

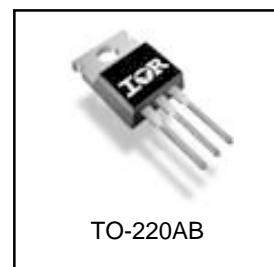
## Applications

- High frequency DC-DC converters

| $V_{DSS}$ | $R_{DS(on) \text{ max}}$ | $I_D$ |
|-----------|--------------------------|-------|
| 200V      | 0.040 $\Omega$           | 56A   |

## Benefits

- Low Gate-to-Drain Charge to Reduce Switching Losses
- Fully Characterized Capacitance Including Effective  $C_{OSS}$  to Simplify Design, (See App. Note AN1001)
- Fully Characterized Avalanche Voltage and Current



## Absolute Maximum Ratings

|                                   | Parameter                                | Max.                   | Units               |
|-----------------------------------|--|------------------------|---------------------|
| $I_D$ @ $T_C = 25^\circ\text{C}$  | Continuous Drain Current, $V_{GS}$ @ 10V | 56                     | A                   |
| $I_D$ @ $T_C = 100^\circ\text{C}$ | Continuous Drain Current, $V_{GS}$ @ 10V | 40                     |                     |
| $I_{DM}$                          | Pulsed Drain Current ①                   | 220                    |                     |
| $P_D$ @ $T_C = 25^\circ\text{C}$  | Power Dissipation                        | 380                    | W                   |
|                                   | Linear Derating Factor                   | 2.5                    | W/ $^\circ\text{C}$ |
| $V_{GS}$                          | Gate-to-Source Voltage                   | $\pm 20$               | V                   |
| $dv/dt$                           | Peak Diode Recovery $dv/dt$ ③            | 10                     | V/ns                |
| $T_J$                             | Operating Junction and                   | -55 to + 175           | $^\circ\text{C}$    |
| $T_{STG}$                         | Storage Temperature Range                |                        |                     |
|                                   | Soldering Temperature, for 10 seconds    | 300 (1.6mm from case ) |                     |
|                                   | Mounting torque, 6-32 or M3 screw        | 10 lbf•in (1.1N•m)     |                     |

## Thermal Resistance

|                 | Parameter                           | Typ. | Max. | Units              |
|-----------------|-------------------------------------|------|------|--------------------|
| $R_{\theta JC}$ | Junction-to-Case                    | —    | 0.40 | $^\circ\text{C/W}$ |
| $R_{\theta CS}$ | Case-to-Sink, Flat, Greased Surface | 0.50 | —    |                    |
| $R_{\theta JA}$ | Junction-to-Ambient                 | —    | 62   |                    |

Notes ① through ⑤ are on page 8

[www.irf.com](http://www.irf.com)

# IRFB260N

International  
**IR** Rectifier

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

|                                 | Parameter                            | Min. | Typ. | Max.  | Units    | Conditions  |
|---------------------------------|--------------------------------------|------|------|-------|----------|---|
| $V_{(BR)DSS}$                   | Drain-to-Source Breakdown Voltage    | 200  | —    | —     | V        | $V_{GS} = 0V, I_D = 250\mu A$                         |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient  | —    | 0.26 | —     | V/°C     | Reference to $25^\circ\text{C}$ , $I_D = 1mA$         |
| $R_{DS(on)}$                    | Static Drain-to-Source On-Resistance | —    | —    | 0.040 | $\Omega$ | $V_{GS} = 10V, I_D = 34A$ ④                           |
| $V_{GS(th)}$                    | Gate Threshold Voltage               | 2.0  | —    | 4.0   | V        | $V_{DS} = V_{GS}, I_D = 250\mu A$                     |
| $I_{DSS}$                       | Drain-to-Source Leakage Current      | —    | —    | 25    | $\mu A$  | $V_{DS} = 200V, V_{GS} = 0V$                          |
|                                 |                                      | —    | —    | 250   |          | $V_{DS} = 160V, V_{GS} = 0V, T_J = 150^\circ\text{C}$ |
| $I_{GSS}$                       | Gate-to-Source Forward Leakage       | —    | —    | 100   | nA       | $V_{GS} = 20V$  |
|                                 | Gate-to-Source Reverse Leakage       | —    | —    | -100  |          | $V_{GS} = -20V$                                       |

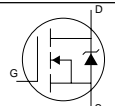
## Dynamic @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

