

| | | |
|------------|----------------|----------------|
| VDS | RDS(on) | ID@25°C |
| 1700V | 45mΩ | 72A |

Applications:

- Solar Inverters
- Switch Mode Power Supplies
- High Voltage DC/DC Converters
- EV Charging
- Motor Drives

Features:

- High Blocking Voltage with Low On-Resistance
- High Speed Switching with Low Capacitances
- Easy to Parallel and Simple to Drive
- Avalanche Ruggedness

Benefits:

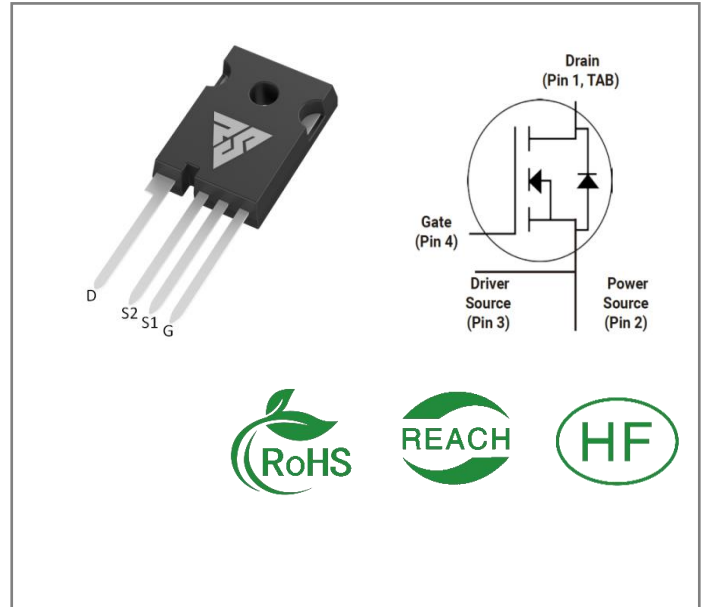
- Higher System Efficiency
- Reduced Cooling Requirements
- Increased Power Density
- Increased System Switching Frequency

Ordering Information

| Part Number | Package | Marking | Packing | Qty. |
|-------------|----------|------------|---------|--------|
| RSM170045Z | TO-247-4 | RSM170045Z | Tube | 30 PCS |

Maximum Ratings (T_J= 25°C unless otherwise specified)

| Symbol | Parameter | Value | Unit | Test Conditions | Note |
|-----------|--|-----------------|------|---|------|
| VDSmax | Drain - Source Voltage | 1700 | V | VGS=0V, ID =100μA | |
| VGSmax | Gate - Source Voltage | -10/+2 5 | V | Absolute maximum values | |
| VGSop | Gate - Source Voltage | -5/+20 | V | Recommended operational values | |
| ID | Continuous Drain Current | 72 48 | A | VGS=20V, TC =25°C VGS=20V, TC =100°C | |
| ID(pulse) | Pulsed Drain Current | 160 | A | Pulse width tp limited by TJmax | |
| PD | Power Dissipation | 520 | W | TC =25°C, TJ =150°C | |
| TL | Solder Temperature | 260 | °C | | |
| TJ, Tstg | Operating Junction and Storage Temperature | -40 to + 150 | °C | | |



