NGB8206N, NGB8206AN

Ignition IGBT

20 A, 350 V, N−Channel D²PAK

This Logic Level Insulated Gate Bipolar Transistor (IGBT) features monolithic circuitry integrating ESD and Overvoltage clamped protection for use in inductive coil drivers applications. Primary uses include Ignition, Direct Fuel Injection, or wherever high voltage and high current switching is required.

Features

- Ideal for Coil−on−Plug and Driver−on−Coil Applications
- Gate−Emitter ESD Protection
- Temperature Compensated Gate−Collector Voltage Clamp Limits Stress Applied to Load
- Integrated ESD Diode Protection
- Low Threshold Voltage for Interfacing Power Loads to Logic or Microprocessor Devices
- Low Saturation Voltage
- High Pulsed Current Capability
- These are Pb−Free Devices

Applications

- Ignition Systems

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

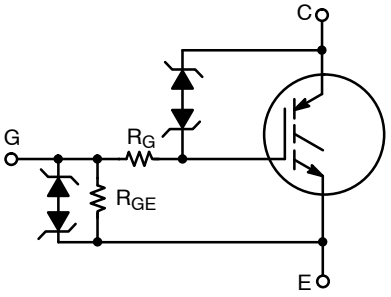
Rating	Symbol	Value	Unit
Collector−Emitter Voltage	V_{CES}	390	V
Collector−Gate Voltage	V_{CER}	390	V
Gate−Emitter Voltage	V_{GE}	±15	V
Collector Current−Continuous @ T_C = 25°C − Pulsed	I_C	20 50	A_{DC} A_{AC}
Continuous Gate Current	I_G	1.0	mA
Transient Gate Current (t ≤ 2 ms, f ≤ 100 Hz)	I_G	20	mA
ESD (Charged−Device Model)	ESD	2.0	kV
ESD (Human Body Model) R = 1500 Ω, C = 100 pF	ESD	8.0	kV
ESD (Machine Model) R = 0 Ω, C = 200 pF	ESD	500	V
Total Power Dissipation @ T_C = 25°C Derate above 25°C	P_D	150 1.0	W W/°C
Operating & Storage Temperature Range	T_J, T_{stg}	−55 to +175	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

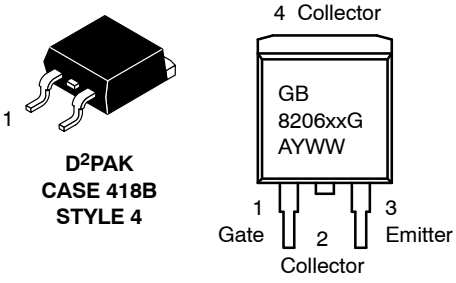
ON Semiconductor®

http://onsemi.com

20 AMPS, 350 VOLTS
$V_{CE(on)}$ = 1.3 V @
I_C = 10 A, V_{GE} ≥ 4.5 V



MARKING DIAGRAM



D²PAK
CASE 418B
STYLE 4

GB8206xx = Device Code
xx = N or AN
A = Assembly Location
Y = Year
WW = Work Week
G = Pb−Free Package

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

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UNCLAMPED COLLECTOR−TO−EMITTER AVALANCHE CHARACTERISTICS ($-55° \le T_J \le 175°C$)

Characteristic	Symbol	Value	Unit
Single Pulse Collector−to−Emitter Avalanche Energy V_{CC} = 50 V, V_{GE} = 5.0 V, Pk I_L = 16.7 A, L = 1.8 mH, R_g = 1 kΩ Starting T_J = 25°C V_{CC} = 50 V, V_{GE} = 5.0 V, Pk I_L = 14.9 A, L = 1.8 mH, R_g = 1 kΩ Starting T_J = 150°C V_{CC} = 50 V, V_{GE} = 5.0 V, Pk I_L = 14.1 A, L = 1.8 mH, R_g = 1 kΩ Starting T_J = 175°C	E_{AS}	 250 200 180	mJ
Reverse Avalanche Energy V_{CC} = 100 V, V_{GE} = 20 V, Pk I_L = 25.8 A, L = 6.0 mH, Starting T_J = 25°C	$E_{AS(R)}$	 2000	mJ