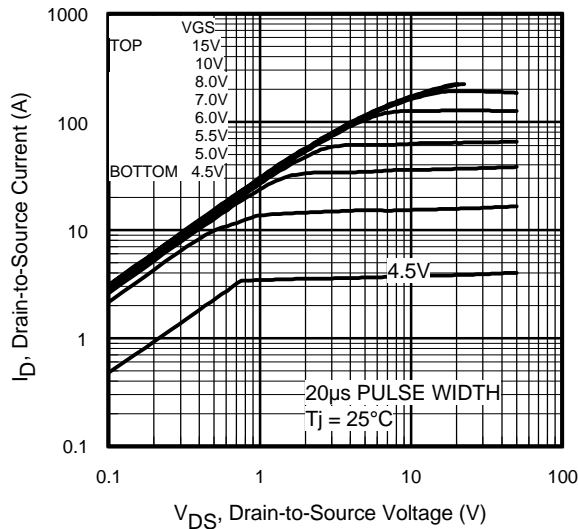
|                        | Parameter                       | Min. | Typ. | Max. | Units | Conditions                                    |
|------------------------|---------------------------------|------|------|------|-------|---|
| $g_{fs}$               | Forward Transconductance        | 29   | —    | —    | S     | $V_{DS} = 50V, I_D = 34A$                     |
| $Q_g$                  | Total Gate Charge               | —    | 150  | 220  | nC    | $I_D = 34A$                                   |
| $Q_{gs}$               | Gate-to-Source Charge           | —    | 24   | 37   |       | $V_{DS} = 160V$                               |
| $Q_{gd}$               | Gate-to-Drain ("Miller") Charge | —    | 67   | 100  |       | $V_{GS} = 10V$ ④                              |
| $t_{d(on)}$            | Turn-On Delay Time              | —    | 17   | —    | ns    | $V_{DD} = 100V$                               |
| $t_r$                  | Rise Time                       | —    | 64   | —    |       | $I_D = 34A$                                   |
| $t_{d(off)}$           | Turn-Off Delay Time             | —    | 52   | —    |       | $R_G = 1.8\Omega$                             |
| $t_f$                  | Fall Time                       | —    | 50   | —    |       | $V_{GS} = 10V$ ④                              |
| $C_{iss}$              | Input Capacitance               | —    | 4220 | —    | pF    | $V_{GS} = 0V$                                 |
| $C_{oss}$              | Output Capacitance              | —    | 580  | —    |       | $V_{DS} = 25V$                                |
| $C_{rss}$              | Reverse Transfer Capacitance    | —    | 140  | —    |       | $f = 1.0MHz$                                  |
| $C_{oss}$              | Output Capacitance              | —    | 5080 | —    |       | $V_{GS} = 0V, V_{DS} = 1.0V, f = 1.0MHz$      |
| $C_{oss}$              | Output Capacitance              | —    | 230  | —    |       | $V_{GS} = 0V, V_{DS} = 160V, f = 1.0MHz$      |
| $C_{oss \text{ eff.}}$ | Effective Output Capacitance    | —    | 500  | —    |       | $V_{GS} = 0V, V_{DS} = 0V \text{ to } 160V$ ⑤ |

## Avalanche Characteristics

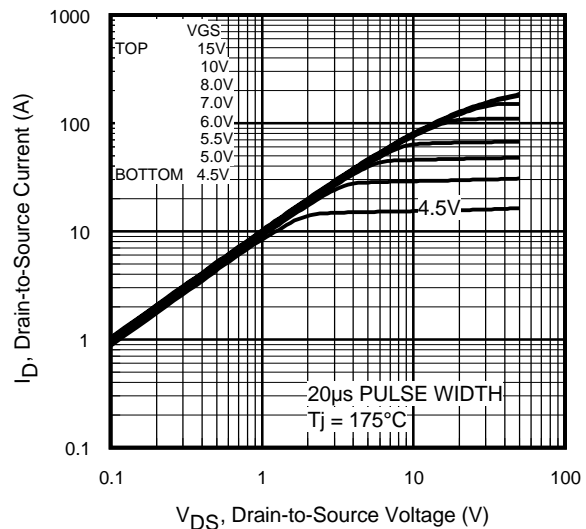
|          | Parameter                      | Typ. | Max. | Units |
|----------|--------------------------------|------|------|-------|
| $E_{AS}$ | Single Pulse Avalanche Energy② | —    | 450  | mJ    |
| $I_{AR}$ | Avalanche Current①             | —    | 34   | A     |
| $E_{AR}$ | Repetitive Avalanche Energy①   | —    | 38   | mJ    |

