

The low V_{th} series is specially designed to use in synchronous rectification power systems with low driving voltage.

Switched mode power supply

| Parameter | Value | Unit |
|--------------------------------|-------|------|
| $V_{DS, min} @ T_{j(max)}$ | 120 | V |
| $I_D, pulse$ | 150 | A |
| $R_{DS(ON), max} @ V_{GS}=10V$ | 12 | |
| Q_g | 33.1 | nC |

Product Name

Package

Marking

Absolute Maximum Ratings at $T_j=25$ unless otherwise noted
Parameter

Dynamic Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|------------------------------|--------------|------|------|------|------|--|
| Input capacitance | C_{iss} | | 2640 | | pF | $V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, 100 kHz |
| Output capacitance | C_{oss} | | 330 | | pF | |
| Reverse transfer capacitance | C_{rss} | | 11.2 | | pF | |
| Turn-on delay time | $t_{d(on)}$ | | 22.3 | | ns | $V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $R_G=1\ \Omega$, $I_D=25\text{ A}$ |
| Rise time | t_r | | 9.7 | | ns | |
| Turn-off delay time | $t_{d(off)}$ | | 85 | | ns | |
| Fall time | t_f | | 112 | | ns | |

Gate Charge Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|----------------------|---------------|------|------|------|------|---|
| Total gate charge | Q_g | | 33.1 | | nC | $V_{GS}=10\text{ V}$, $V_{DS}=50\text{ V}$, $I_D=25\text{ A}$ |
| Gate-source charge | Q_{gs} | | 5.6 | | nC | |
| Gate-drain charge | Q_{gd} | | 7.2 | | nC | |
| Gate plateau voltage | $V_{plateau}$ | | 3.1 | | V | |

Body Diode Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Test condition |
|-----------|--------|------|------|------|------|--|
| | | | | | | $I_S=12\text{ A}$, $V_{GS}=0\text{ V}$ |

