

Product Preview

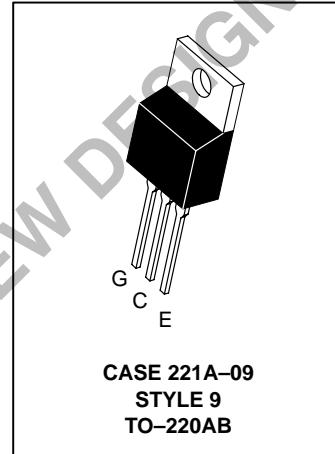
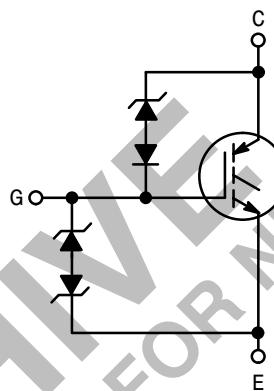
SMARTDISCRETES™
Internally Clamped, N-Channel
IGBT

This Logic Level Insulated Gate Bipolar Transistor (IGBT) features Gate-Emitter ESD protection, Gate-Collector overvoltage protection from SMARTDISCRETES™ 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 Microprocessors
- Low Saturation Voltage
- High Pulsed Current Capability

MGP20N14CL

20 AMPERES
VOLTAGE CLAMPED
N-CHANNEL IGBT
 $V_{CE(on)} = 1.9$ VOLTS
135 VOLTS (CLAMPED)



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_{CGR}	CLAMPED	Vdc
Gate-Emitter Voltage	V_{GE}	CLAMPED	Vdc
Collector Current — Continuous — Single Pulsed ($t_p = \pm 10 \mu\text{s}$)	I_C I_{CM}	20 60	Adc Apk
Total Power Dissipation (TO-220) Derate Above 25°C	P_D	150 1.0	Watts W/ $^\circ\text{C}$
Operating and Storage Temperature Range	T_J, T_{stg}	-55 to 175	$^\circ\text{C}$
Single Pulse Collector-Emitter Avalanche Energy @ Starting $T_J = 25^\circ\text{C}$ ($V_{CC} = 80$ V, $V_{GE} = 5$ V, Peak $I_L = 10$ A, $L = 10$ mH)	E_{AS}	500	mJ

THERMAL CHARACTERISTICS

Thermal Resistance — Junction to Case — (TO-220) — Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	1.0 62.5	$^\circ\text{C/W}$
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 5 seconds	T_L	260	$^\circ\text{C}$
Mounting Torque, 6-32 or M3 screw	10 lbf•in (1.13 N•m)		

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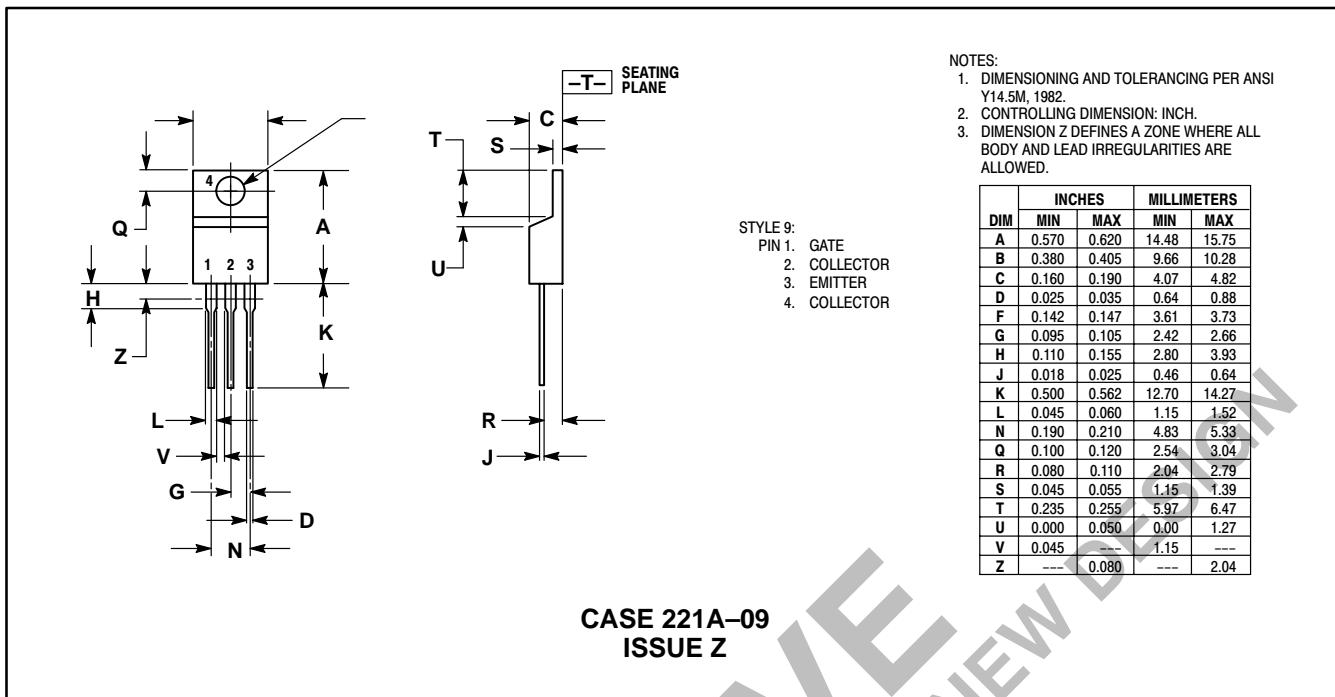
This document contains information on a new product. Specifications and information herein are subject to change without notice.

