

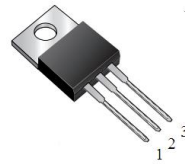
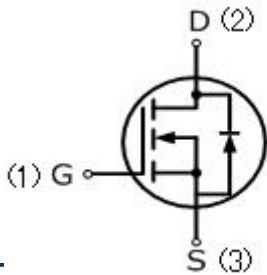


MIC-IRFZ44

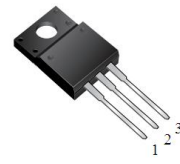
50 Amps, 60 Volts N-CHANNEL MOSFET

FEATURE

- 50A, 60V, $R_{DS(ON)MAX}=17.5m\ \Omega$ @VGS=10V/25A
 $R_{DS(ON)MAX}=18.5m\ \Omega$ @VGS=5V/25A
 $R_{DS(ON)MAX}=20m\ \Omega$ @VGS=4.5V/25A
- Low gate charge
- Low C_{iss}
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



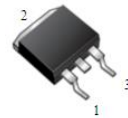
TO-220AB



ITO-220AB



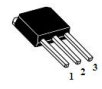
TO-262



TO-263



TO-252



TO-251

Absolute Maximum Ratings ($T_C=25^\circ C$, unless otherwise noted)

| Parameter | Symbol | MIC-IRFZ44 | UNIT |
|--|------------------|------------|------------|
| Drain-Source Voltage | V_{DSS} | 60 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | |
| Continuous Drain Current | I_D | 50 | A |
| Pulsed Drain Current (Note 1) | I_{DM} | 200 | |
| Single Pulse Avalanche Energy (Note 2) | E_{AS} | 150 | mJ |
| Avalanche Current (Note 1) | I_{AR} | 50 | A |
| Repetitive Avalanche Energy (Note 1) | E_{AR} | 12 | mJ |
| Reverse Diode dv/dt (Note 3) | dv/dt | 7.0 | V/ns |
| Operating Junction and Storage Temperature Range | T_J, T_{STG} | -55to+150 | $^\circ C$ |
| Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds | T_L | 260 | $^\circ C$ |
| Mounting Torque | 6-32 or M3 screw | 10 | lbf • in |
| | | 1.1 | N • m |

Thermal Characteristics

| Parameter | Symbol | ITO-220 | TO-220 | TO-262/263 | TO-251/252 | Units |
|-------------------------------------|----------------|---------|--------|------------|------------|--------------|
| Thermal resistance, Channel to Case | $R_{th(ch-c)}$ | 3.0 | 2.0 | 2.0 | 2.7 | $^\circ C/W$ |
| Maximum Power Dissipation | P_D | 65 | 150 | 150 | 100 | W |