Electrical Characteristics Diagrams

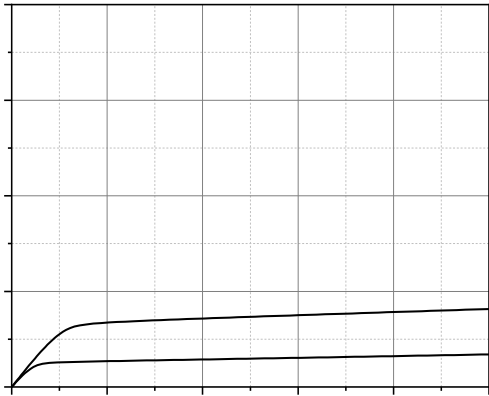


Figure 1. Typ. output characteristics

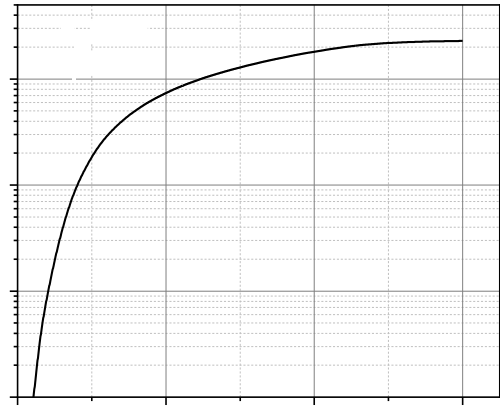


Figure 2. Typ. transfer characteristics

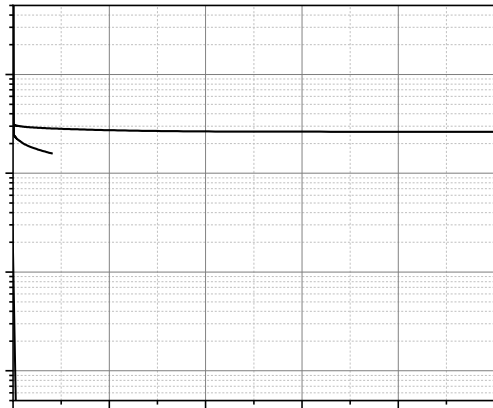


Figure 3. Typ. capacitances

Figure 4. Typ. gate charge

