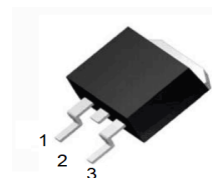


### Description

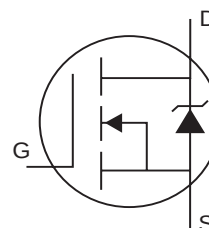
Fifth Generation from International Rectifier utilize advanced processing techniques to achieve the lowest possible on-resistance per silicon area. This benefit, combined with the fast switching speed and ruggedized device design that Power MOSFETs are well known for, provides the designer with an extremely efficient device for use in a wide variety of applications



TO -263

### Features

- $V_{DS} (V) = 55V$
- $I_D = 16A$  ( $V_{GS} = 10V$ )
- $R_{DS(ON)} < 35m\Omega$  ( $V_{GS}=10V$ )
- Logic-Level Gate Drive
- Advanced Process Technology
- 175°C Operating Temperature
- Fast Switching
- Fully Avalanche Rated
- Lead-Free



### Absolute Maximum Ratings

|                           | Parameter                                  | Max.                   | Units |
|---------------------------|--------------------------------------------|------------------------|-------|
| $I_D @ T_C = 25^\circ C$  | Continuous Drain Current, $V_{GS} @ 10V$ Ⓢ | 30                     | A     |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ Ⓢ | 21                     |       |
| $I_{DM}$                  | Pulsed Drain Current ① ②                   | 110                    |       |
| $P_D @ T_A = 25^\circ C$  | Power Dissipation                          | 3.8                    | W     |
| $P_D @ T_C = 25^\circ C$  | Power Dissipation                          | 68                     | W     |
|                           | Linear Derating Factor                     | 0.45                   | W/°C  |
| $V_{GS}$                  | Gate-to-Source Voltage                     | $\pm 16$               | V     |
| $E_{AS}$                  | Single Pulse Avalanche Energy ② ③          | 110                    | mJ    |
| $I_{AR}$                  | Avalanche Current ①                        | 16                     | A     |
| $E_{AR}$                  | Repetitive Avalanche Energy ①              | 6.8                    | mJ    |
| $dv/dt$                   | Peak Diode Recovery $dv/dt$ ③ ④            | 5.0                    | V/ns  |
| $T_J$                     | Operating Junction and                     | -55 to + 175           | °C    |
| $T_{STG}$                 | Storage Temperature Range                  |                        |       |
|                           | Soldering Temperature, for 10 seconds      | 300 (1.6mm from case ) |       |

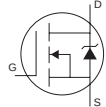
### Thermal Resistance

|                 | Parameter                                          | Typ. | Max. | Units |
|-----------------|----------------------------------------------------|------|------|-------|
| $R_{\theta JC}$ | Junction-to-Case                                   | ---  | 2.2  | °C/W  |
| $R_{\theta JA}$ | Junction-to-Ambient ( PCB Mounted, steady-state)** | ---  | 40   |       |