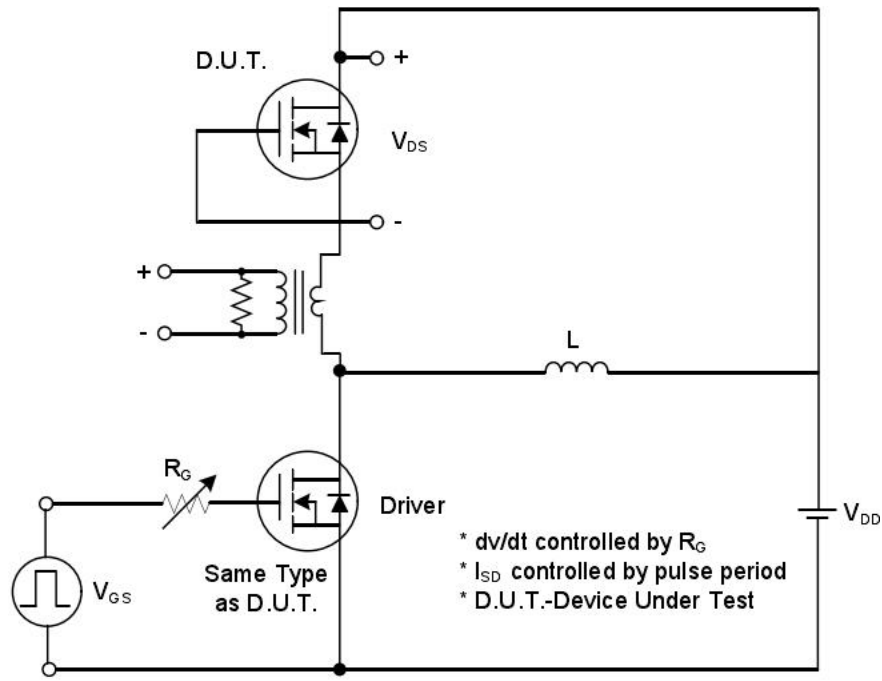
| Electrical Characteristics (T _c =25°C, unless otherwise noted) | | | | | | |
|---|--|---|-----|------|------|-------|
| Parameter | Symbol | Test Conditions | Mix | Typ | Max | Units |
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} =0V, I _D =250uA | 60 | — | — | V |
| Breakdown Temperature Coefficient | ΔBV _{DSS} /ΔT _J | Reference to 25°C, I _D =250uA | — | 0.6 | — | V/°C |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | — | — | 1 | uA |
| Gate-Body Leakage Current, Forward | I _{GSSF} | V _{GS} =20V, V _{DS} =0V | — | — | 100 | nA |
| Gate-Body Leakage Current, Reverse | I _{GSSR} | V _{GS} =-20V, V _{DS} =0V | — | — | -100 | nA |
| On Characteristics | | | | | | |
| Gate-Source Threshold Voltage | V _{GS(th)} | V _{DS} =10V, I _D =250uA | 1.0 | — | 3.0 | V |
| Drain-Source On-State Resistance | R _{DS(on)} | V _{GS} =10V, I _D =25A | — | — | 17.5 | mΩ |
| | R _{DS(on)} | V _{GS} =5.0V, I _D =25A | — | — | 18 | mΩ |
| | R _{DS(on)} | V _{GS} =4.5V, I _D =25A | — | — | 20 | mΩ |
| Dynamic Characteristics | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =25V, V _{GS} =0V, f=1.0MHZ | — | 1250 | — | pF |
| Output Capacitance | C _{oss} | | — | 445 | — | pF |
| Reverse Transfer Capacitance | C _{rss} | | — | 90 | — | pF |