## Diode Characteristics

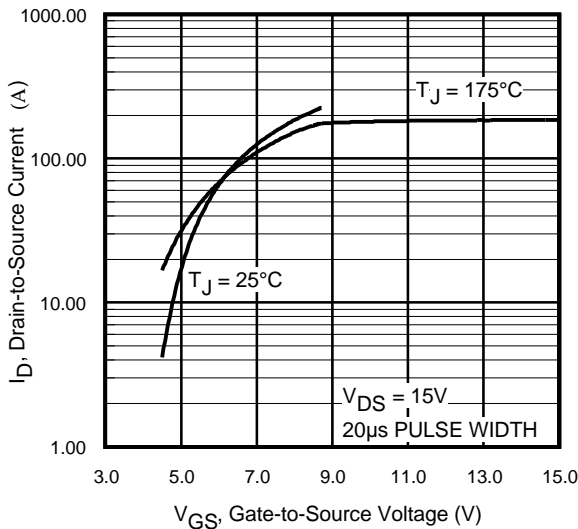
|          | Parameter                              | Min.  | Typ. | Max. | Units   | Conditions   |
|----------|--|---|------|------|---------|--|
| $I_S$    | Continuous Source Current (Body Diode) | —   | —    | 56   | A       | MOSFET symbol showing the integral reverse p-n junction diode.  |
| $I_{SM}$ | Pulsed Source Current (Body Diode) ①   | —   | —    | 220  |         |  |
| $V_{SD}$ | Diode Forward Voltage                  | —   | —    | 1.3  | V       | $T_J = 25^\circ\text{C}, I_S = 34A, V_{GS} = 0V$ ④   |
| $t_{rr}$ | Reverse Recovery Time                  | —   | 240  | 360  | ns      | $T_J = 25^\circ\text{C}, I_F = 34A$  |
| $Q_{rr}$ | Reverse Recovery Charge                | —   | 2.1  | 3.2  | $\mu C$ | $di/dt = 100A/\mu s$ ④   |
| $t_{on}$ | Forward Turn-On Time                   | Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ ) |      |      |         |  |



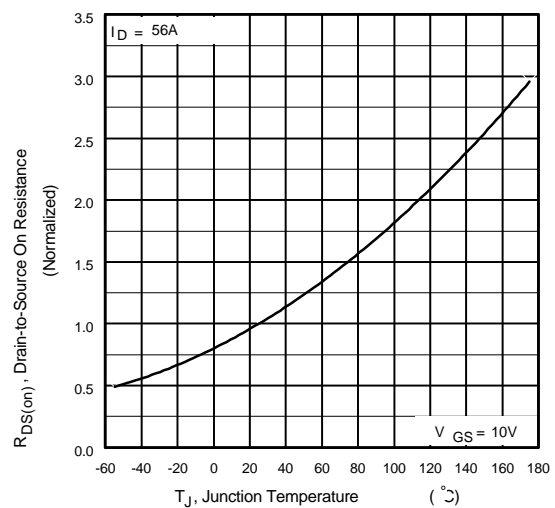
**Fig 1.** Typical Output Characteristics