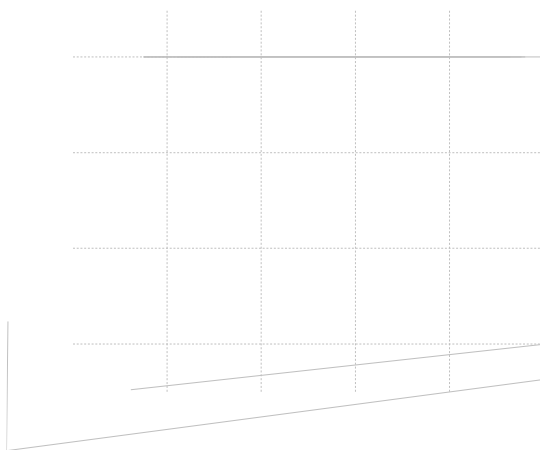


Figure 5. Drain-source breakdown voltage

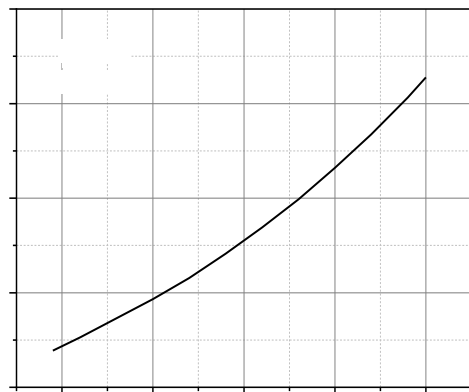


Figure 6. Drain-source on-state resistance

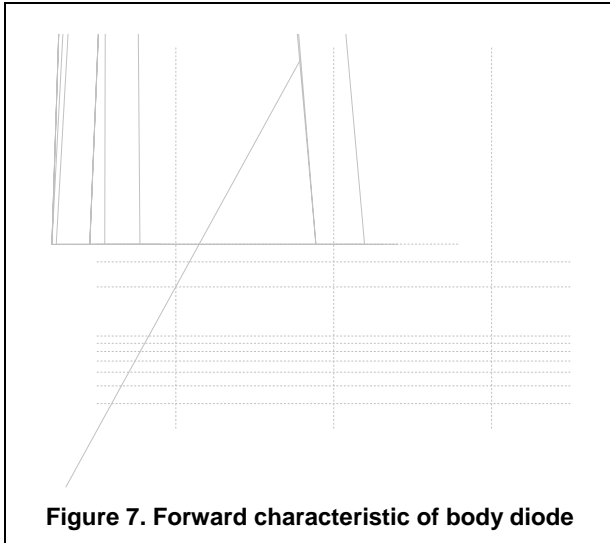


Figure 7. Forward characteristic of body diode

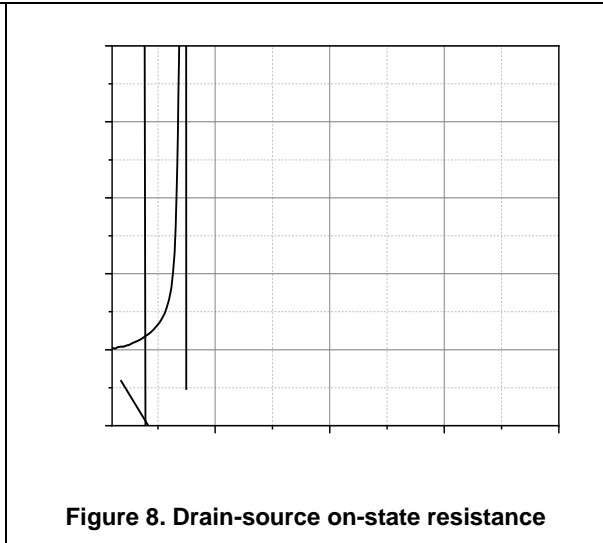