| Switching Characteristics | | | | | | |
| Turn-On Delay Time | t _{d(on)} | V _{DD} =30V, I _D =50A, R _G =25Ω (Note4,5) | — | 20 | — | ns |
| Turn-On Rise Time | t _r | | — | 380 | — | ns |
| Turn-Off Delay Time | t _{d(off)} | | — | 80 | — | ns |
| Turn-Off Fall Time | t _f | | — | 145 | — | ns |
| Total Gate Charge | Q _g | V _{DS} =48V, I _D =50A, V _{GS} =5V, (Note4,5) | — | 24.5 | — | nC |
| Gate-Source Charge | Q _{gs} | | — | 6 | — | nC |
| Gate-Drain Charge | Q _{gd} | | — | 14.5 | — | nC |
| Drain-Source Body Diode Characteristics and Maximum Ratings | | | | | | |
| Continuous Diode Forward Current | I _S | | — | — | 50 | A |
| Pulsed Diode Forward Current | I _{SM} | | — | — | 200 | A |
| Diode Forward Voltage | V _{SD} | I _S =50A, V _{GS} =0V | — | — | 1.5 | V |
| Reverse Recovery Time | t _{rr} | V _{GS} =0V, I _S =50A, dI _F /dt=100A/us, (Note4) | — | 65 | — | ns |
| Reverse Recovery Charge | Q _{rr} | | — | 125 | — | uC |

Notes

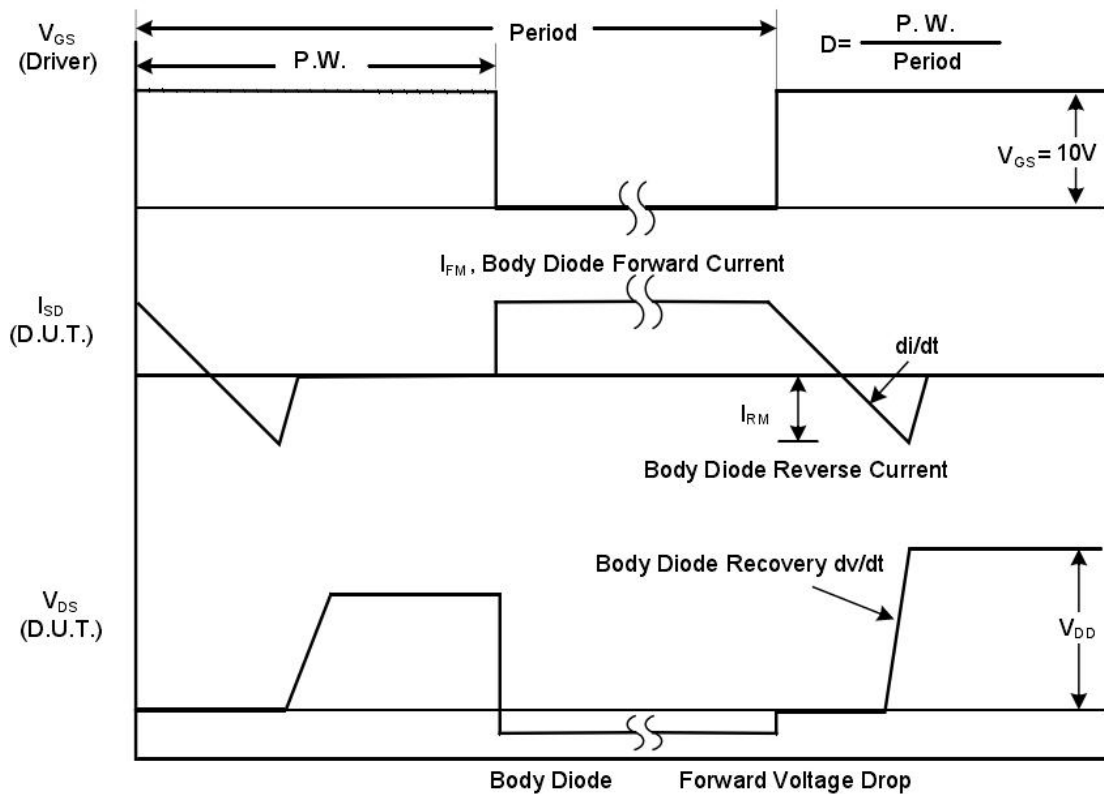
1. Repetitive Rating: pulse width limited by maximum junction temperature.
2. V_{DD}=10V, L=0.1mH, R_G=25Ω, I_{AS}=50A, T_J=25°C.
3. I_{SD} ≤ I_D, dI/dt = _A/us, V_{DD} ≤ BV_{DSS}, starting T_J=25°C.
4. Pulse width ≤ 300us; duty cycle ≤ 2%.
5. Repetitive rating; pulse width limited by maximum junction temperature.



