

MGP15N38CL, MGB15N38CL1.

Preferred Device

Ignition IGBT 15 Amps, 380 Volts N-Channel TO-220 and D²PAK

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

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V _{CES}	CLAMPED	V _{dc}
Collector-Gate Voltage	V _{CER}	CLAMPED	V _{dc}
Gate-Emitter Voltage	V _{GE}	CLAMPED	V _{dc}
Collector Current – Continuous	I _C	15	A _{dc}
Total Power Dissipation Derate above 25°C	P _D	136 0.91	Watts W/°C
Operating and Storage Temperature Range	T _J , T _{stg}	-55 to 175	°C

UNCLAMPED COLLECTOR-TO-EMITTER AVALANCHE CHARACTERISTICS (T_J < 150°C)

Single Pulse Collector-to-Emitter Avalanche Energy V _{CC} = 50 V, V _{GE} = 5.0 V, Peak I _L = 14.2 A, L = 3.0 mH, Starting T _J = 25°C	E _{AS}	300	mJ
V _{CC} = 50 V, V _{GE} = 5.0 V, Peak I _L = 10 A, L = 3.0 mH, Starting T _J = 150°C		150	

THERMAL CHARACTERISTICS

Thermal Resistance – Junction-to-Case – Junction-to-Ambient	R _{θJC} R _{θJA}	1.1 62.5	°C/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T _L	260	°C

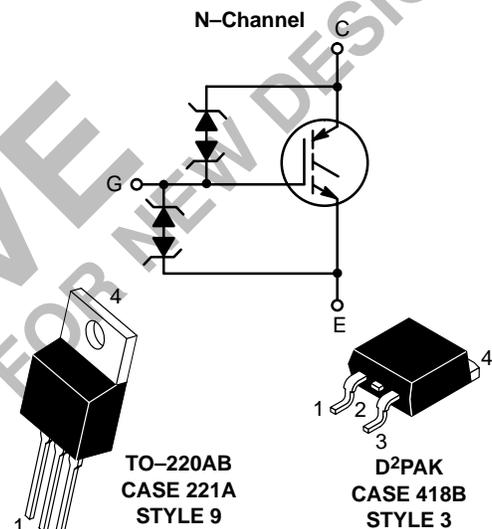


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**15 AMPERES
380 VOLTS (Clamped)**

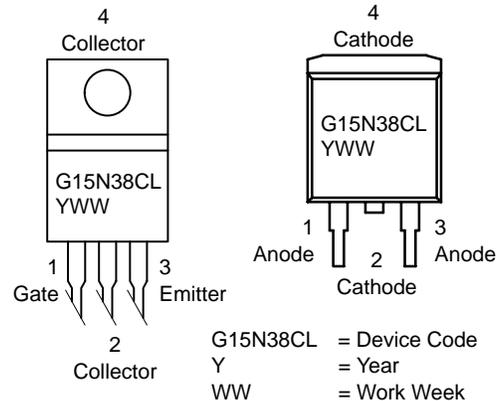
V_{CE(on)} = 1.8 mΩ



TO-220AB
CASE 221A
STYLE 9

D²PAK
CASE 418B
STYLE 3

MARKING DIAGRAMS & PIN ASSIGNMENTS



ORDERING INFORMATION

Device	Package	Shipping
MGP15N38CL	TO-220	50 Units/Rail
MGB15N38CLT4	D2PAK	800 Tape & Reel

Preferred devices are recommended choices for future use and best overall value.

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ELECTRICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Clamp Voltage (I _C = 1.0 mA, T _J = –40°C to 175°C)	V _{(BR)CES}	350	380	410	Vdc
Zero Gate Voltage Collector Current (V _{CE} = 300 V, V _{GE} = 0 V) (V _{CE} = 300 V, V _{GE} = 0 V, T _J = 150°C)	I _{CES}	–	–	10 150	μA _{dc}
Gate–Emitter Clamp Voltage (I _G = 5.0 mA)	V _{(BR)GES}	17	–	22	Vdc
Gate–Emitter Leakage Current (V _{GE} = 10 V)	I _{GES}	–	–	10	μA _{dc}

ON CHARACTERISTICS (Note 1.)