### Electrical Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

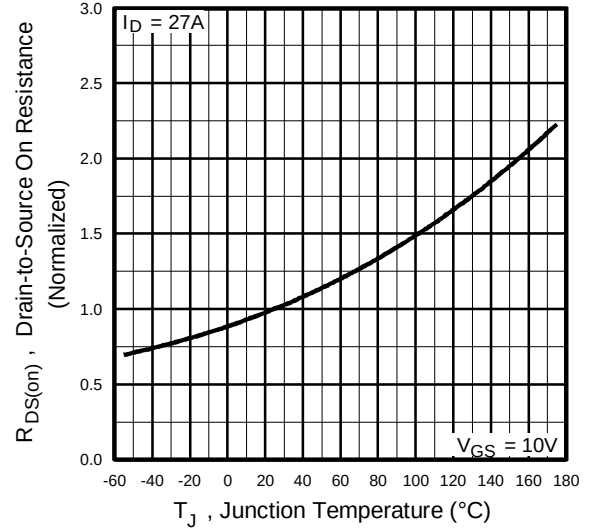
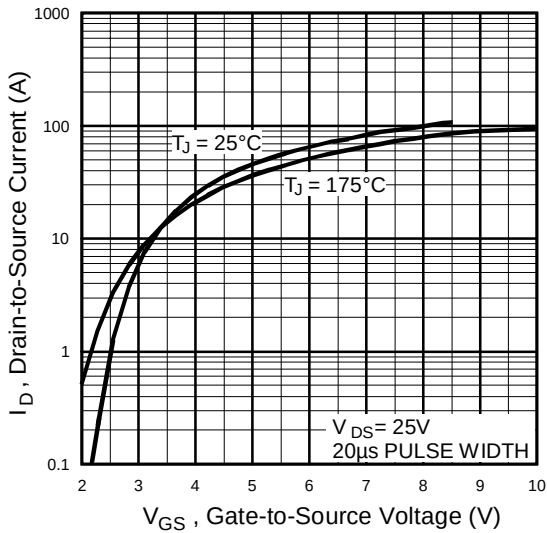
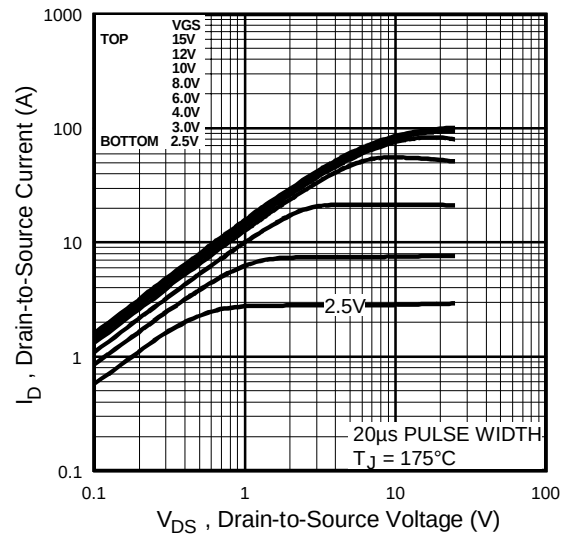
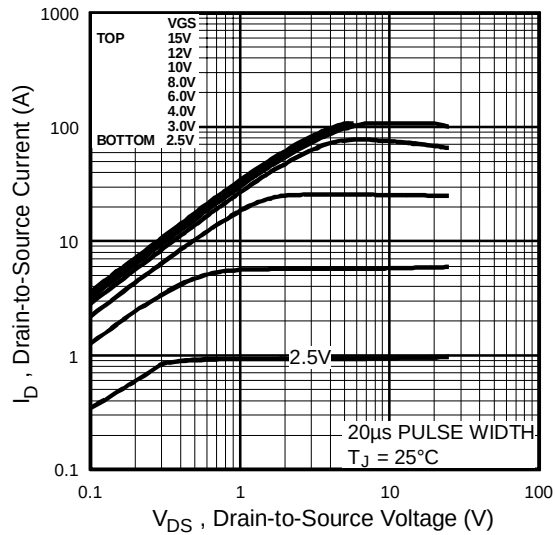
|                                 | Parameter                            | Min. | Typ.  | Max. | Units               | Conditions                                                               |
|---------------------------------|--------------------------------------|------|-------|------|---------------------|--------------------------------------------------------------------------|
| $V_{(BR)DSS}$                   | Drain-to-Source Breakdown Voltage    | 55   | —     | —    | V                   | $V_{GS} = 0\text{V}$ , $I_D = 250\mu\text{A}$                            |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | 0.065 | —    | V/ $^\circ\text{C}$ | Reference to $25^\circ\text{C}$ , $I_D = 1\text{mA}$ ③                   |
| $R_{DS(on)}$                    | Static Drain-to-Source On-Resistance | —    | —     | 35   | $\text{m}\Omega$    | $V_{GS} = 10\text{V}$ , $I_D = 16\text{A}$ ④                             |
|                                 |                                      | —    | —     | 46   |                     | $V_{GS} = 5.0\text{V}$ , $I_D = 16\text{A}$ ④                            |
|                                 |                                      | —    | —     | 60   |                     | $V_{GS} = 4.0\text{V}$ , $I_D = 14\text{A}$ ④                            |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | 1.0  | —     | 2.0  | V                   | $V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$                               |
| $g_{fs}$                        | Forward Transconductance             | 11   | —     | —    | S                   | $V_{DS} = 25\text{V}$ , $I_D = 16\text{A}$ ⑤                             |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —     | 25   | $\mu\text{A}$       | $V_{DS} = 55\text{V}$ , $V_{GS} = 0\text{V}$                             |
|                                 |                                      | —    | —     | 250  |                     | $V_{DS} = 44\text{V}$ , $V_{GS} = 0\text{V}$ , $T_J = 150^\circ\text{C}$ |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —     | 100  | nA                  | $V_{GS} = 16\text{V}$                                                    |