Figure 8. Drain-source on-state resistance

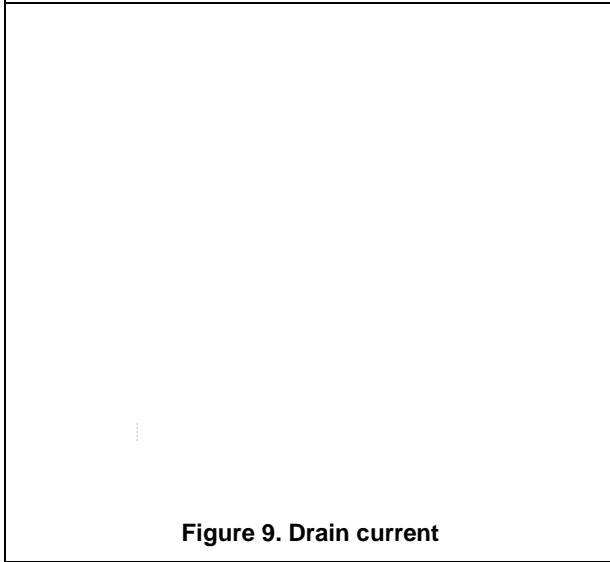


Figure 9. Drain current

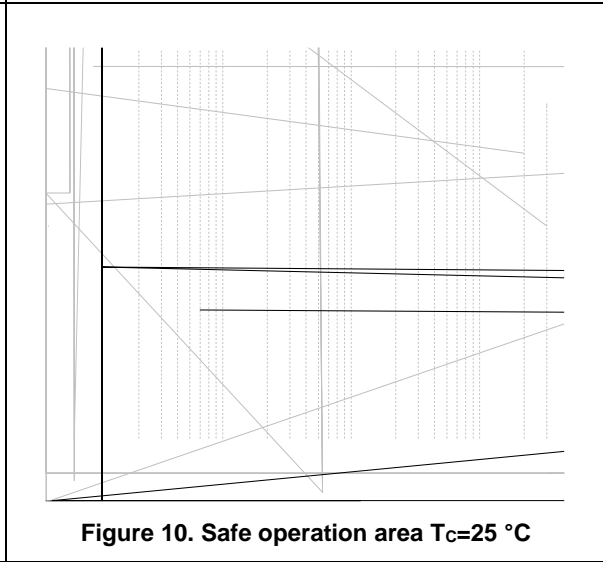


Figure 10. Safe operation area T_c=25 °C

Test circuits and waveforms

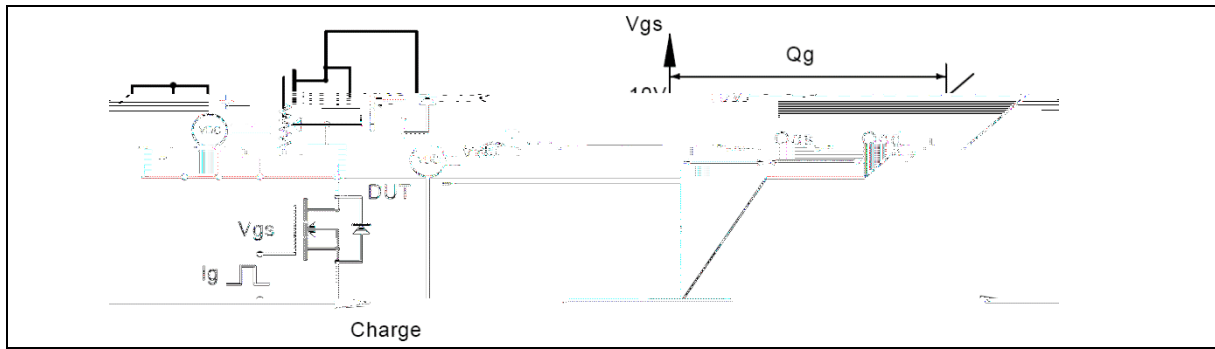


Figure 1. Gate charge test circuit & waveform