Gate Threshold Voltage (V _{GE} = V _{CE} , I _C = 1.0 mA) Threshold Temperature Coefficient (Negative)	V _{GE(th)}	1.3 –	1.8 4.4	2.1 –	Vdc mV/°C
Collector–to–Emitter On–Voltage (V _{GE} = 3.5 V, I _C = 6.0 A) (V _{GE} = 4.0 V, I _C = 10 A, T _J = 150°C)	V _{CE(on)}	– –	– –	2.0 1.8	Volts
Forward Transconductance (V _{CE} = 5.0 V, I _C = 10 A)	g _{fe}	8.0	19	–	Mhos

DYNAMIC CHARACTERISTICS

Input Capacitance	(V _{CC} = 15 V, V _{GE} = 0 V, f = 1.0 MHz)	C _{ies}	–	TBD	–	pF
Output Capacitance		C _{oes}	–	TBD	–	
Transfer Capacitance		C _{res}	–	TBD	–	

SWITCHING CHARACTERISTICS (Note 1.)

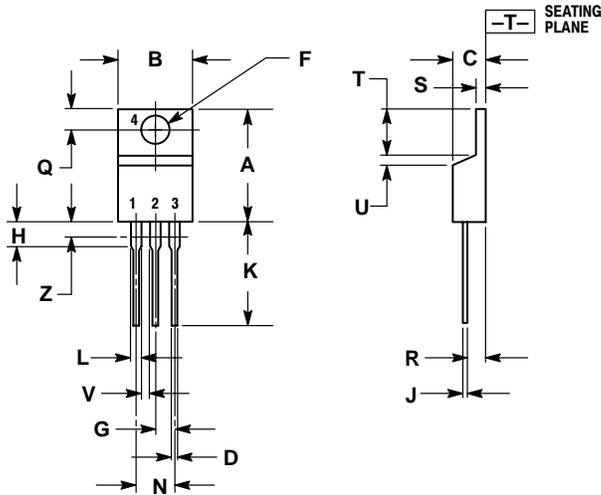
Turn–Off Delay Time	(V _{CC} = 300 V, I _C = 6.5 A, R _G = 1.0 kΩ, L = 300 μH)	t _{d(off)}	–	TBD	–	μSec
Fall Time		t _f	–	TBD	–	
Turn–On Delay Time	(V _{CC} = 10 V, I _C = 6.5 A, R _G = 1.0 kΩ, R _L = 1.0 Ω)	t _{d(on)}	–	TBD	–	μSec
Rise Time		t _r	–	TBD	–	
Gate Charge	(V _{CC} = 300 V, I _C = 15 A, V _{GE} = 5.0 V)	Q _T	–	TBD	–	nC
		Q ₁	–	TBD	–	
		Q ₂	–	TBD	–	

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

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PACKAGE DIMENSIONS

TO-220 THREE-LEAD
TO-220AB
CASE 221A-09
ISSUE AA



NOTES:

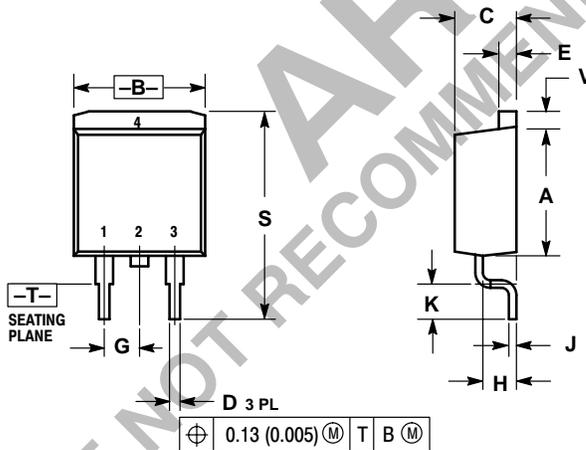
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

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

STYLE 9:

- PIN 1. GATE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

D²PAK
CASE 418B-03
ISSUE D



NOTES:

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

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40

STYLE 3:

- PIN 1. ANODE
2. CATHODE
3. ANODE
4. CATHODE

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