|                                 | Gate-to-Source Reverse Leakage       | —    | —     | -100 |                     | $V_{GS} = -16\text{V}$                                                   |
| $Q_g$                           | Total Gate Charge                    | —    | —     | 25   | nC                  | $I_D = 16\text{A}$                                                       |
| $Q_{gs}$                        | Gate-to-Source Charge                | —    | —     | 5.2  |                     | $V_{DS} = 44\text{V}$                                                    |
| $Q_{gd}$                        | Gate-to-Drain ("Miller") Charge      | —    | —     | 14   |                     | $V_{GS} = 5.0\text{V}$ , See Fig. 6 and 13 ④ ⑤                           |
| $t_{d(on)}$                     | Turn-On Delay Time                   | —    | 8.9   | —    | ns                  | $V_{DD} = 28\text{V}$                                                    |
| $t_r$                           | Rise Time                            | —    | 100   | —    |                     | $I_D = 16\text{A}$                                                       |
| $t_{d(off)}$                    | Turn-Off Delay Time                  | —    | 21    | —    |                     | $R_G = 6.5\Omega$ , $V_{GS} = 5.0\text{V}$                               |
| $t_f$                           | Fall Time                            | —    | 29    | —    |                     | $R_D = 1.8\Omega$ , See Fig. 10 ④ ⑤                                      |
| $L_S$                           | Internal Source Inductance           | —    | 7.5   | —    | nH                  | Between lead, and center of die contact                                  |
| $C_{iss}$                       | Input Capacitance                    | —    | 880   | —    | pF                  | $V_{GS} = 0\text{V}$                                                     |
| $C_{oss}$                       | Output Capacitance                   | —    | 220   | —    |                     | $V_{DS} = 25\text{V}$                                                    |
| $C_{rss}$                       | Reverse Transfer Capacitance         | —    | 94    | —    |                     | $f = 1.0\text{MHz}$ , See Fig. 5⑤                                        |