THERMAL CHARACTERISTICS

Thermal Resistance, Junction−to−Case	$R_{\theta JC}$	1.0	°C/W
Thermal Resistance, Junction−to−Ambient (Note 1)	$R_{\theta JA}$	62.5	°C/W
Maximum Temperature for Soldering Purposes, 0.125 in from case for 5 seconds (Note 2)	T_L	275	°C

1. When surface mounted to an FR4 board using the minimum recommended pad size.
2. For further details, see Soldering and Mounting Techniques Reference Manual: SOLDERRM/D.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions	Temperature	Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Collector−Emitter Clamp Voltage	BV_{CES}	I_C = 2.0 mA	T_J = −40°C to 175°C	325	350	375	V
		I_C = 10 mA	T_J = −40°C to 175°C	340	365	390	
Zero Gate Voltage Collector Current	I_{CES}	V_{CE} = 15 V, V_{GE} = 0 V	T_J = 25°C		0.1	1.0	μA
		V_{CE} = 175 V, V_{GE} = 0 V	T_J = 25°C	0.5	1.5	10	
			T_J = 175°C	1.0	25	100*	
			T_J = −40°C	0.4	0.8	5.0	
Reverse Collector−Emitter Clamp Voltage	$B_{VCES(R)}$	I_C = −75 mA − NGB8206	T_J = 25°C	30	35	39	V
			T_J = 175°C	35	39	45*	
			T_J = −40°C	30	33	37	
		I_C = −75 mA − NGB8206A	T_J = 25°C	30	35	39	
			T_J = 175°C	32	37	42	
			T_J = −40°C	29	32	37	
Reverse Collector−Emitter Leakage Current	$I_{CES(R)}$	V_{CE} = −24 V − NGB8206	T_J = 25°C	0.05	0.25	0.5	mA
			T_J = 175°C	1.0	12.5	25	
			T_J = −40°C	0.005	0.03	0.25	
		V_{CE} = −24 V − NGB8206A	T_J = 25°C	0.05	0.25	1.0	
			T_J = 175°C	1.0	12.5	25	
			T_J = −40°C	0.005	0.03	0.25	
Gate−Emitter Clamp Voltage	BV_{GES}	I_G = ±5.0 mA	T_J = −40°C to 175°C	12	12.5	14	V
Gate−Emitter Leakage Current	I_{GES}	V_{GE} = ±5.0 V	T_J = −40°C to 175°C	200	300	350*	μA
Gate Resistor	R_G		T_J = −40°C to 175°C		70		Ω
Gate−Emitter Resistor	R_{GE}		T_J = −40°C to 175°C	14.25	16	25	kΩ
ON CHARACTERISTICS (Note 3)							
Gate Threshold Voltage	$V_{GE(th)}$	I_C = 1.0 mA, V_{GE} = V_{CE}	T_J = 25°C	1.5	1.8	2.1	V
			T_J = 175°C	0.7	1.0	1.3	
			T_J = −40°C	1.7	2.0	2.3*	

*Maximum Value of Characteristic across Temperature Range.
3. Pulse Test: Pulse Width ≤ 300 μS, Duty Cycle ≤ 2%.

