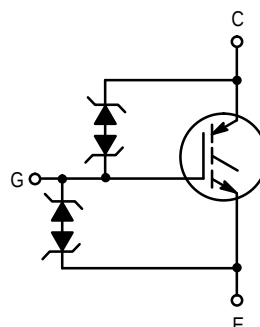


Product Preview

Internally Clamped N-Channel IGBT

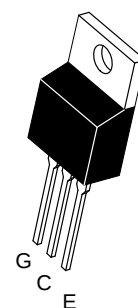
This Logic Level Insulated Gate Bipolar Transistor (IGBT) features Gate–Emitter ESD protection, Gate Collector Over–Voltage Protection from monolithic circuitry for usage as an Ignition Coil Driver.

- 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



MGP15N38CL

**15 AMPERES
N-CHANNEL IGBT
 $V_{CE(on)} = 1.8\text{ V}$
380 VOLTS
CLAMPED**



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

MAXIMUM RATINGS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CES}	CLAMPED	Vdc
Collector–Gate Voltage	V_{CER}	CLAMPED	Vdc
Gate–Emitter Voltage	V_{GE}	CLAMPED	Vdc
Collector Current — Continuous	I_C	15	Adc
Total Power Dissipation Derate above 25°C	P_D	136 0.91	Watts W/ $^\circ\text{C}$
Operating and Storage Temperature Range	T_J, T_{stg}	–55 to 175	$^\circ\text{C}$

UNCLAMPED COLLECTOR–TO–EMITTER AVALANCHE CHARACTERISTICS ($T_J < 150^\circ\text{C}$)

Single Pulse Collector–to–Emitter Avalanche Energy $V_{CC} = 50\text{ V}$, $V_{GE} = 5.0\text{ V}$, PEAK $I_L = 14.2\text{ A}$, $L = 3.0\text{ mH}$, Starting $T_J = 25^\circ\text{C}$ $V_{CC} = 50\text{ V}$, $V_{GE} = 5.0\text{ V}$, PEAK $I_L = 10\text{ A}$, $L = 3.0\text{ mH}$, Starting $T_J = 150^\circ\text{C}$	E_{AS}	300 150	mJ
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THERMAL CHARACTERISTICS

Thermal Resistance — Junction–to–Case — Junction–to–Ambient	$R_{\theta JC}$ $R_{\theta JA}$	1.1 62.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T_L	260	$^\circ\text{C}$

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



MGP15N38CL

ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Clamp Voltage ($I_C = 1.0\text{ mA}$, $T_J = -40^\circ\text{C}$ to 175°C)	$V_{(BR)CES}$	350	380	410	Vdc
Zero Gate Voltage Collector Current ($V_{CE} = 300\text{ V}$, $V_{GE} = 0\text{ V}$) ($V_{CE} = 300\text{ V}$, $V_{GE} = 0\text{ V}$, $T_J = 150^\circ\text{C}$)	I_{CES}	— —	— —	10 150	μAdc
Gate–Emitter Clamp Voltage ($I_G = 5.0\text{ mA}$)	$V_{(BR)GES}$	17	—	22	Vdc
Gate–Emitter Leakage Current ($V_{GE} = 10\text{ V}$)	I_{GES}	—	—	10	μAdc

ON CHARACTERISTICS (1)

Gate Threshold Voltage ($V_{GE} = V_{CE}$, $I_C = 1.0\text{ mA}$) Threshold Temperature Coefficient (Negative)	$V_{GE(th)}$	1.3 —	1.8 4.4	2.1 —	Vdc mV/ $^\circ\text{C}$
Collector–to–Emitter On–Voltage ($V_{GE} = 3.5\text{ V}$, $I_C = 6.0\text{ A}$) ($V_{GE} = 4.0\text{ V}$, $I_C = 10\text{ A}$, $T_J = 150^\circ\text{C}$)	$V_{CE(on)}$	— —	— —	2.0 1.8	Volts
Forward Transconductance ($V_{CE} = 5.0\text{ V}$, $I_C = 10\text{ A}$)	g_{fe}	8.0	19	—	Mhos

DYNAMIC CHARACTERISTICS

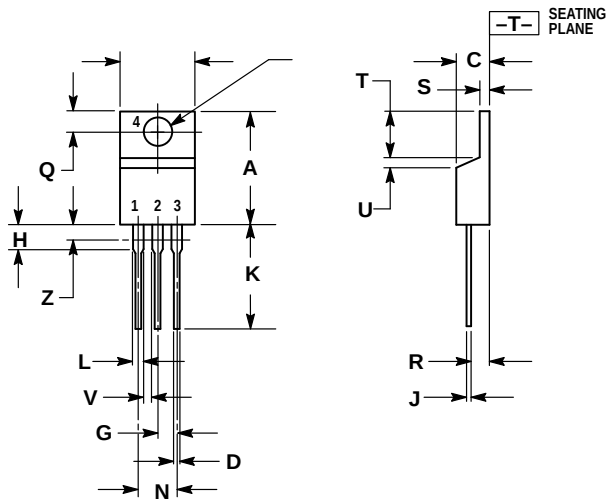
Input Capacitance	$(V_{CC} = 15\text{ V}$, $V_{GE} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{ies}	—	TBD	—	pF
Output Capacitance		C_{oes}	—	TBD	—	
Transfer Capacitance		C_{res}	—	TBD	—	

SWITCHING CHARACTERISTICS (1)

Turn–Off Delay Time	$(V_{CC} = 300\text{ V}$, $I_C = 6.5\text{ A}$, $R_G = 1.0\text{ k}\Omega$, $L = 300\text{ }\mu\text{H}$)	$t_d(off)$	—	TBD	—	μSec
Fall Time		t_f	—	TBD	—	
Turn–On Delay Time	$(V_{CC} = 10\text{ V}$, $I_C = 6.5\text{ A}$, $R_G = 1.0\text{ k}\Omega$, $R_L = 1.0\text{ }\Omega$)	$t_d(on)$	—	TBD	—	μSec
Rise Time		t_r	—	TBD	—	
Gate Charge	$(V_{CC} = 300\text{ V}$, $I_C = 15\text{ A}$, $V_{GE} = 5.0\text{ V}$)	Q_T	—	TBD	—	nC
		Q_1	—	TBD	—	
		Q_2	—	TBD	—	

(1) Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$.

PACKAGE DIMENSIONS



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

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