MGP20N14CL
ELECTRICAL CHARACTERISTICS ($T_J = 25^\circ\text{C}$ unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Clamp Voltage ($I_{\text{Clamp}} = 10 \text{ mA}$, $T_J = -40 \text{ to } 150^\circ\text{C}$)	$V_{(\text{BR})\text{CES}}$	135			Vdc
Zero Gate Voltage Collector Current ($V_{\text{CE}} = 100 \text{ V}$, $V_{\text{GE}} = 0 \text{ V}$) ($V_{\text{CE}} = 100 \text{ V}$, $V_{\text{GE}} = 0 \text{ V}$, $T_J = 150^\circ\text{C}$)	I_{CES}	—	—	10 100	μA
Gate-Emitter Clamp Voltage ($I_G = 1 \text{ mA}$)	$V_{(\text{BR})\text{GES}}$	10			Vdc
Gate-Emitter Leakage Current ($V_{\text{GE}} = \pm 5 \text{ V}$, $V_{\text{CE}} = 0 \text{ V}$)	I_{GES}	—	—	1.0	μA
ON CHARACTERISTICS (1)					
Gate Threshold Voltage ($V_{\text{CE}} = V_{\text{GE}}$, $I_C = 1 \text{ mA}$) Threshold Temperature Coefficient (Negative)	$V_{\text{GE}(\text{th})}$	1.0	1.5 4.4	2.0	V mV°C
Collector-Emitter On-Voltage ($V_{\text{GE}} = 5 \text{ V}$, $I_C = 10 \text{ A}$) ($V_{\text{GE}} = 5 \text{ V}$, $I_C = 10 \text{ A}$, $T_J = 175^\circ\text{C}$)	$V_{\text{CE}(\text{on})}$	—	—	1.9 1.8	V
Forward Transconductance ($V_{\text{CE}} > 15 \text{ V}$, $I_C = 10 \text{ A}$)	g_{fe}	8.0	15	—	Mhos
DYNAMIC CHARACTERISTICS					
Input Capacitance	$(V_{\text{CE}} = 25 \text{ Vdc}, V_{\text{GE}} = 0 \text{ Vdc}, f = 1.0 \text{ MHz})$	C_{ies}	—	430	pF
Output Capacitance		C_{oes}	—	182	
Transfer Capacitance		C_{res}	—	48	
SWITCHING CHARACTERISTICS (1)					
Turn-On Delay Time	$(V_{\text{CC}} = 68 \text{ V}, I_C = 20 \text{ A}, V_{\text{GE}} = 5 \text{ V}, R_G = 9.1 \Omega)$	$t_{\text{d}(\text{on})}$	—	TBD	ns
Rise Time		t_r	—	TBD	
Turn-Off Delay Time		$t_{\text{d}(\text{off})}$	—	TBD	
Fall Time		t_f	—	TBD	
Total Gate Charge	$(V_{\text{CC}} = 108 \text{ V}, I_C = 20 \text{ A}, V_{\text{GE}} = 5 \text{ V})$	Q_T	—	14	nC
Gate-Emitter Charge		Q_{ge}	—	3.0	
Gate-Collector Charge		Q_{gc}	—	6.0	

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

PACKAGE DIMENSIONS



DEVICE NOT RECOMMENDED FOR NEW DESIGN

ARCHIVE
RECOMMENDED FOR NEW DESIGN

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