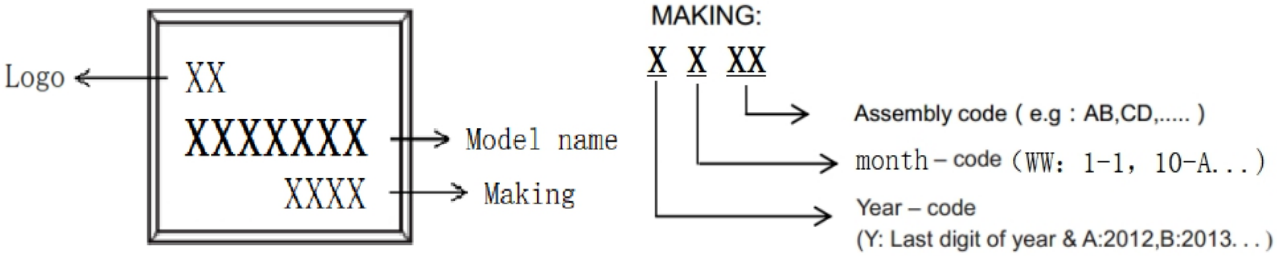
## Package Outline Dimensions millimeters

TO-252




| Dim. | Min. | Max. |
|---|---|---|
| A | 2.1 | 2.5 |
| A1 | 6.3 | 6.9 |
| B | 0.96 | 1.42 |
| B1 | 0.74 | 0.86 |
| B2 | 0.74 | 0.94 |
| C | Typ0.5 | |
| D | 5.33 | 5.53 |
| D1 | 3.65 | 4.05 |
| D2 | 5 | 5.4 |
| E | 6 | 6.2 |
| E1 | Typ2.29 | |
| E2 | Typ4.58 | |
| E3 | 4.6 | 5 |
| O | 0 | 0.15 |
| L1 | 9.9 | 10.5 |
| L2 | Typ1.65 | |
| L3 | 0.6 | 1 |
| All Dimensions in millimeter | | |

## Marking on the body




## packing instruction

| PKG | Minimal Package | Mini Box | Box |
|---|---|---|---|
| TO-252 |  |  |  |
| | 2500pcs/disk | 5000pcs/disk | 25000pcs/box |

## Notice

All product,product specifications and data are subject to change without notice to improve.The right to explain is owned by LINGXUN electronics company.

Confirm that operation temperature is within the specified range described in the product specification. Avoid applying poer exceeding normal rated

poer; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.

LINGXUN electronics shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

http://www.lxmicro.com

## Revision History

| Rev | Changes | Date |
|---|---|---|
| 1.0 | First version | 2025/8/30 |