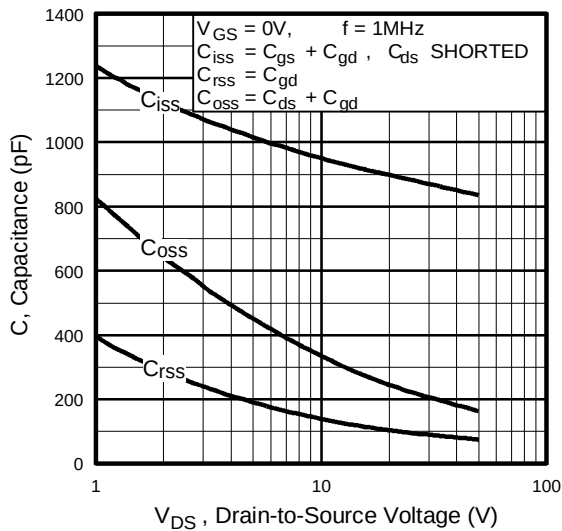
### Source-Drain Ratings and Characteristics

|          | Parameter                              | Min.                                                                        | Typ. | Max. | Units | Conditions                                                                                                                                           |
|----------|----------------------------------------|-----------------------------------------------------------------------------|------|------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| $I_S$    | Continuous Source Current (Body Diode) | —                                                                           | —    | 30   | A     | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ①   | —                                                                           | —    | 110  |       |                                                                                                                                                      |
| $V_{SD}$ | Diode Forward Voltage                  | —                                                                           | —    | 1.3  | V     | $T_J = 25^\circ\text{C}$ , $I_S = 16\text{A}$ , $V_{GS} = 0\text{V}$ ④                                                                               |
| $t_{rr}$ | Reverse Recovery Time                  | —                                                                           | 76   | 110  | ns    | $T_J = 25^\circ\text{C}$ , $I_F = 16\text{A}$                                                                                                        |
| $Q_{rr}$ | Reverse Recovery Charge                | —                                                                           | 190  | 290  | nC    | $di/dt = 100\text{A}/\mu\text{s}$ ④ ⑤                                                                                                                |
| $t_{on}$ | Forward Turn-On Time                   | Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ ) |      |      |       |                                                                                                                                                      |

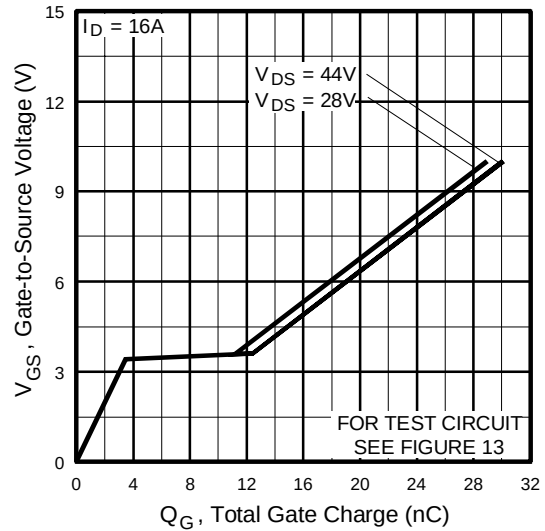
#### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. ( See fig. 11 )
- ②  $V_{DD} = 25\text{V}$ , starting  $T_J = 25^\circ\text{C}$ ,  $L = 610\mu\text{H}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 16\text{A}$ . (See Figure 12)
- ③  $I_{SD} \leq 16\text{A}$ ,  $di/dt \leq 270\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  
 $T_J \leq 175^\circ\text{C}$
- ④ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ⑤ Uses IRLZ34N data and test conditions

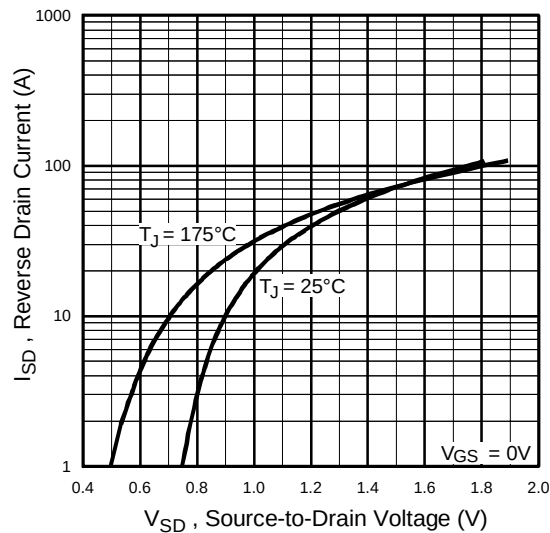




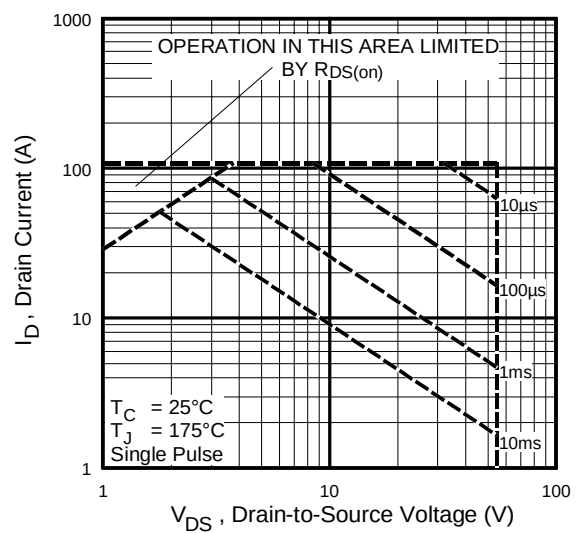
**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage



