

*Product Preview*

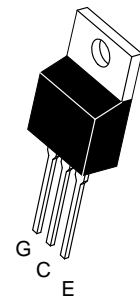
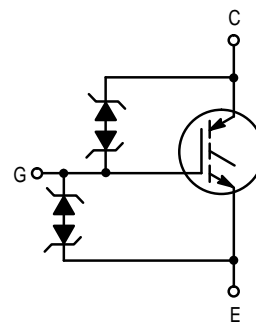
**Internally Clamped N-Channel IGBT**

This Logic Level Insulated Gate Bipolar Transistor (IGBT) features Gate–Emitter ESD protection, Gate Collector Over–Voltage Protection from monolithic circuitry for usage as an Ignition Coil Driver.

- Temperature Compensated Gate – Collector Clamp Limits Stress Applied to Load
- Integrated ESD Diode Protection
- Low Threshold Voltage to Interface Power Loads to Logic or Microprocessor Devices
- Low Saturation Voltage
- High Pulsed Current Capability

**MGP15N43CL**

**15 AMPERES  
N-CHANNEL IGBT  
V<sub>CE(on)</sub> = 1.8 V  
430 VOLTS  
CLAMPED**



**CASE 221A-09  
STYLE 9  
TO-220AB**

**MAXIMUM RATINGS** (T<sub>J</sub> = 25°C unless otherwise noted)

| Rating                                       | Symbol                            | Value       | Unit          |
|--|-----------------------------------|-------------|---------------|
| Collector–Emitter Voltage                    | V <sub>CES</sub>                  | CLAMPED     | Vdc           |
| Collector–Gate Voltage                       | V <sub>CER</sub>                  | CLAMPED     | Vdc           |
| Gate–Emitter Voltage                         | V <sub>GE</sub>                   | CLAMPED     | Vdc           |
| Collector Current — Continuous               | I <sub>C</sub>                    | 15          | Adc           |
| Total Power Dissipation<br>Derate above 25°C | P <sub>D</sub>                    | 136<br>0.91 | Watts<br>W/°C |
| Operating and Storage Temperature Range      | T <sub>J</sub> , T <sub>stg</sub> | –55 to 175  | °C            |

**UNCLAMPED COLLECTOR–TO–EMITTER AVALANCHE CHARACTERISTICS (T<sub>J</sub> < 150°C)**

| Single Pulse Collector–to–Emitter Avalanche Energy<br>V <sub>CC</sub> = 50 V, V <sub>GE</sub> = 5.0 V, PEAK I <sub>L</sub> = 14.2 A, L = 3.0 mH, Starting T <sub>J</sub> = 25°C<br>V <sub>CC</sub> = 50 V, V <sub>GE</sub> = 5.0 V, PEAK I <sub>L</sub> = 10 A, L = 3.0 mH, Starting T <sub>J</sub> = 150°C | E <sub>AS</sub> | 300<br>150 | mJ |
|---|-----------------|------------|----|
|---|-----------------|------------|----|

**THERMAL CHARACTERISTICS**

|   |                                      |             |      |
|---|--------------------------------------|-------------|------|
| Thermal Resistance — Junction–to–Case<br>— Junction–to–Ambient                | R <sub>θJC</sub><br>R <sub>θJA</sub> | 1.1<br>62.5 | °C/W |
| Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds | T <sub>L</sub>                       | 260         | °C   |

This document contains information on a new product. Specifications and information herein are subject to change without notice.



## MGP15N43CL

### ELECTRICAL CHARACTERISTICS (T<sub>J</sub> = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

#### OFF CHARACTERISTICS

|   |                      |        |        |           |                  |
|---|----------------------|--------|--------|-----------|------------------|
| Collector–Emitter Clamp Voltage<br>(I <sub>C</sub> = 1.0 mA, T <sub>J</sub> = –40°C to 175°C)   | V <sub>(BR)CES</sub> | —      | 430    | —         | Vdc              |
| Zero Gate Voltage Collector Current<br>(V <sub>CE</sub> = 360 V, V <sub>GE</sub> = 0 V)<br>(V <sub>CE</sub> = 360 V, V <sub>GE</sub> = 0 V, T <sub>J</sub> = 150°C) | I <sub>CES</sub>     | —<br>— | —<br>— | 10<br>150 | μA <sub>dc</sub> |
| Gate–Emitter Clamp Voltage<br>(I <sub>G</sub> = 5.0 mA)   | V <sub>(BR)GES</sub> | 17     | —      | 22        | Vdc              |
| Gate–Emitter Leakage Current<br>(V <sub>GE</sub> = 10 V)  | I <sub>GES</sub>     | —      | —      | 10        | μA <sub>dc</sub> |