Electrical Characteristics (T_J= 25°C unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max | Unit | Test Conditions | Note |
|----------|----------------------------------|----------|----------|-----|------|--|------|
| V(BR)DSS | Drain-Source Breakdown Voltage | 170 0 | | | V | VGS=0V, ID =100μA | |
| VGS(th) | Gate Threshold Voltage | 2.0 | 2.6 | 4.0 | V | VGS= VDS, IDS=18mA, TC =25°C | |
| | | | 1.8 | | V | VGS= VDS, IDS=18mA, TC =150°C | |
| IDSS | Zero Gate Voltage Drain Current | | 1 | 100 | μA | VDS= 1700V, VGS=0V | |
| IGSS | Gate-Source Leakage Current | | | 250 | nA | VGS=25V, VDS= 0V | |
| RDS(on) | Drain-Source on-state Resistance | | 45 | 70 | mΩ | VGS=20V, ID =50A, TC =25°C | |
| | | | 90 | | | VGS=20V, ID =50A, TC =150°C | |
| Ciss | Input Capacitance | | 355 0 | | pF | VGS=0V, VDS=1000 V, f=1MHz, VAC=25 mV | |
| Coss | Output Capacitance | | 165 | | | | |
| Crss | Reverse Transfer Capacitance | | 6.1 | | | | |
| EON | Turn-On Switching Energy | | 310 0 | | μJ | VDS =1200V, VGS =-5/20V, ID = 30A, RG(ext) = 2.5Ω, L= 200μH | |
| EOFF | Turn-Off Energy | | 110 0 | | | | |
| td(on) | Turn-On Delay Time | | 27 | | ns | VDS =1200V, VGS =-5/20 V ID = 30A, RG(ext) =2. 5 Ω , RL =20Ω | |
| tr | Rise Time | | 32 | | | | |
| td(off) | Turn-Off Delay Time | | 16 | | | | |
| tf | Fall Time | | 10 | | | | |
| RG(int) | Internal Gate Resistance | | 2.6 | | Ω | f=1 MHz, VAC=25mV | |
| Qgs | Gate to Source Charge | | 54 | | nC | VDS=1200V, VGS=-5/20V ID =50A | |
| Qgd | Gate to Drain Charge | | 25 | | nC | | |
| Qg | Total Gate Charge | | 193 | | | | |

Reverse Diode Characteristics (T_J= 25°C unless otherwise specified)

| Symbol | Parameter | Typ. | Max | Unit | Test Conditions | Note |
|--------|----------------------------------|------|-----|------|---|------|
| VSD | Diode Forward Voltage | 3.6 | | V | VGS=-5V, ISD = 25 A, T _J = 25°C | |
| | | 3.3 | | V | VGS=-5V, ISD= 25 A, T _J = 150°C | |
| IS | Continuous Diode Forward Current | | 72 | A | VGS=-5V, TC= 25°C | |
| trr | Reverse Recovery time | 55 | | ns | ISD= 50A, VR = 1200V | |
| Qrr | Reverse Recovery Charge | 220 | | nC | | |
| Irrm | Peak Reverse Recovery Current | 6.7 | | A | | |

Thermal Characteristics (T_J= 25°C unless otherwise specified)

| Symbol | Parameter | Typ. | Unit | Test Conditions | Note |
|------------------|---|------|------|-----------------|------|
| R _{θJC} | Thermal Resistance from Junction to Case | 0.24 | °C/W | | |
| R _{θJA} | Thermal Resistance From Junction to Ambient | 40 | | | |