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions	Temperature	Min	Typ	Max	Unit
ON CHARACTERISTICS (Note 3)							
Threshold Temperature Coefficient (Negative)				3.8	4.6	6.0	mV/°C
Collector−to−Emitter On−Voltage	$V_{CE(on)}$	I_C = 6.5 A, V_{GE} = 3.7 V	T_J = 25°C	0.95	1.15	1.35	V
			T_J = 175°C	0.70	0.95	1.15	
			T_J = −40°C	1.0	1.30	1.40	
		I_C = 9.0 A, V_{GE} = 3.9 V	T_J = 25°C	0.95	1.25	1.45	
			T_J = 175°C	0.8	1.05	1.25	
			T_J = −40°C	1.1	1.4	1.50	
		I_C = 7.5 A, V_{GE} = 4.5 V	T_J = 25°C	0.85	1.15	1.4	
			T_J = 175°C	0.7	0.95	1.2	
			T_J = −40°C	1.0	1.3	1.6*	
		I_C = 10 A, V_{GE} = 4.5 V NGB8206	T_J = 25°C	1.0	1.3	1.6	
			T_J = 175°C	0.8	1.05	1.4	
			T_J = −40°C	1.1	1.4	1.7*	
		I_C = 10 A, V_{GE} = 4.5 V NGB8206A	T_J = 25°C	0.9	1.2	1.6	
			T_J = 175°C	0.8	1.05	1.4	
			T_J = −40°C	1.0	1.2	1.7*	
		I_C = 15 A, V_{GE} = 4.5 V NGB8206	T_J = 25°C	1.15	1.45	1.7	
			T_J = 175°C	1.0	1.3	1.55	
			T_J = −40°C	1.25	1.55	1.8*	
		I_C = 15 A, V_{GE} = 4.5 V NGB8206A	T_J = 25°C	1.0	1.3	1.7	
			T_J = 175°C	1.0	1.3	1.55	
			T_J = −40°C	1.1	1.35	1.8*	
		I_C = 20 A, V_{GE} = 4.5 V	T_J = 25°C	1.3	1.6	1.9	
			T_J = 175°C	1.2	1.5	1.8	
			T_J = −40°C	1.4	1.75	2.0*	
Forward Transconductance	gfs	I_C = 6.0 A, V_{CE} = 5.0 V	T_J = 25°C	10	18	25	Mhos
DYNAMIC CHARACTERISTICS							
Input Capacitance	C_{ISS}	f = 10 kHz, V_{CE} = 25 V	T_J = 25°C	1100	1300	1500	pF
Output Capacitance	C_{OSS}			70	80	90	
Transfer Capacitance	C_{RSS}			18	20	22	

*Maximum Value of Characteristic across Temperature Range.

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

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions	Temperature	Min	Typ	Max	Unit
SWITCHING CHARACTERISTICS							
Turn−Off Delay Time (Resistive)	$t_{d(off)}$	V_{CC} = 300 V, I_C = 9.0 A R_G = 1.0 kΩ, R_L = 33 Ω V_{GE} = 5 V	T_J = 25°C	6.0	8.0	10	μSec
			T_J = 175°C	6.0	8.0	10	
Fall Time (Resistive)	t_f		T_J = 25°C	4.0	6.0	8.0	
			T_J = 175°C	8.0	10.5	14	
Turn−Off Delay Time (Inductive)	$t_{d(off)}$	V_{CC} = 300 V, I_C = 9.0 A R_G = 1.0 kΩ, L = 300 μH V_{GE} = 5 V	T_J = 25°C	3.0	5.0	7.0	
			T_J = 175°C	5.0	7.0	9.0	
Fall Time (Inductive)	t_f		T_J = 25°C	1.5	3.0	4.5	
			T_J = 175°C	5.0	7.0	10	
Turn−On Delay Time	$t_{d(on)}$	V_{CC} = 14 V, I_C = 9.0 A R_G = 1.0 kΩ, R_L = 1.5 Ω V_{GE} = 5 V	T_J = 25°C	1.0	1.5	2.0	
			T_J = 175°C	1.0	1.5	2.0	
Rise Time	t_r		T_J = 25°C	4.0	6.0	8.0	
			T_J = 175°C	3.0	5.0	7.0	

*Maximum Value of Characteristic across Temperature Range.