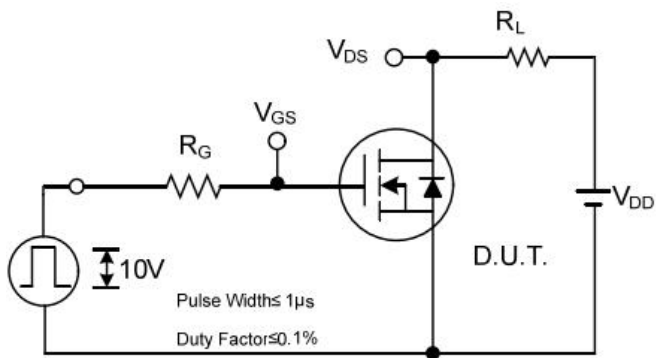
TEST CIRCUIT AND WAVEFORM



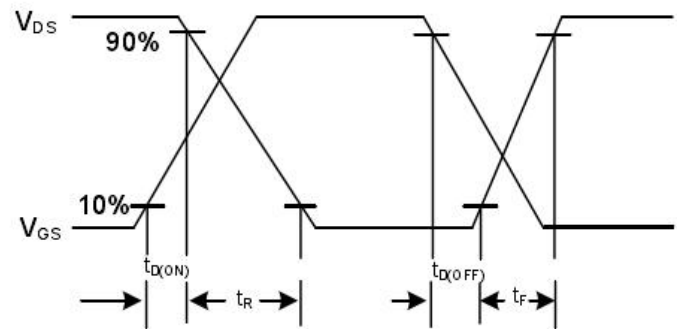
Peak Diode Recovery dv/dt Test Circuit



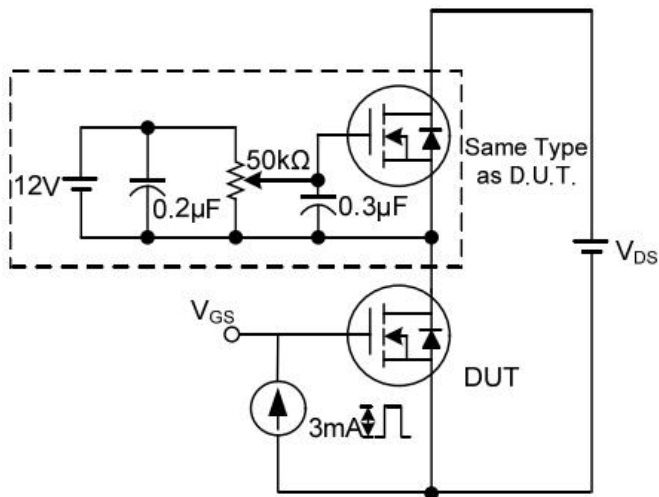
Peak Diode Recovery dv/dt Waveforms



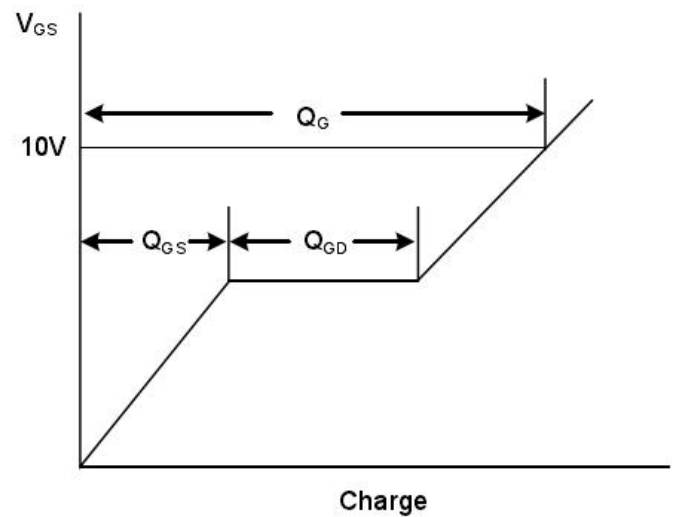
Switching Test Circuit



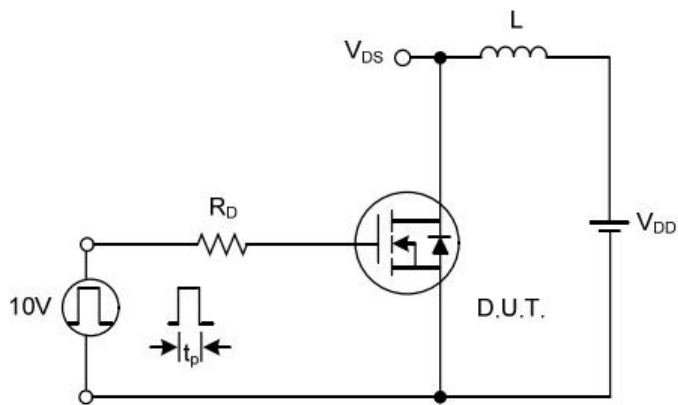
Switching Waveforms