Typical Feature Curve

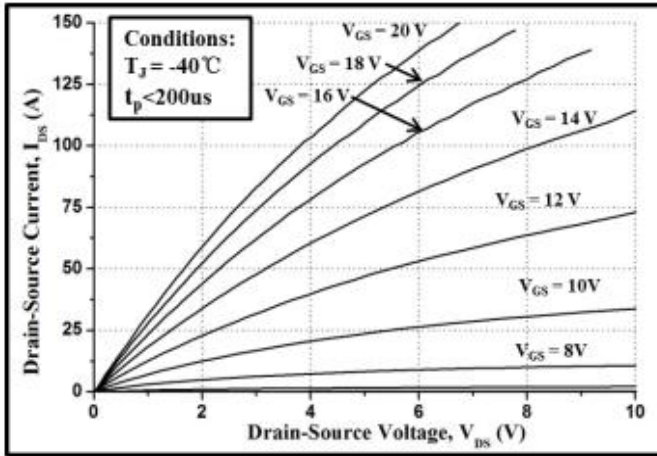


Figure 1. Output Characteristics $T_J = -40\text{ }^\circ\text{C}$

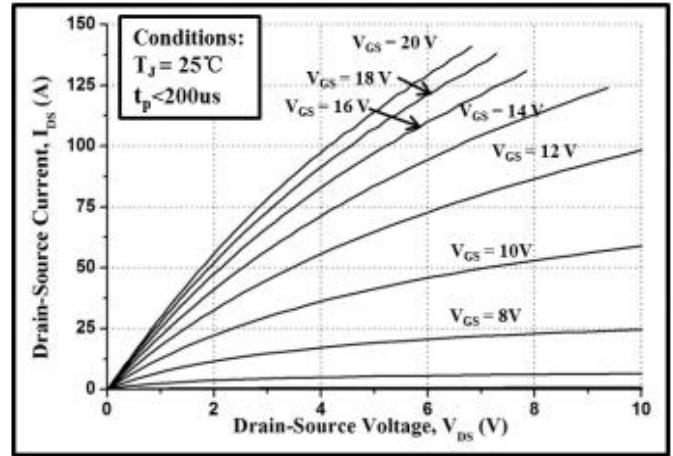


Figure 2. Output Characteristics $T_J = 25\text{ }^\circ\text{C}$

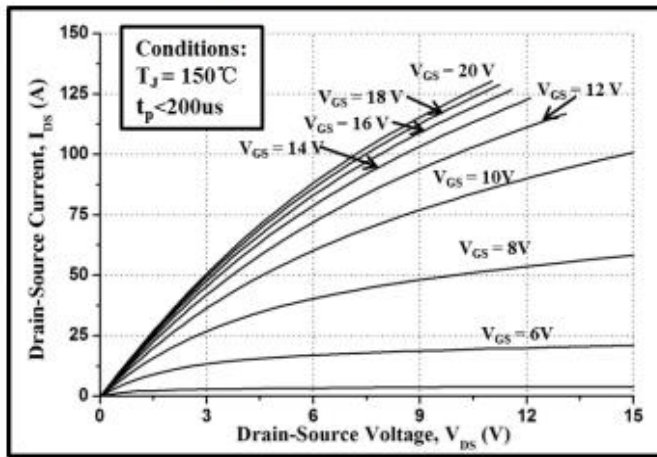


Figure 3. Output Characteristics $T_J = 150\text{ }^\circ\text{C}$

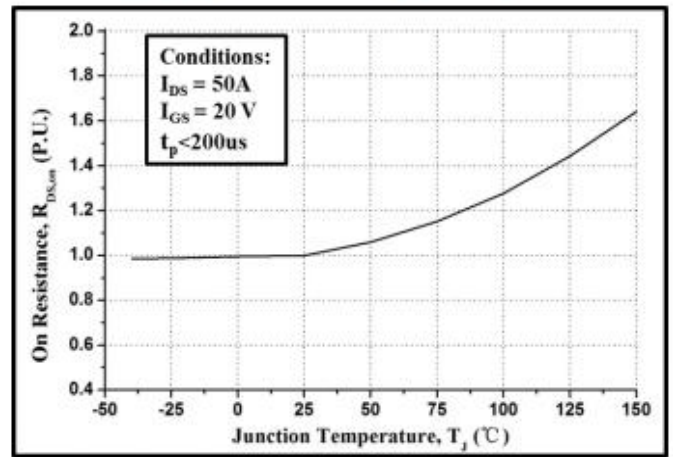