**Fig 2.** Typical Output Characteristics



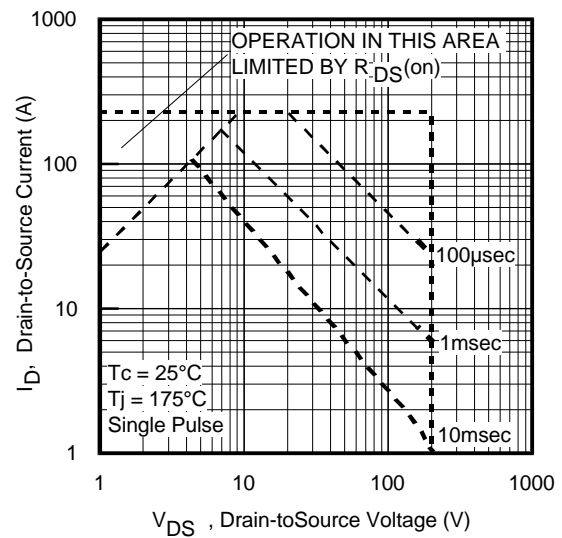
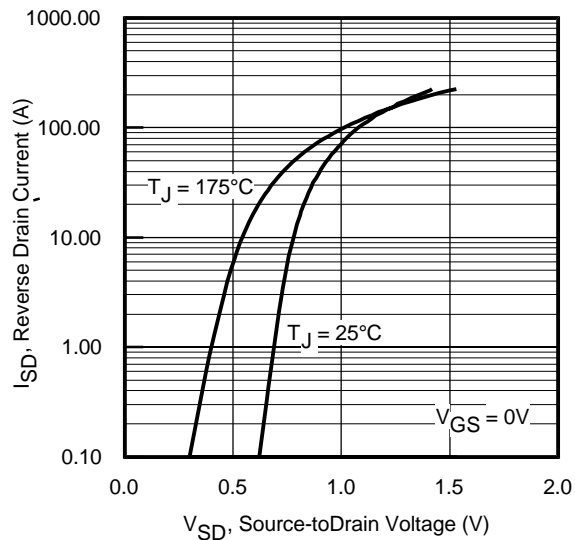
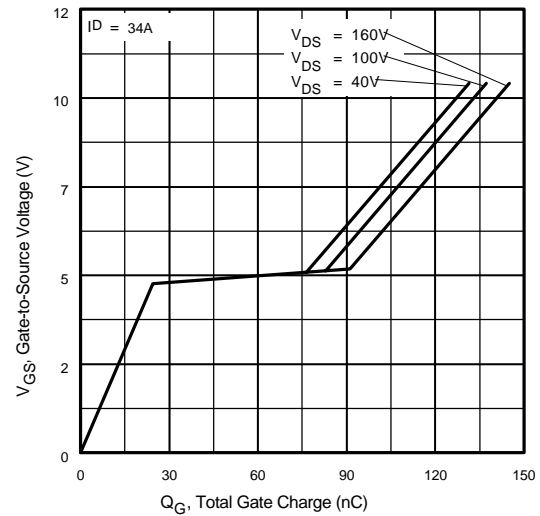
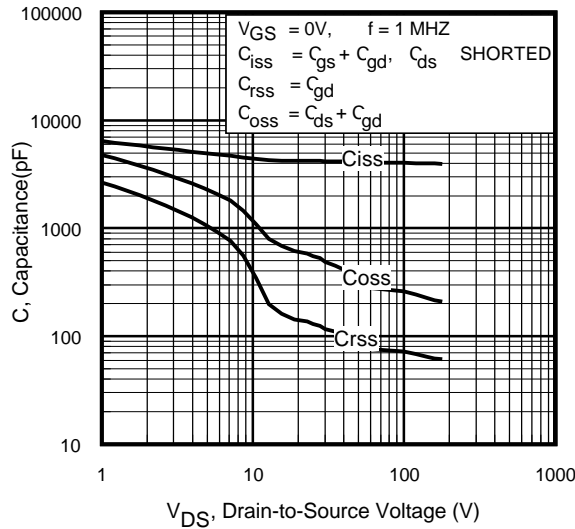
**Fig 3.** Typical Transfer Characteristics