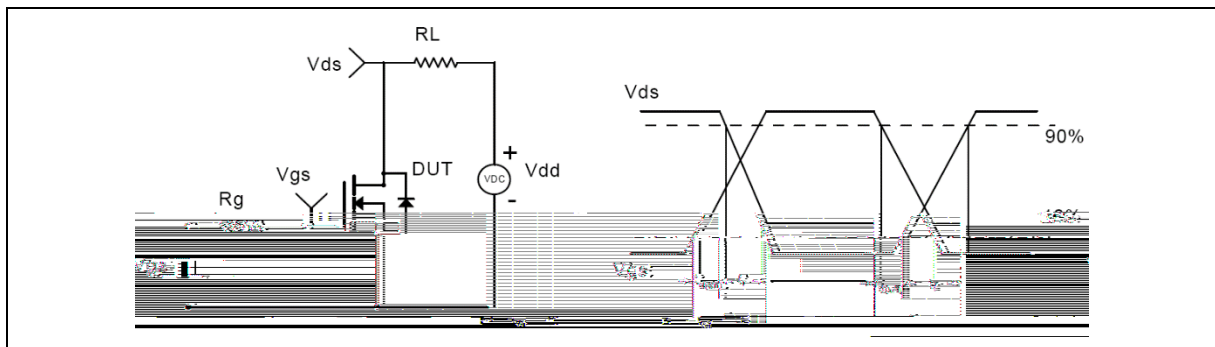


Figure 2. Switching time test circuit & waveforms

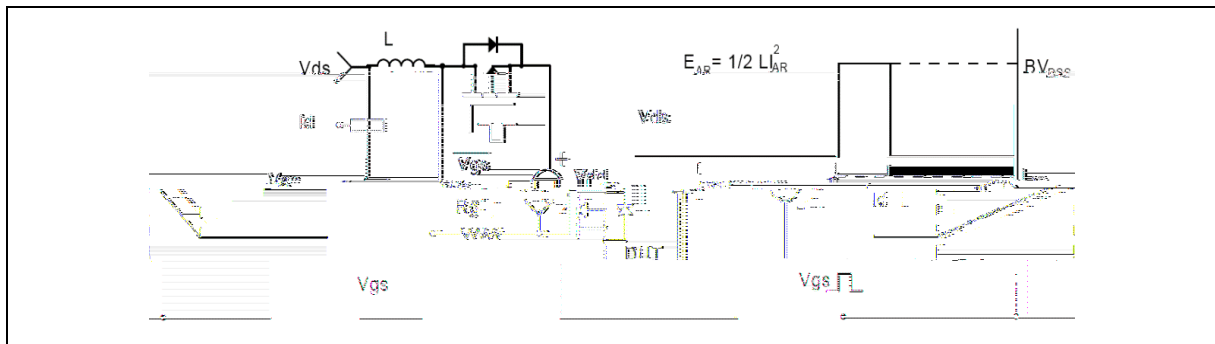


Figure 3. Unclamped inductive switching (UIS) test circuit & waveforms

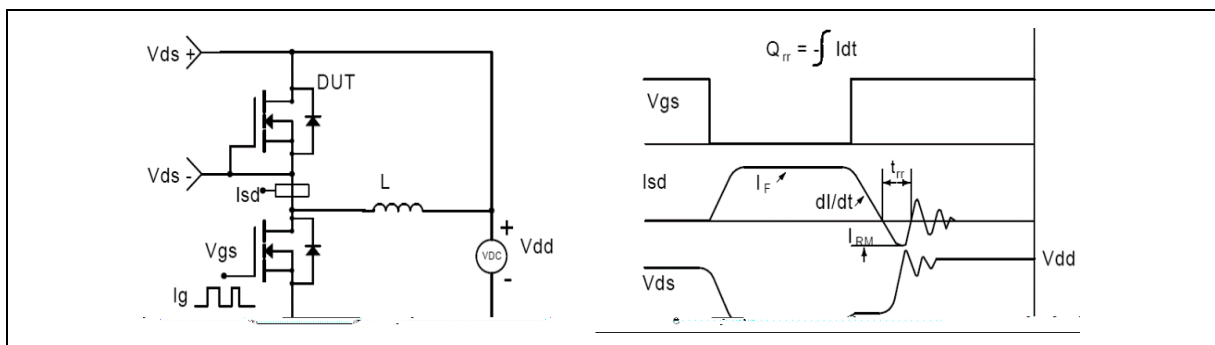
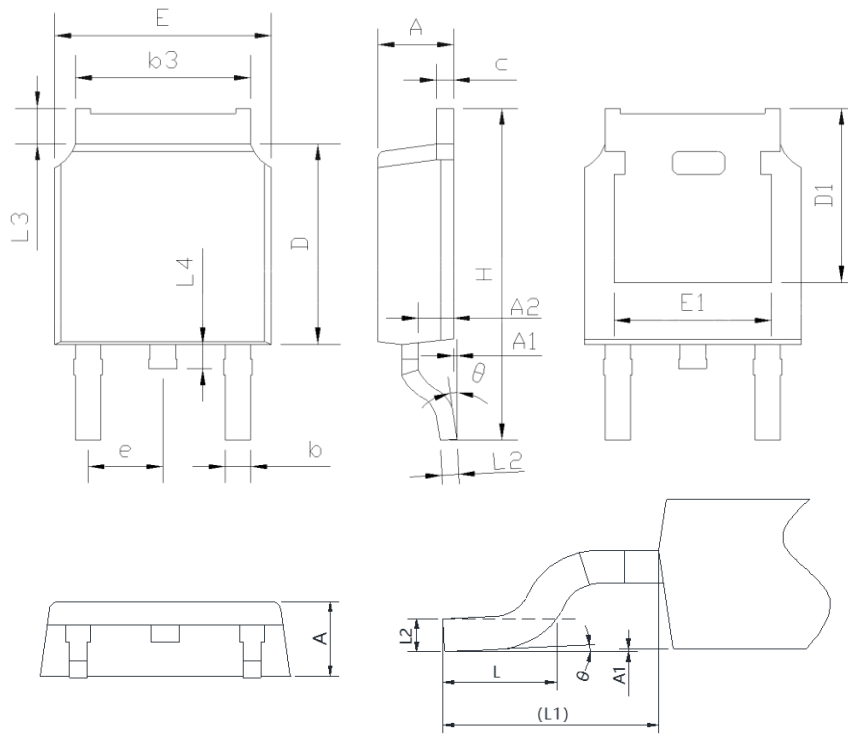