**Fig 7.** Typical Source-Drain Diode Forward Voltage



**Fig 8.** Maximum Safe Operating Area

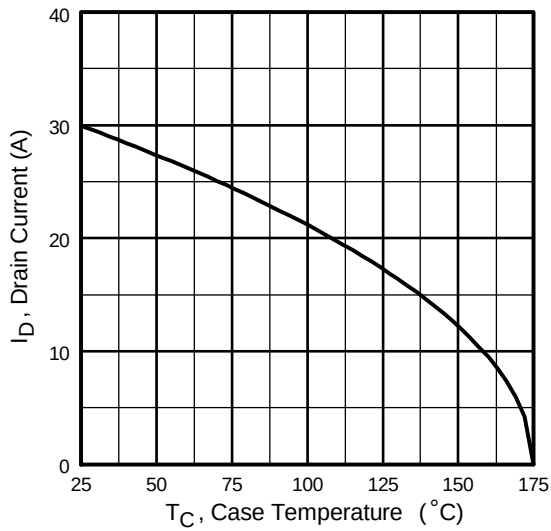


Fig 9. Maximum Drain Current vs. Case Temperature

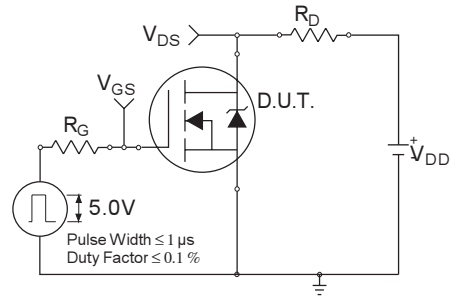


Fig 10a. Switching Time Test Circuit

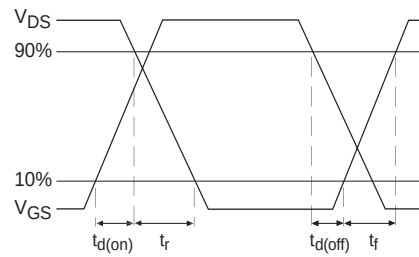


Fig 10b. Switching Time Waveforms

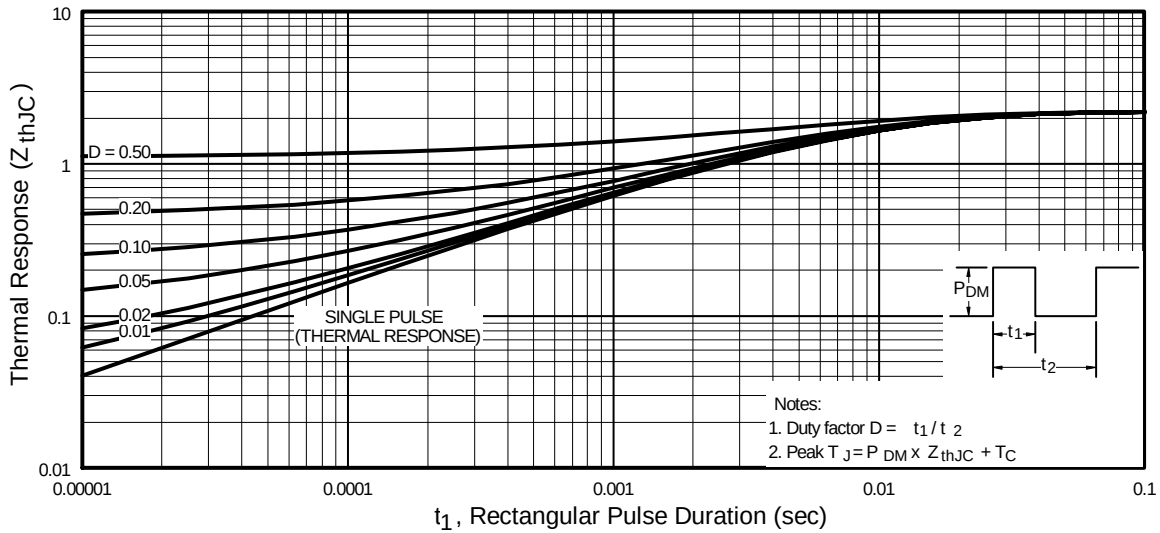


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

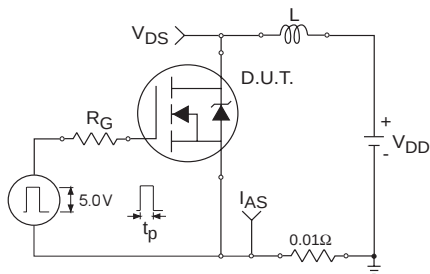


Fig 12a. Unclamped Inductive Test Circuit

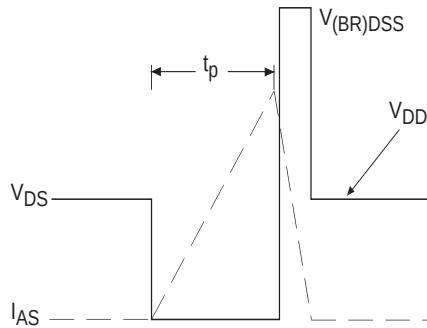


Fig 12b. Unclamped Inductive Waveforms

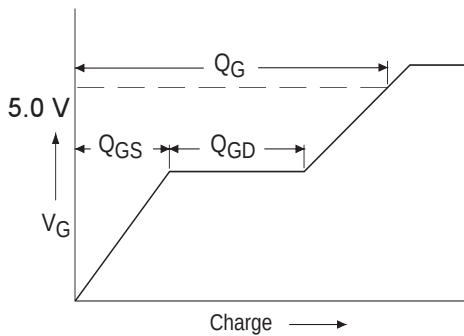