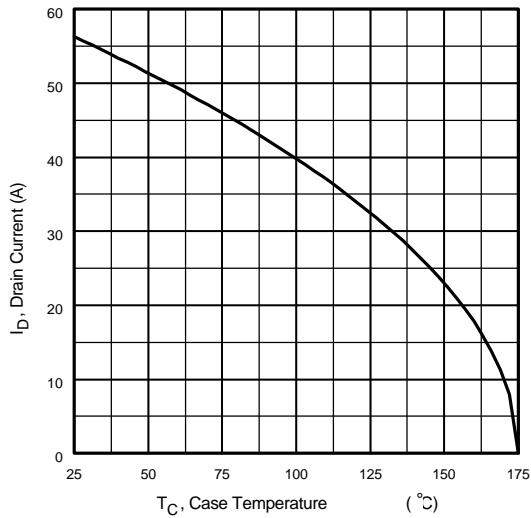


**Fig 4.** Normalized On-Resistance Vs. Temperature

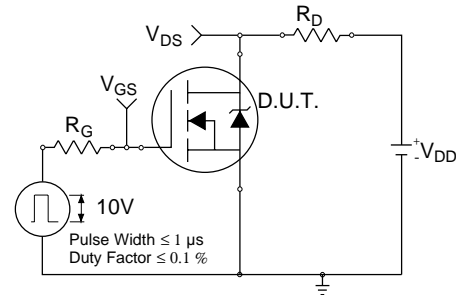
# IRFB260N

International  
**IR** Rectifier

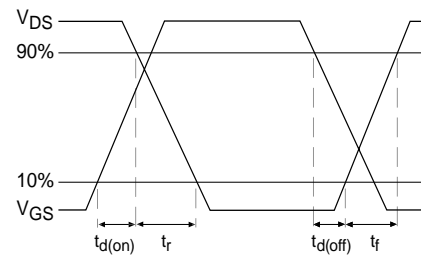




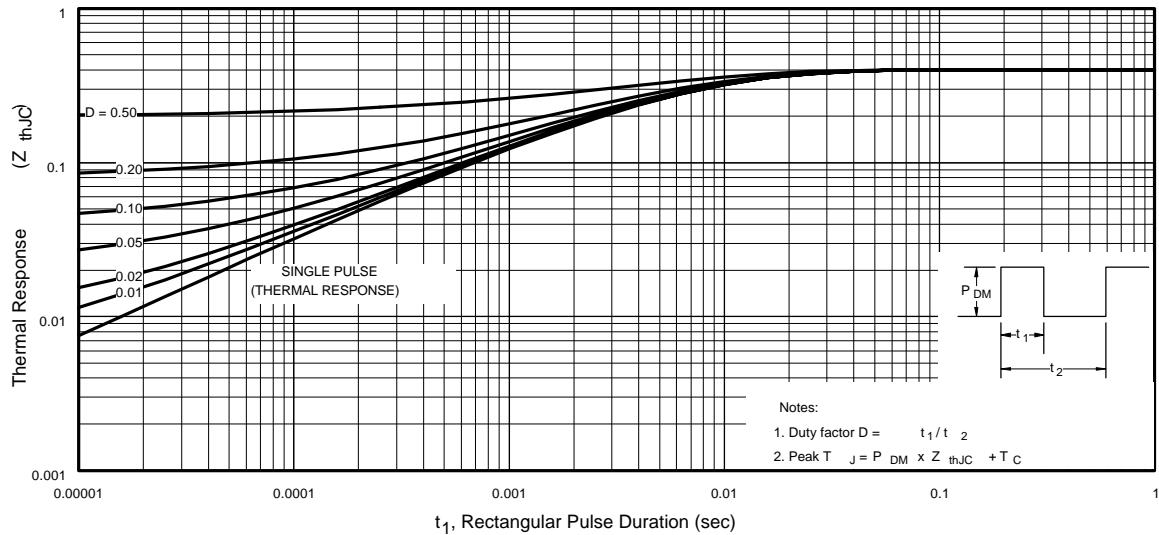
**Fig 9.** Maximum Drain Current Vs. Case Temperature



**Fig 10a.** Switching Time Test Circuit



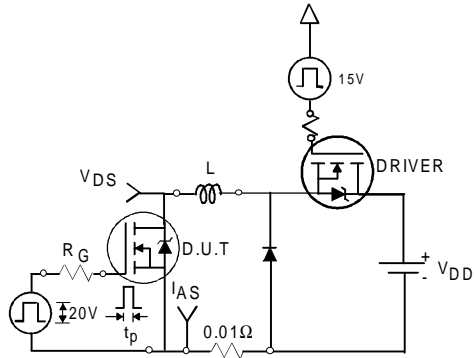
**Fig 10b.** Switching Time Waveforms



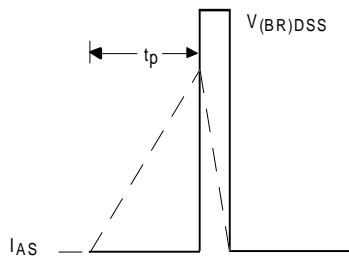
**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Case