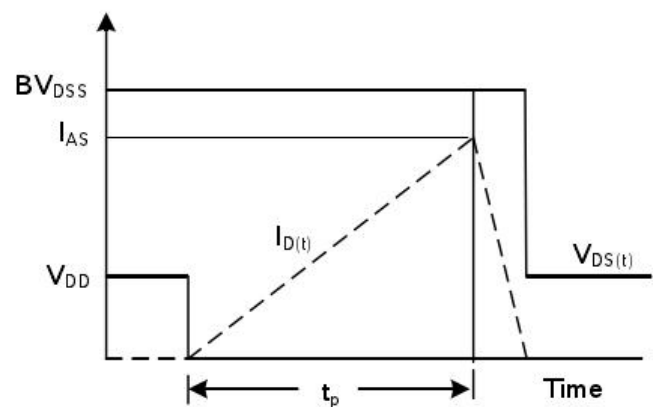
Gate Charge Test Circuit



Gate Charge Waveform



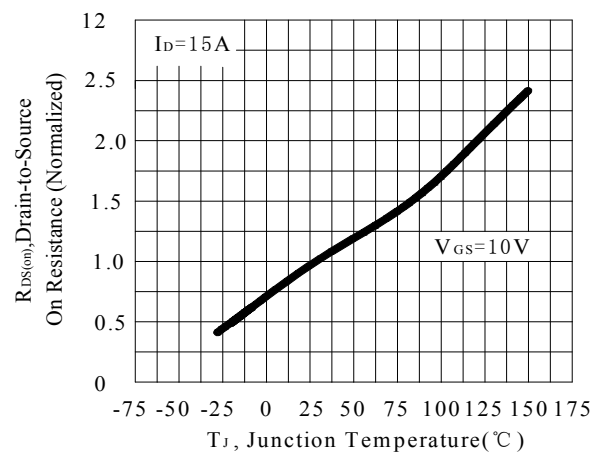
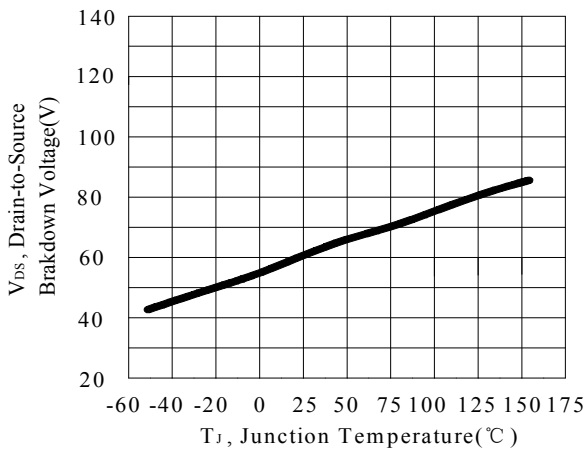
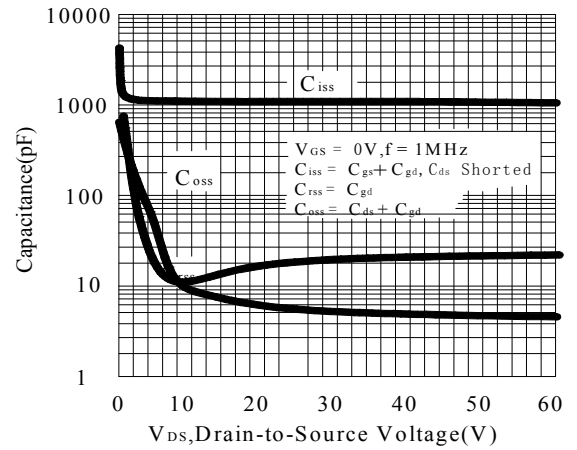
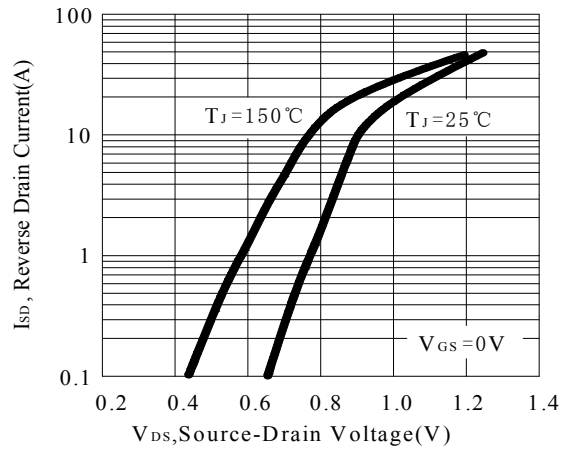
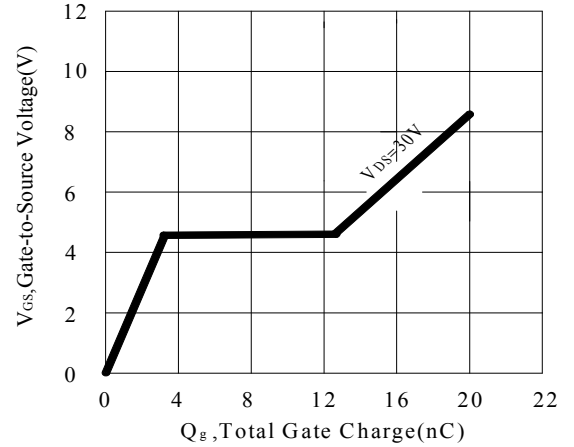
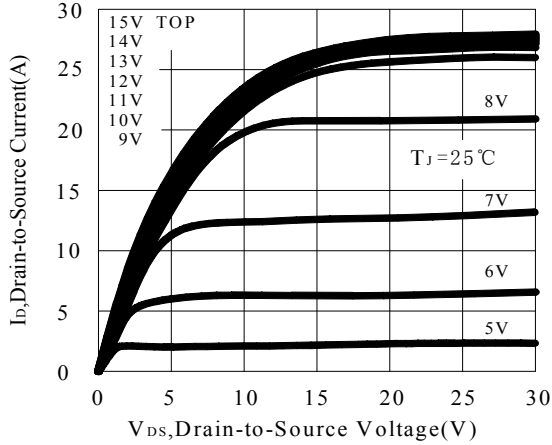
Unclamped Inductive Switching Test Circuit