Fig 13a. Basic Gate Charge Waveform

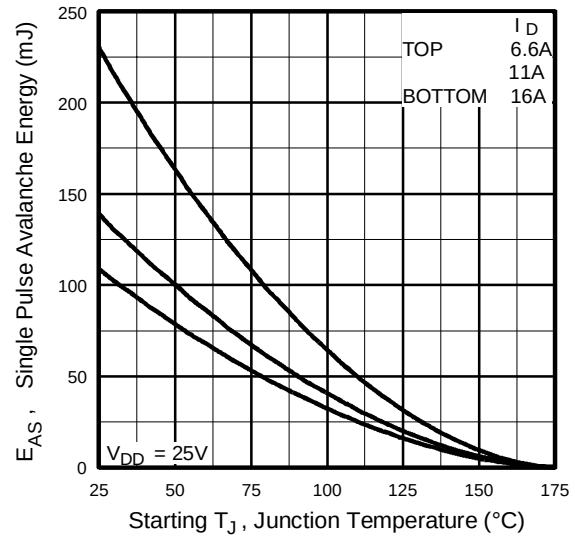


Fig 12c. Maximum Avalanche Energy  
Vs. Drain Current

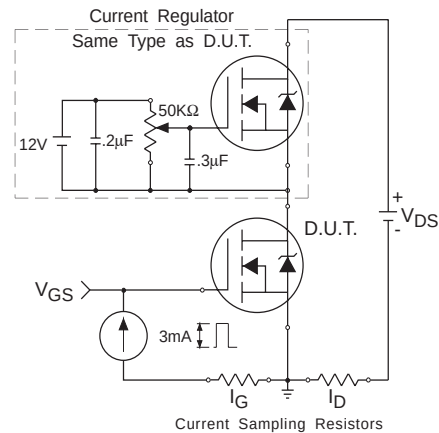
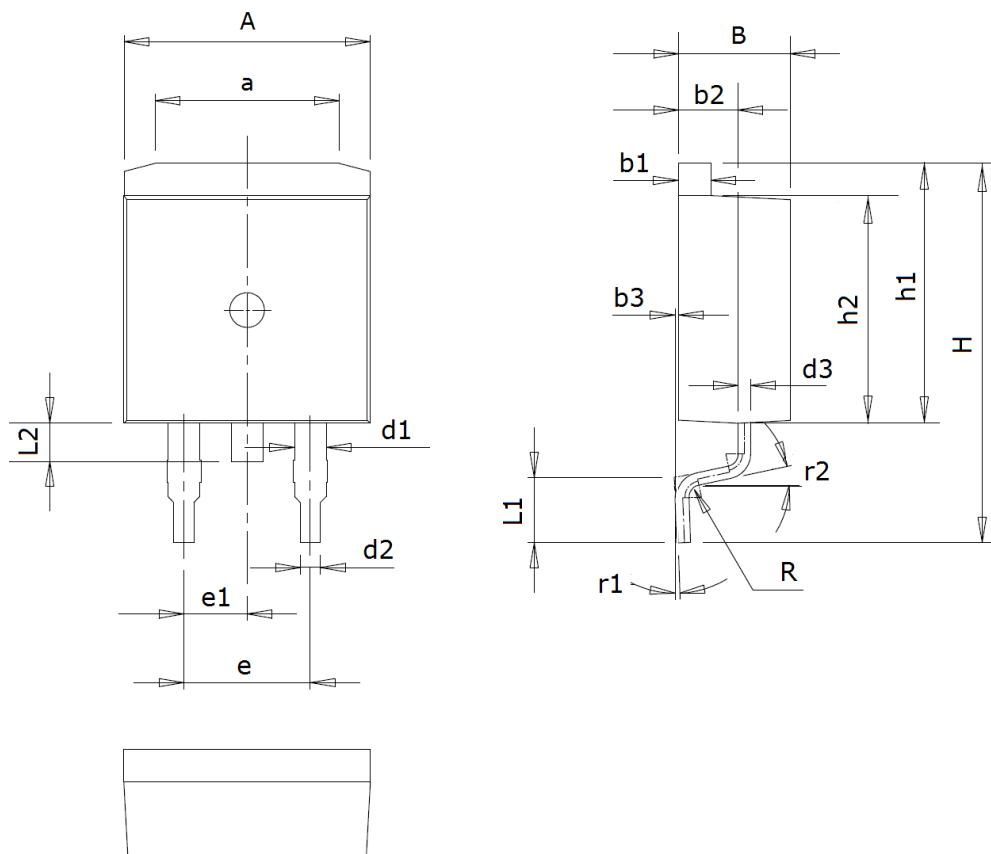


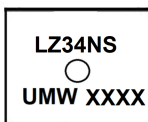
Fig 13b. Gate Charge Test Circuit

Package Mechanical Data TO-263



| Symbol | Dimensions (mm) | Symbol | Dimensions (mm) | Symbol | Dimensions (mm) |
|--------|-----------------|--------|-----------------|--------|-----------------|
| A      | 9.7~10.3        | d2     | 0.7~0.9         | L1     | 2.4~2.9         |
| a      | 7.0~7.8         | d3     | 0.4~0.6         | L2     | 1.3~1.8         |
| B      | 4.3~4.7         | e      | 5.08 (typ)      | R      | 0.5(typ)        |
| b1     | 1.25~1.35       | e1     | 2.54 (typ)      | r1     | 0~8°            |
| b2     | 2.2~2.6         | H      | 14.8~15.6       | r2     | 12° (typ)       |
| b3     | 0~0.2           | h1     | 10.2~10.7       |        |                 |
| d1     | 1.2~1.4         | h2     | 8.9~9.4         |        |                 |

## Marking



## Ordering information

| Order code      | Package | Baseqty | Deliverymode  |
|-----------------|---------|---------|---------------|
| UMW IRLZ34NSTRL | TO-263  | 800     | Tape and reel |