# IRFB260N

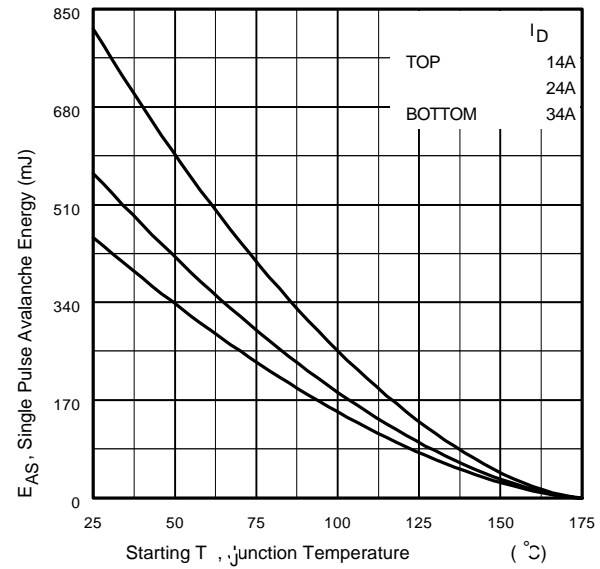
International  
**IR** Rectifier



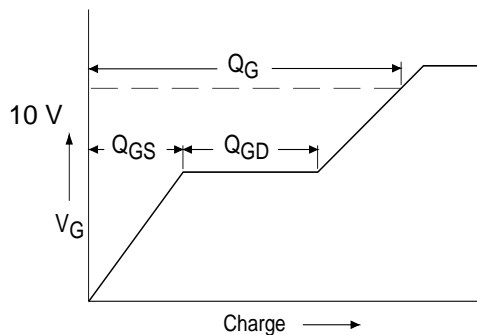
**Fig 12a.** Unclamped Inductive Test Circuit



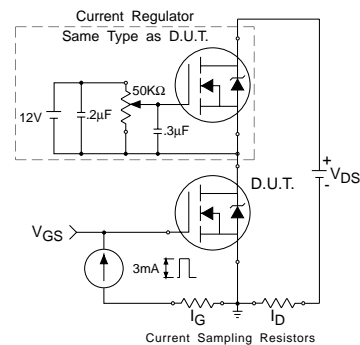
**Fig 12b.** Unclamped Inductive Waveforms



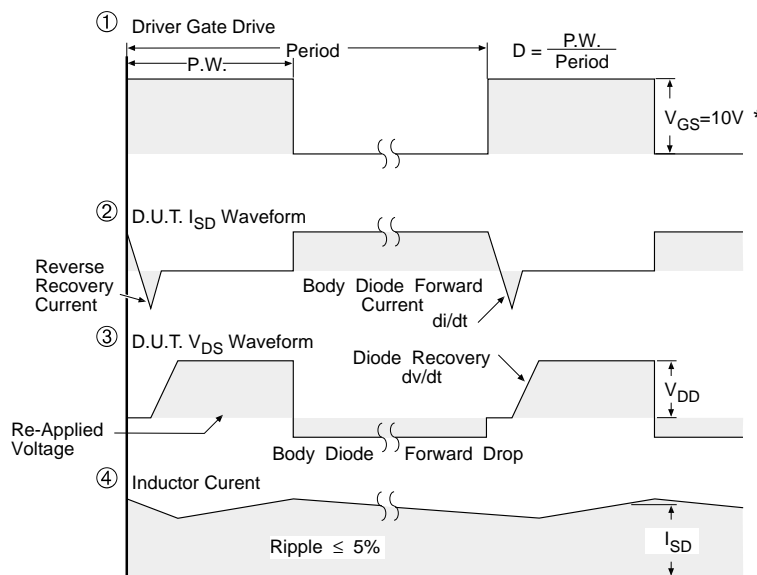
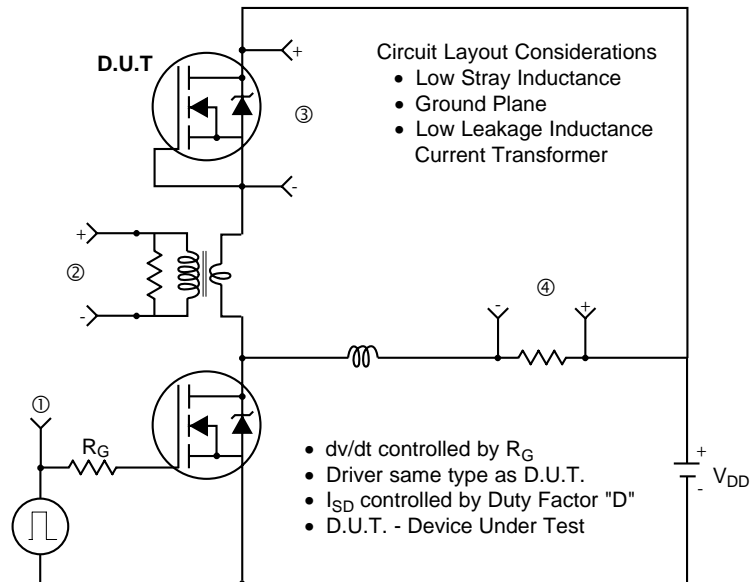
**Fig 12c.** Maximum Avalanche Energy Vs. Drain Current