Figure 4. Normalized On-Resistance vs. Temperature

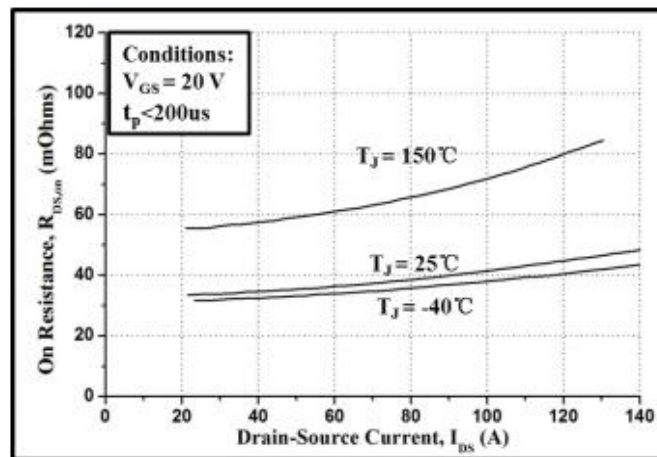


Figure 5. On-Resistance vs. Drain Current For Various Temperatures

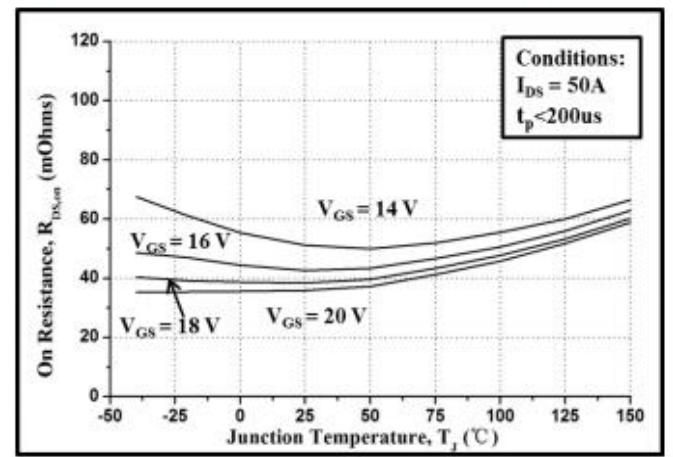


Figure 6. On-Resistance vs. Temperature For Various Gate Voltage

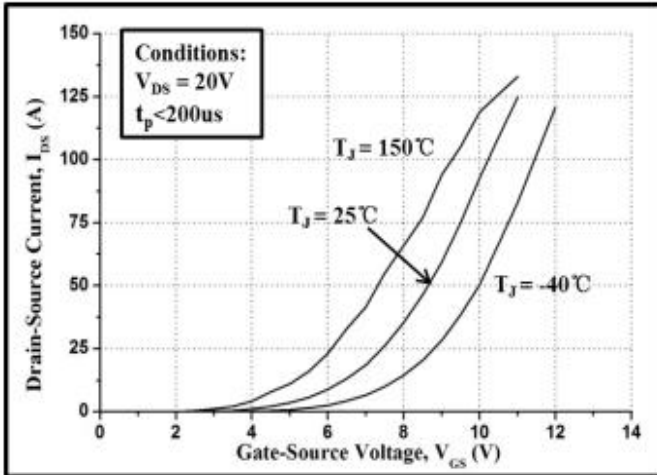


Figure 7. Transfer Characteristic for Various Junction Temperatures