#### ON CHARACTERISTICS (1)

|  |                     |          |            |            |              |
|--|---------------------|----------|------------|------------|--------------|
| Gate Threshold Voltage<br>(V <sub>GE</sub> = V <sub>CE</sub> , I <sub>C</sub> = 1.0 mA)<br>Threshold Temperature Coefficient (Negative)                          | V <sub>GE(th)</sub> | 1.3<br>— | 1.8<br>4.4 | 2.1<br>—   | Vdc<br>mV/°C |
| Collector–to–Emitter On–Voltage<br>(V <sub>GE</sub> = 3.5 V, I <sub>C</sub> = 6.0 A)<br>(V <sub>GE</sub> = 4.0 V, I <sub>C</sub> = 10 A, T <sub>J</sub> = 150°C) | V <sub>CE(on)</sub> | —<br>—   | —<br>—     | 2.0<br>1.8 | Volts        |
| Forward Transconductance<br>(V <sub>CE</sub> = 5.0 V, I <sub>C</sub> = 10 A)   | g <sub>fe</sub>     | 8.0      | 20         | —          | Mhos         |

#### DYNAMIC CHARACTERISTICS

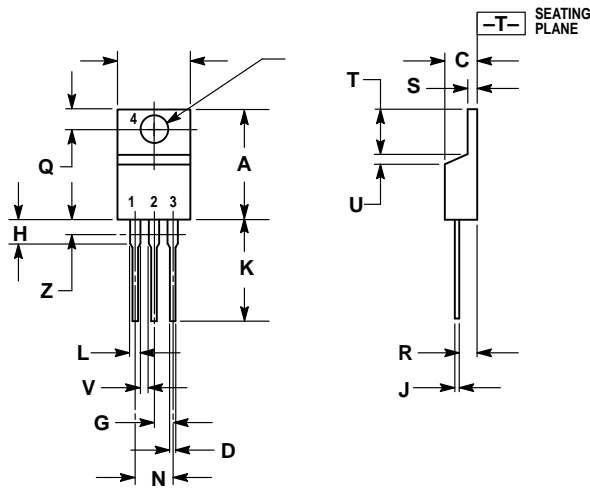
|                      |   |                  |   |     |   |    |
|----------------------|---|------------------|---|-----|---|----|
| Input Capacitance    | (V <sub>CC</sub> = 15 V, V <sub>GE</sub> = 0 V,<br>f = 1.0 MHz) | C <sub>ies</sub> | — | TBD | — | pF |
| Output Capacitance   |   | C <sub>oes</sub> | — | TBD | — |    |
| Transfer Capacitance |   | C <sub>res</sub> | — | TBD | — |    |

#### SWITCHING CHARACTERISTICS (1)

|                     |  |                     |   |     |   |      |
|---------------------|--|---------------------|---|-----|---|------|
| Turn–Off Delay Time | (V <sub>CC</sub> = 400 V, I <sub>C</sub> = 6.5 A,<br>R <sub>G</sub> = 1.0 kΩ, L = 300 μH)            | t <sub>d(off)</sub> | — | TBD | — | μSec |
| Fall Time           |  | t <sub>f</sub>      | — | TBD | — |      |
| Turn–On Delay Time  | (V <sub>CC</sub> = 10 V, I <sub>C</sub> = 6.5 A,<br>R <sub>G</sub> = 1.0 kΩ, R <sub>L</sub> = 1.0 Ω) | t <sub>d(on)</sub>  | — | TBD | — | μSec |
| Rise Time           |  | t <sub>r</sub>      | — | TBD | — |      |
| Gate Charge         | (V <sub>CC</sub> = 350 V, I <sub>C</sub> = 15 A,<br>V <sub>GE</sub> = 5.0 V)                         | Q <sub>T</sub>      | — | TBD | — | nC   |
|                     |  | Q <sub>1</sub>      | — | TBD | — |      |
|                     |  | Q <sub>2</sub>      | — | TBD | — |      |

(1) Pulse Test: Pulse Width ≤ 300 μS, Duty Cycle ≤ 2%.

PACKAGE DIMENSIONS




STYLE 9:  
 PIN 1. GATE  
 2. COLLECTOR  
 3. EMITTER  
 4. COLLECTOR

- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.  
 3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

| DIM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 0.570  | 0.620 | 14.48       | 15.75 |
| B   | 0.380  | 0.405 | 9.66        | 10.28 |
| C   | 0.160  | 0.190 | 4.07        | 4.82  |
| D   | 0.025  | 0.035 | 0.64        | 0.88  |
| F   | 0.142  | 0.147 | 3.61        | 3.73  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.155 | 2.80        | 3.93  |
| J   | 0.018  | 0.025 | 0.46        | 0.64  |
| K   | 0.500  | 0.562 | 12.70       | 14.27 |
| L   | 0.045  | 0.060 | 1.15        | 1.52  |
| N   | 0.190  | 0.210 | 4.83        | 5.33  |
| Q   | 0.100  | 0.120 | 2.54        | 3.04  |
| R   | 0.080  | 0.110 | 2.04        | 2.79  |
| S   | 0.045  | 0.055 | 1.15        | 1.39  |
| T   | 0.235  | 0.255 | 5.97        | 6.47  |
| U   | 0.000  | 0.050 | 0.00        | 1.27  |
| V   | 0.045  | —     | 1.15        | —     |
| Z   | —      | 0.080 | —           | 2.04  |

CASE 221A-09  
 ISSUE Z

# MGP15N43CL

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