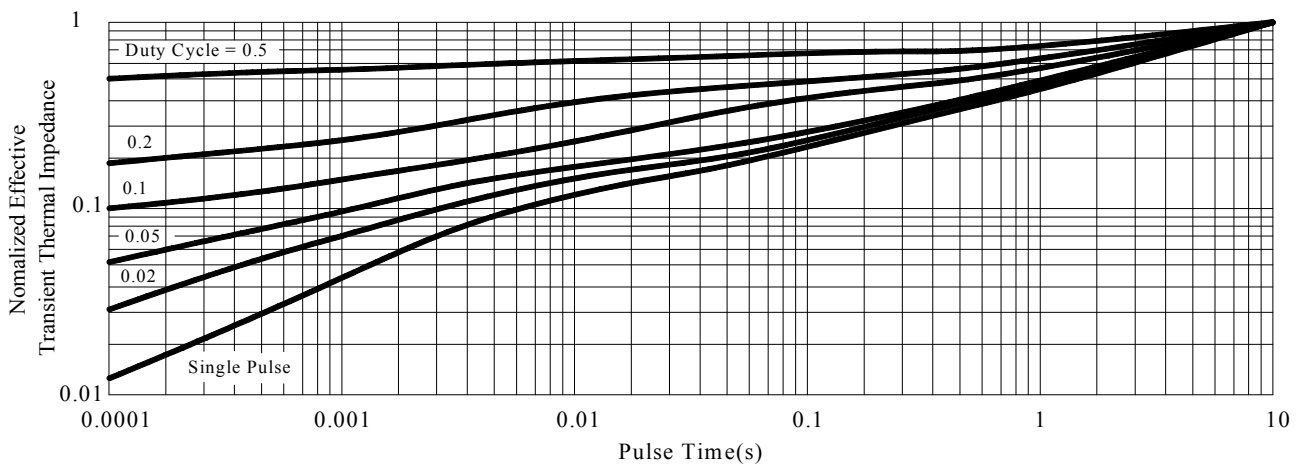
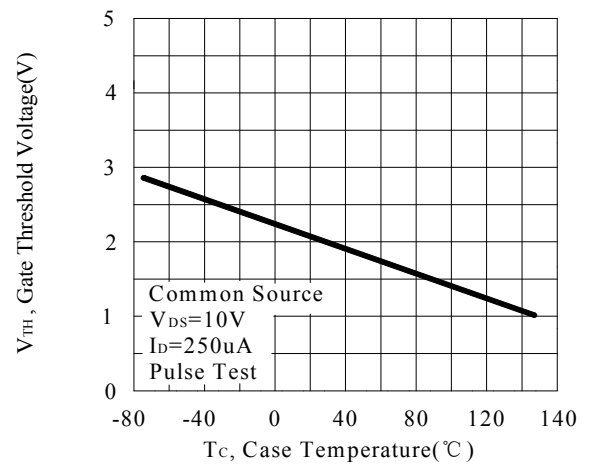
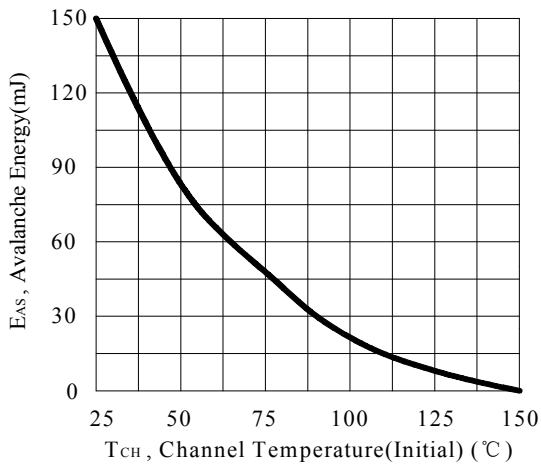
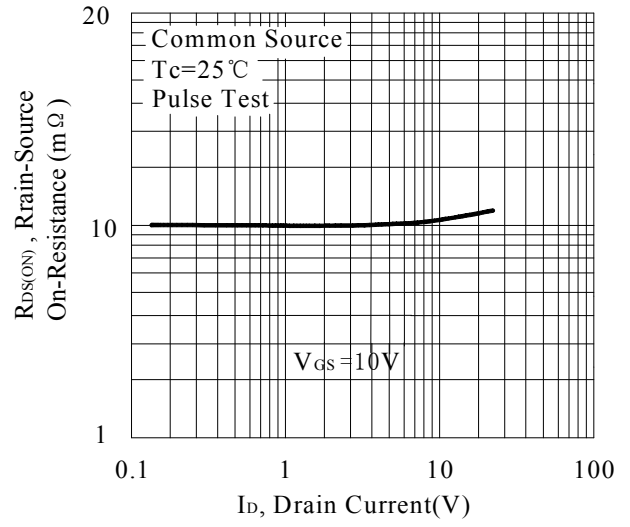
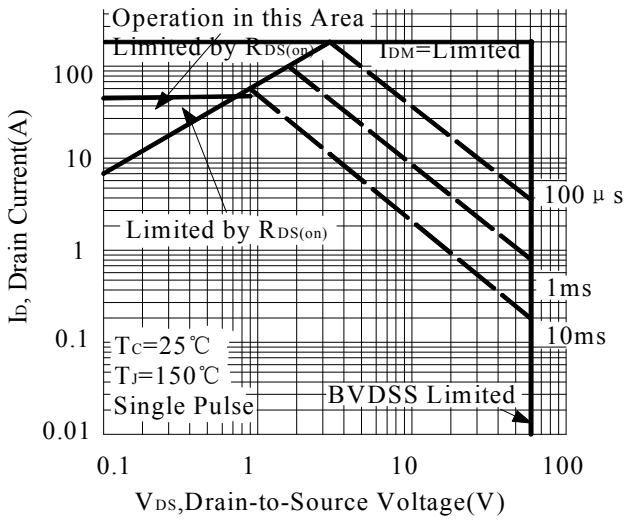