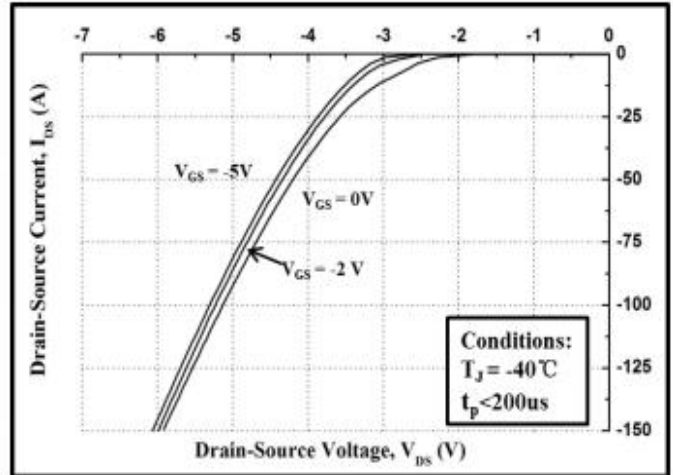


Figure 8. Body Diode Characteristic at -40 °C

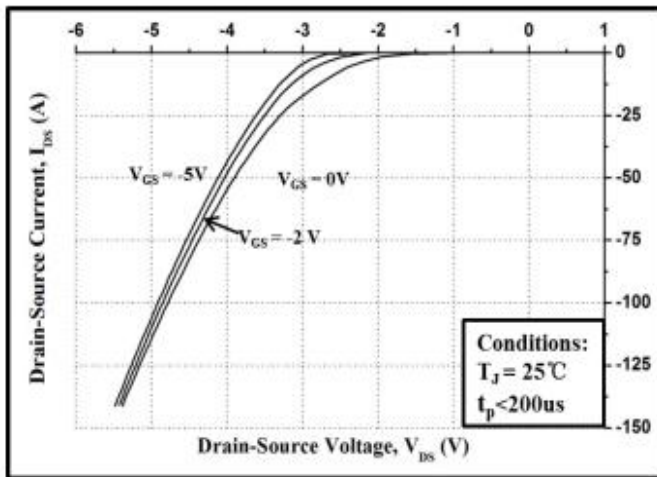


Figure 9. Body Diode Characteristic at 25 °C

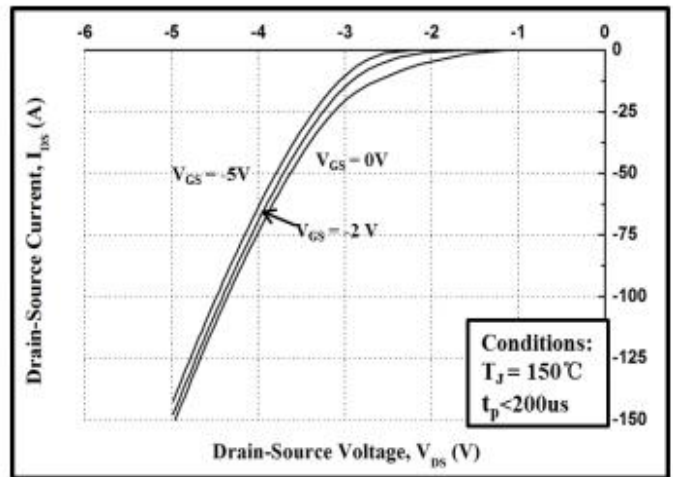


Figure 10. Body Diode Characteristic at 150 °C

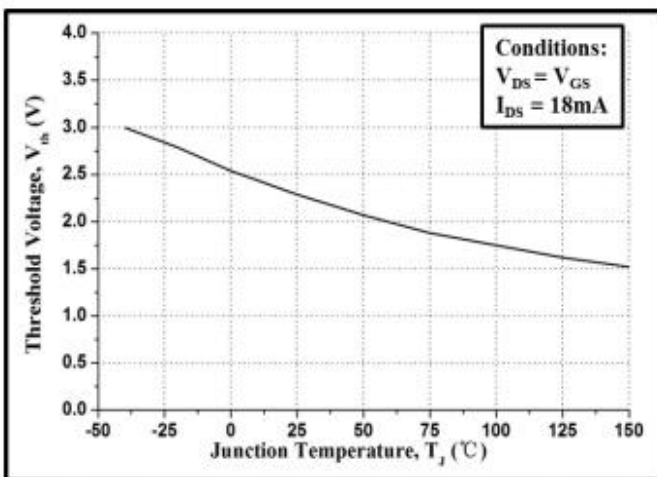


Figure 11. Threshold Voltage vs. Temperature