**Fig 13a.** Basic Gate Charge Waveform



**Fig 13b.** Gate Charge Test Circuit

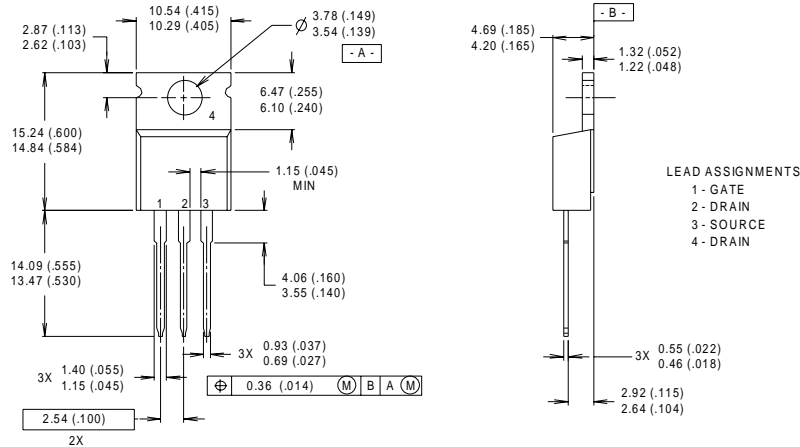


# IRFB260N

International  
**IR** Rectifier

## TO-220AB Package Outline

Dimensions are shown in millimeters (inches)



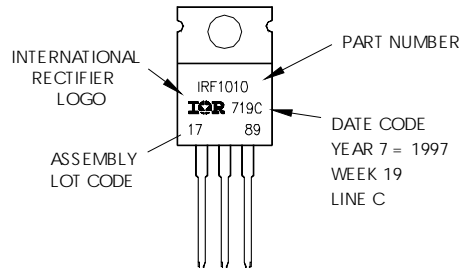
### NOTES:

- 1 DIMENSIONING & TOLERANCING PER ANSI Y14.5M, 1982.
- 2 CONTROLLING DIMENSION : INCH

- 3 OUTLINE CONFORMS TO JEDEC OUTLINE TO-220AB.
- 4 HEATSINK & LEAD MEASUREMENTS DO NOT INCLUDE BURRS.

## TO-220AB Part Marking Information

EXAMPLE: THIS IS AN IRF1010  
LOT CODE 1789  
ASSEMBLED ON WW 19, 1997  
IN THE ASSEMBLY LINE "C"



### Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Starting  $T_J = 25^\circ\text{C}$ ,  $L = 0.78\text{mH}$   
 $R_G = 25\Omega$ ,  $I_{AS} = 34\text{A}$ .
- ③  $I_{SD} \leq 34$ ,  $di/dt \leq 480\text{A}/\mu\text{s}$ ,  $V_{DD} \leq V_{(BR)DSS}$ ,  
 $T_J \leq 175^\circ\text{C}$
- ④ Pulse width  $\leq 300\mu\text{s}$ ; duty cycle  $\leq 2\%$ .
- ⑤  $C_{OSS}$  eff. is a fixed capacitance that gives the same charging time as  $C_{OSS}$  while  $V_{DS}$  is rising from 0 to 80%  $V_{DSS}$

Data and specifications subject to change without notice.  
This product has been designed and qualified for the Industrial market.  
Qualification Standards can be found on IR's Web site.

International  
**IR** Rectifier

**IR WORLD HEADQUARTERS:** 233 Kansas St., El Segundo, California 90245, USA Tel: (310) 252-7105  
TAC Fax: (310) 252-7903

Visit us at [www.irf.com](http://www.irf.com) for sales contact information.08/01

[www.irf.com](http://www.irf.com)