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

TYPICAL ELECTRICAL CHARACTERISTICS

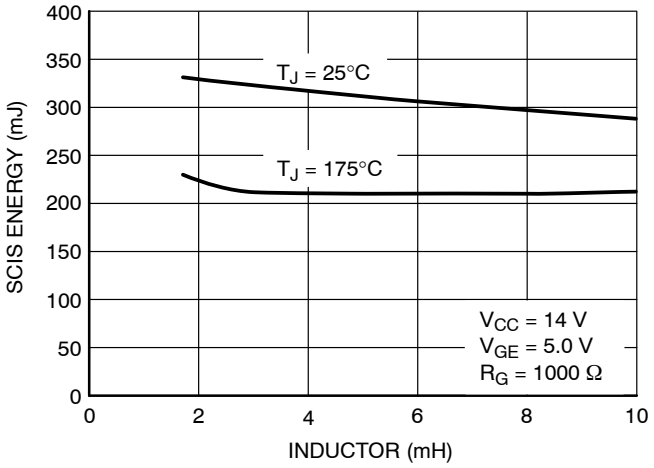


Figure 1. Self Clamped Inductive Switching

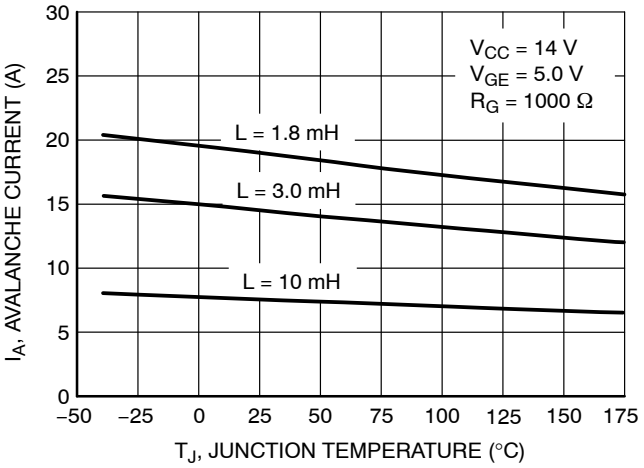


Figure 2. Open Secondary Avalanche Current vs. Temperature

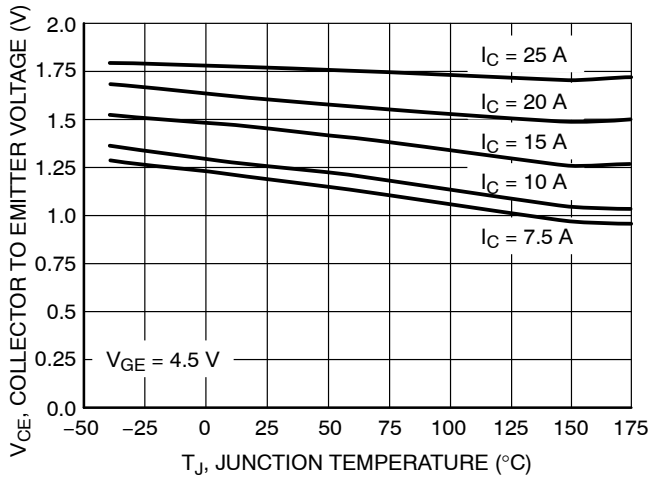


Figure 3. Collector−to−Emitter Voltage vs. Junction Temperature

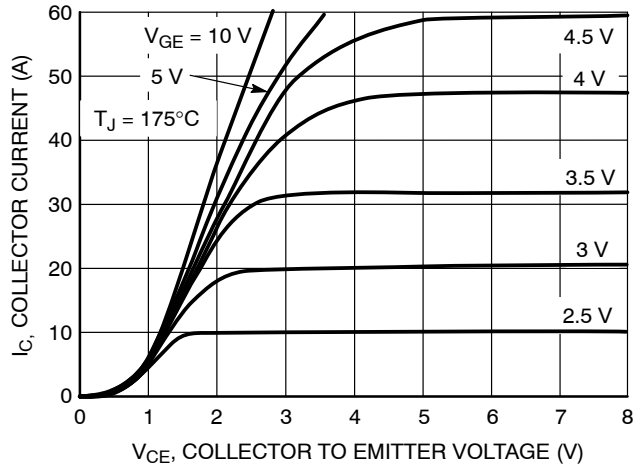