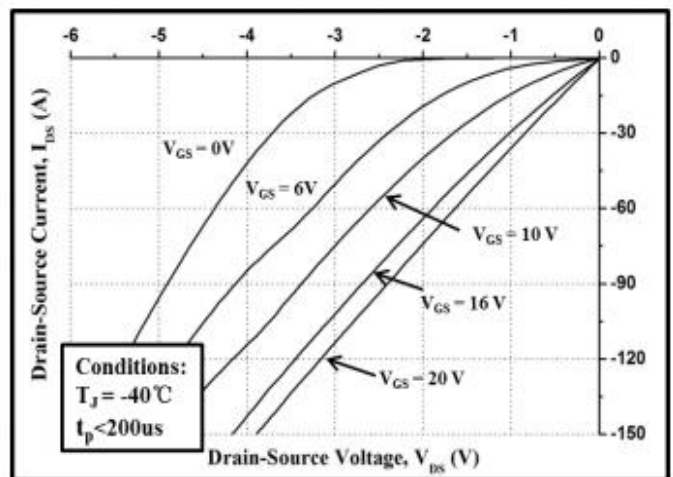


Figure 12. 3rd Quadrant Characteristic at -40 °C

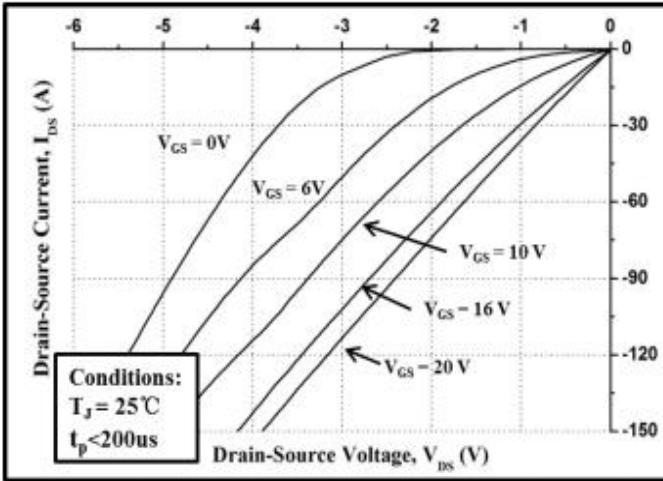


Figure 13. 3rd Quadrant Characteristic at 25°C

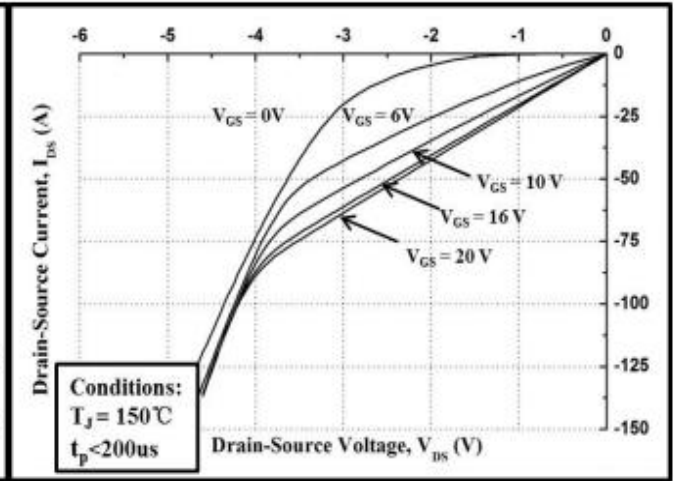


Figure 14. 3rd Quadrant Characteristic at 150°C

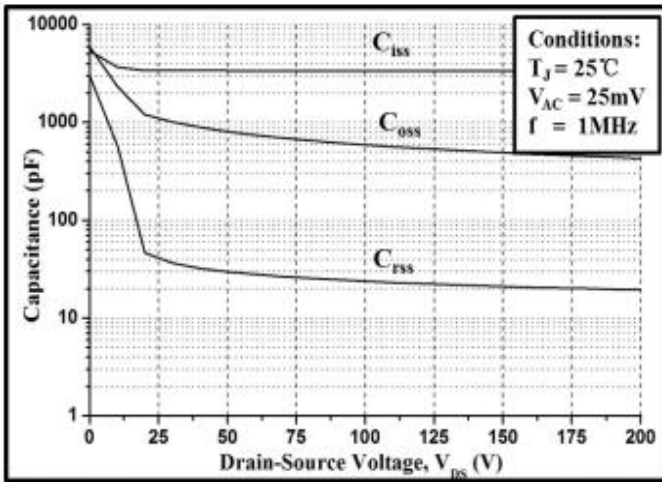


Figure 15. Capacitances vs. Drain-Source Voltage (0 - 200V)