Unclamped Inductive Switching Waveforms



RATING AND CHARACTERISTIC CURVES

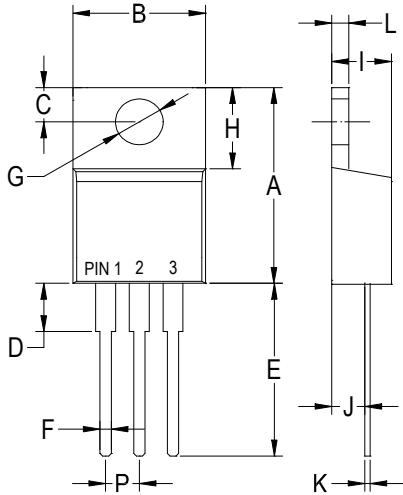






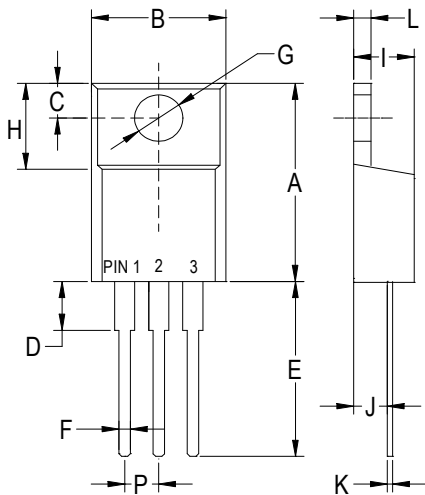
PACKAGE OUTLINE DIMENSIONS

TO-220AB



| TO-220AB | | |
|----------|--------------|--------------|
| Dim | Min | Max |
| A | .573 (14.55) | .603 (15.32) |
| B | — | .412 (10.5) |
| C | .103 (2.62) | .113 (2.87) |
| D | .140 (3.56) | .160 (4.06) |
| E | .510 (13.0) | .560 (14.3) |
| F | .027 (0.68) | .037 (0.94) |
| G | .148 (3.74) | .154 (3.91) |
| H | .230 (5.84) | .270 (6.86) |
| I | .175 (4.44) | .185 (4.86) |
| J | .100 (2.54) | .110 (2.79) |
| K | .014 (0.35) | .025 (0.64) |
| L | .045 (1.14) | .055 (1.40) |
| P | .095 (2.41) | .105 (2.67) |

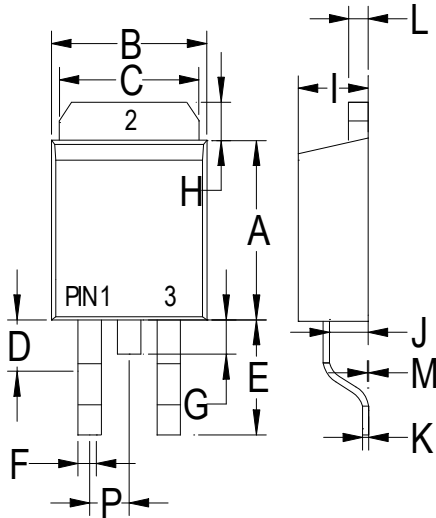
ITO-220AB



| ITO-220AB | | |
|-----------|-------------|-------------|
| Dim | Min | Max |
| A | .571 (14.5) | .610 (15.5) |
| B | .383 (9.72) | .406 (10.3) |
| C | .110 (2.80) | .126 (3.20) |
| D | .133 (3.38) | .162 (4.10) |
| E | .512 (13.0) | .551 (14.0) |
| F | .028 (0.70) | .035 (0.90) |
| G | .114 (2.90) | .138 (3.50) |
| H | .268 (6.80) | .291 (7.40) |
| I | .162 (4.10) | .185 (4.70) |
| J | .102 (2.60) | .110 (2.80) |
| K | .018 (0.45) | .026 (0.65) |
| L | .097 (2.46) | .113 (2.86) |
| P | .890 (2.25) | .113 (2.85) |



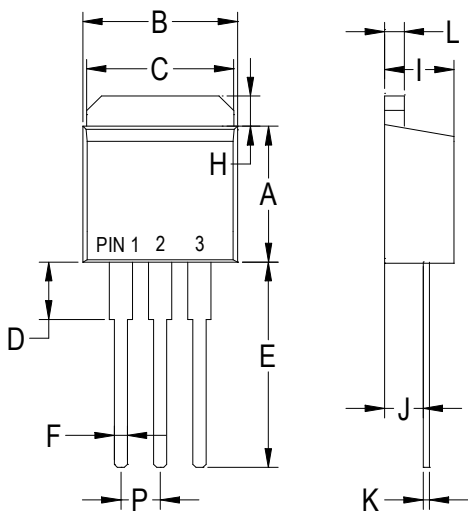
TO-263



| TO-263 | | |
|--------|-------------|-------------|
| Dim | Min | Max |
| A | .323 (8.20) | .348 (8.85) |
| B | .394 (10.0) | .413 (10.5) |
| C | .394 (10.0) | .402 (10.2) |
| D | .077 (1.95) | .100 (2.55) |
| E | .204 (5.17) | .227 (5.77) |
| F | .027 (0.68) | .037 (0.94) |
| G | -- | .067 (1.70) |
| H | .046 (1.17) | .053 (1.34) |
| I | .175 (4.44) | .191 (4.86) |
| J | .100 (2.54) | .110 (2.79) |
| K | .014 (0.35) | .025 (0.64) |
| L | .047 (1.20) | .055 (1.40) |
| M | .000 (0.00) | .010 (0.25) |
| P | .095 (2.41) | .105 (2.67) |