Figure 4. Diode reverse recovery test circuit & waveforms

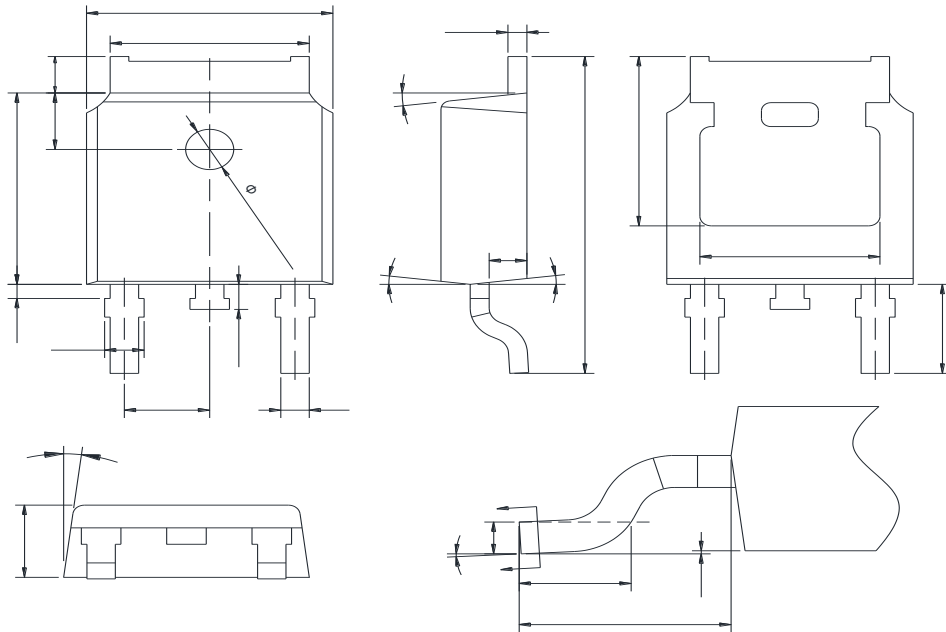
Package Information



| Symbol | mm | | |
|--------|-----------|-------|-------|
| | Min | Nom | Max |
| A | 2.20 | 2.30 | 2.38 |
| A1 | 0.00 | - | 0.20 |
| A2 | 0.97 | 1.07 | 1.17 |
| b | 0.68 | 0.78 | 0.90 |
| b3 | 5.20 | 5.33 | 5.46 |
| c | 0.43 | 0.53 | 0.61 |
| D | 5.98 | 6.10 | 6.22 |
| D1 | 5.30 REF | | |
| E | 6.40 | 6.60 | 6.73 |
| E1 | 4.63 | - | - |
| e | 2.286 BSC | | |
| H | 9.40 | 10.10 | 10.50 |
| L | 1.38 | 1.50 | 1.75 |
| L1 | 2.90 REF | | |
| L2 | 0.51 BSC | | |
| L3 | 0.88 | - | 1.28 |
| L4 | 0.50 | - | 1.00 |
| | 0 | - | |

Version 1: TO252-C package outline dimension

Package Information



| Symbol | mm | | |
|--------|-----------|-------|-------|
| | Min | Nom | Max |
| A | 2.20 | 2.30 | 2.38 |
| A1 | 0.00 | - | 0.10 |
| A2 | 0.90 | 1.01 | 1.10 |
| b | 0.72 | - | 0.85 |
| b1 | 0.71 | 0.76 | 0.81 |
| b2 | 0.72 | - | 0.90 |
| b3 | 5.13 | 5.33 | 5.46 |
| c | 0.47 | - | 0.60 |
| c1 | 0.46 | 0.51 | 0.56 |
| c2 | 0.47 | - | 0.60 |
| D | 6.00 | 6.10 | 6.20 |
| D1 | 5.25 | - | - |
| E | 6.50 | 6.60 | 6.70 |
| E1 | 4.70 | - | - |
| e | 2.186 | 2.286 | 2.386 |
| H | 9.80 | 10.10 | 10.40 |
| L | 1.40 | 1.50 | 1.70 |
| L1 | 2.90 REF | | |
| L2 | 0.508 BSC | | |
| L3 | 0.90 | - | 1.25 |
| L4 | 0.60 | 0.80 | 1.00 |
| L5 | 0.15 | - | 0.75 |
| L6 | 1.80 REF | | |
| | 0 | - | |
| 0 | | | |
| 1 | | | |

Version 2: TO252-J package outline dimension

Ordering Information

| Package Type | Units/ Reel | Reels / Inner Box | Units/ Inner Box | Inner Boxes/ Carton Box | Units/ Carton Box |
|--------------|-------------|-------------------|------------------|-------------------------|-------------------|
| TO252-C | 2500 | 2 | 5000 | 2 | 25000 |
| TO252-J | 2500 | 2 | 5000 | 2 | 25000 |

Product Information

| Product | Package | Pb Free | RoHS | Halogen Free |
|------------|---------|---------|------|--------------|
| SFG12R12DF | TO252 | yes | yes | yes |