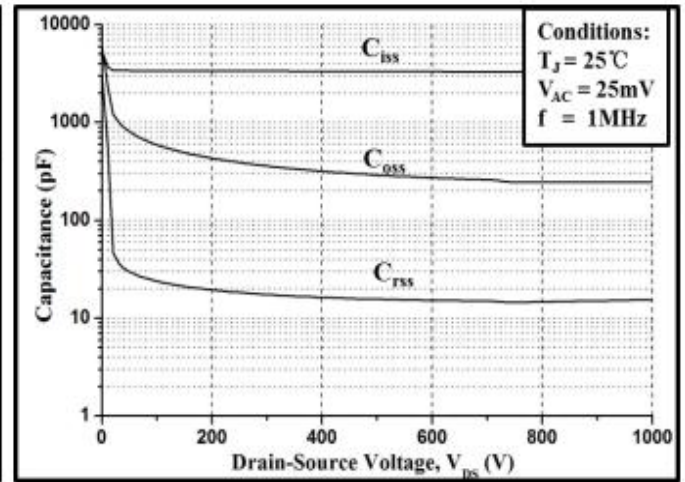


Figure 16. Capacitances vs. Drain-Source Voltage (0 - 1000V)

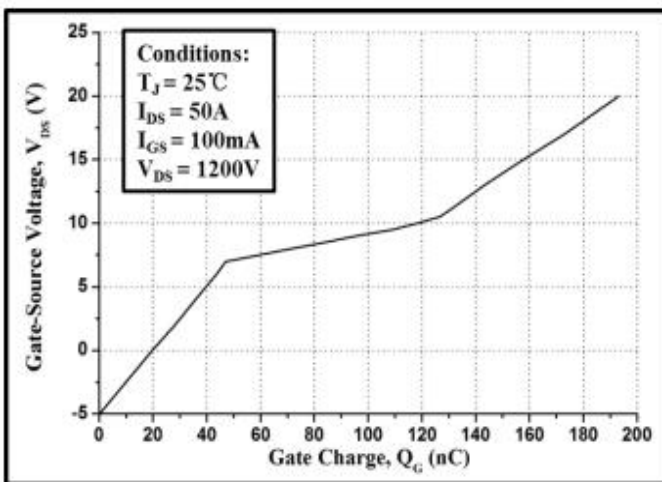


Figure 17. Gate Charge Characteristic

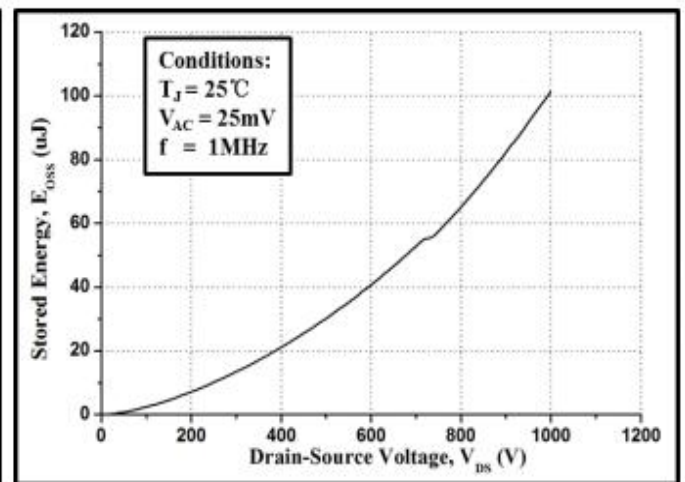
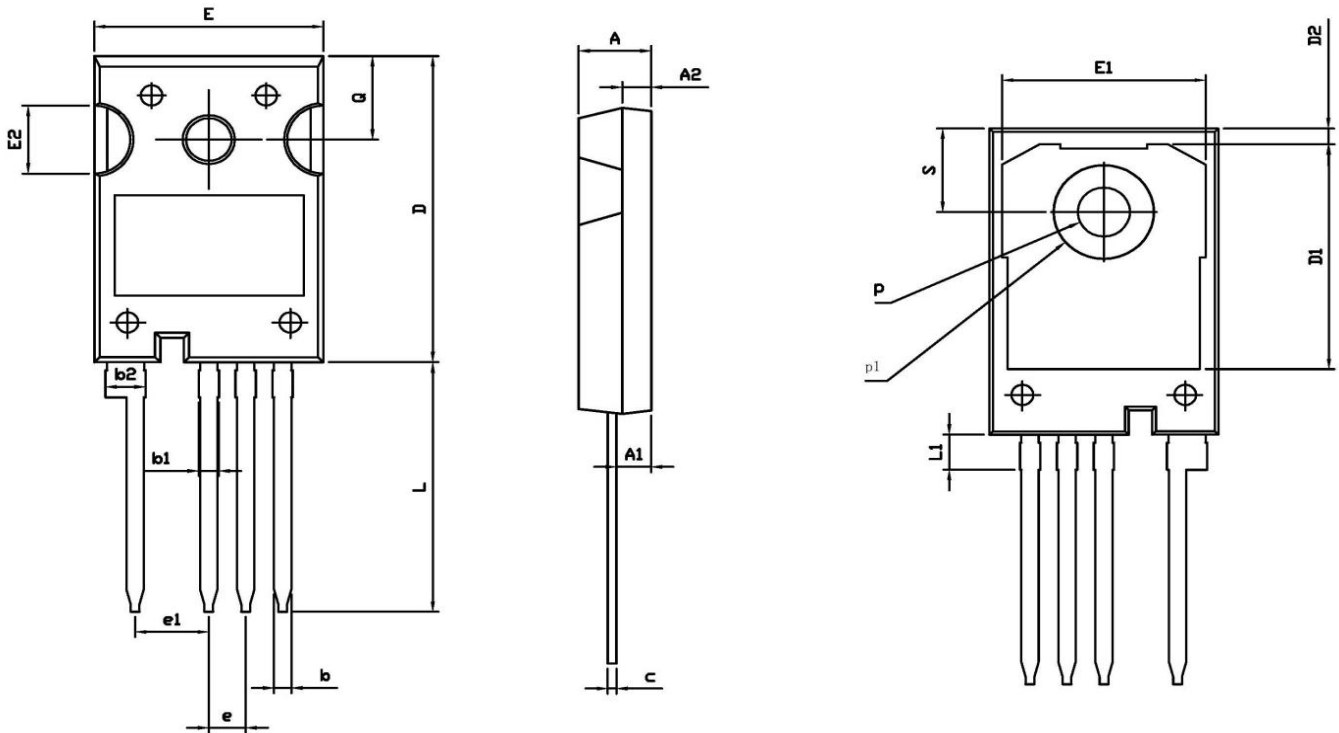
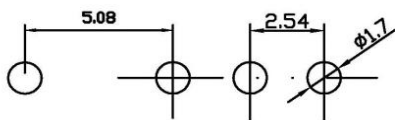


Figure 18. Output Capacitor Stored Energy

Package outline drawing(TO-247-4 Unit: mm)



RECOMMENDED LAND PATTERN



UNIT: mm

| | MIN | NOM | MAX |
|----|-------|-------|-------|
| A | 4.80 | 5.00 | 5.20 |
| A1 | 2.25 | 2.40 | 2.45 |
| A2 | 1.85 | 2.00 | 2.15 |
| b | 1.05 | 1.20 | 1.35 |
| b1 | 1.00 | 1.30 | 1.60 |
| b2 | 2.35 | 2.65 | 2.95 |
| c | 0.50 | 0.60 | 0.70 |
| D | 22.34 | 22.54 | 22.74 |
| D1 | 16.00 | 16.50 | 17.00 |
| D2 | 0.97 | 1.17 | 1.37 |
| e | 2.34 | 2.54 | 2.74 |
| e1 | 4.88 | 5.08 | 5.28 |
| E | 15.60 | 15.80 | 16.00 |
| E1 | 13.50 | 14.00 | 14.50 |
| E2 | 4.80 | 5.00 | 5.20 |
| L | 18.08 | 18.38 | 18.68 |
| L1 | 2.38 | 2.58 | 2.78 |
| p | 3.50 | 3.60 | 3.70 |
| p1 | 6.60 | 6.80 | 7.00 |
| Q | 6.00 | 6.15 | 6.30 |
| S | 6.00 | 6.15 | 6.30 |

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