Dimensions in inches and (millimeters)

TO-262

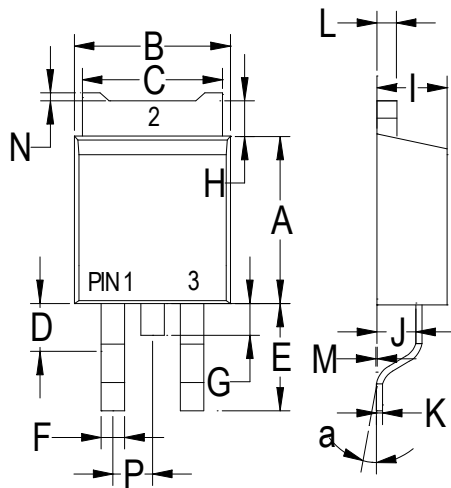


| TO-262 | | |
|--------|-------------|-------------|
| Dim | Min | Max |
| A | .323 (8.20) | .348 (8.85) |
| B | .394 (10.0) | .413 (10.5) |
| C | .394 (10.0) | .402 (10.2) |
| D | .140 (3.56) | .160 (4.06) |
| E | .510 (13.0) | .560 (14.3) |
| F | .027 (0.68) | .037 (0.94) |
| H | .046 (1.17) | .053 (1.34) |
| I | .175 (4.44) | .185 (4.86) |
| J | .100 (2.54) | .110 (2.79) |
| K | .014 (0.35) | .025 (0.64) |
| L | .045 (1.14) | .055 (1.40) |
| P | .095 (2.41) | .105 (2.67) |

Dimensions in inches and (millimeters)



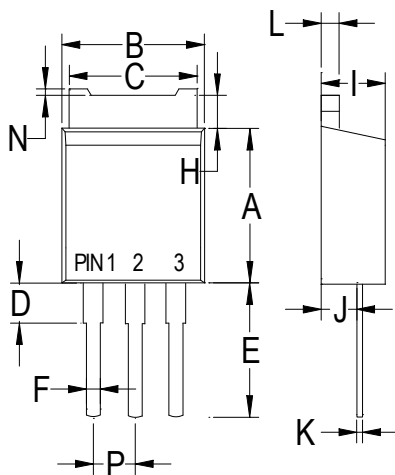
TO-252



| TO-252 | | |
|--------|-------------|-------------|
| Dim | Min | Max |
| A | .230 (5.85) | .246 (6.25) |
| B | .250 (6.35) | .264 (6.75) |
| C | .207 (5.27) | .218 (5.54) |
| D | .037 (0.93) | .045 (1.14) |
| E | .106 (2.70) | .138 (3.50) |
| F | .028 (0.72) | .033 (0.84) |
| G | .024 (0.60) | .041 (1.05) |
| H | .028 (0.72) | .043 (1.10) |
| I | .085 (2.15) | .096 (2.45) |
| J | .037 (0.95) | .047 (1.20) |
| K | .018 (0.45) | .026 (0.65) |
| L | .018 (0.45) | .024 (0.60) |
| P | .081 (2.05) | .094 (2.40) |
| M | .000 (0.00) | .006 (0.15) |
| N | -- | .008 (0.20) |
| a | 0° | 10° |

Dimensions in inches and (millimeters)

TO-251



| TO-251 | | |
|--------|-------------|-------------|
| Dim | Min | Max |
| A | .230 (5.85) | .246 (6.25) |
| B | .250 (6.35) | .266 (6.75) |
| C | .207 (5.27) | .218 (5.54) |
| D | .037 (0.93) | .045 (1.14) |
| E | .173 (4.40) | .205 (5.20) |
| F | .028 (0.72) | .033 (0.84) |
| H | .028 (0.70) | .043 (1.10) |
| I | .085 (2.15) | .096 (2.45) |
| J | .037 (0.95) | .047 (1.20) |
| K | .018 (0.45) | .026 (0.65) |
| L | .018 (0.45) | .024 (0.60) |
| N | -- | .008 (0.20) |
| P | .081 (2.05) | .094 (2.40) |

Dimensions in inches and (millimeters)