Figure 4. Collector Current vs. Collector−to−Emitter Voltage

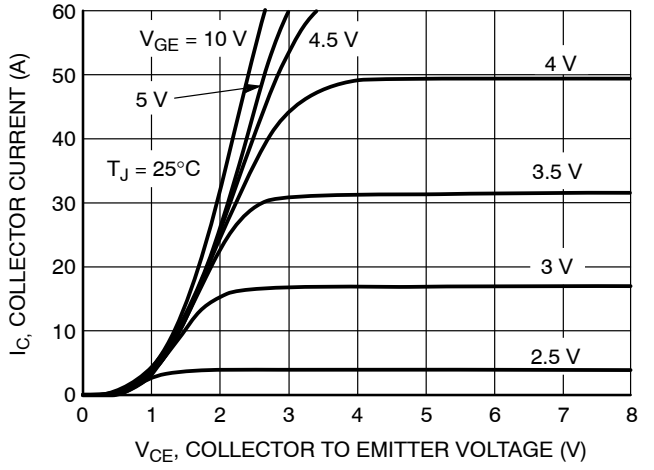


Figure 5. Collector Current vs. Collector−to−Emitter Voltage

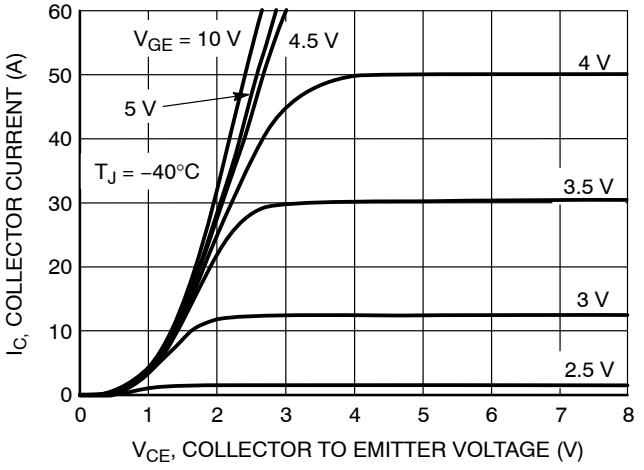


Figure 6. Collector Current vs. Collector−to−Emitter Voltage

TYPICAL ELECTRICAL CHARACTERISTICS

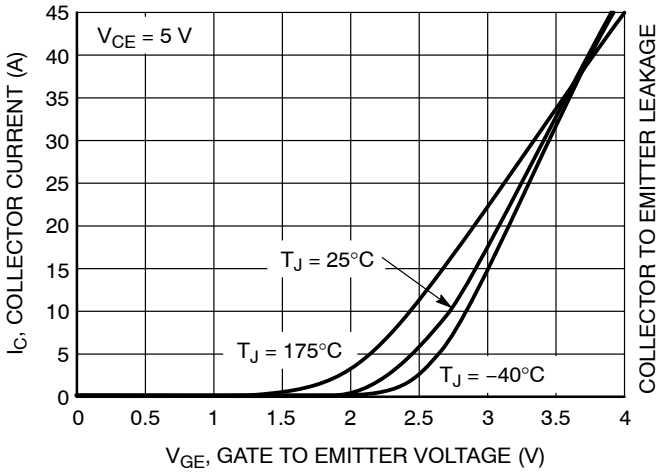


Figure 7. Transfer Characteristics

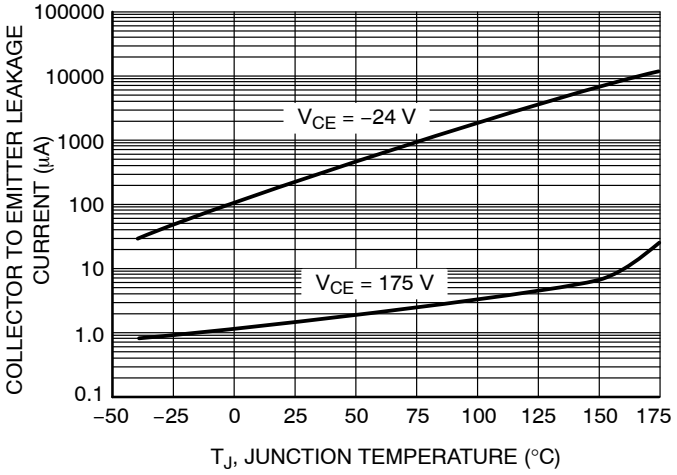


Figure 8. Collector−to−Emitter Leakage Current vs. Temperature

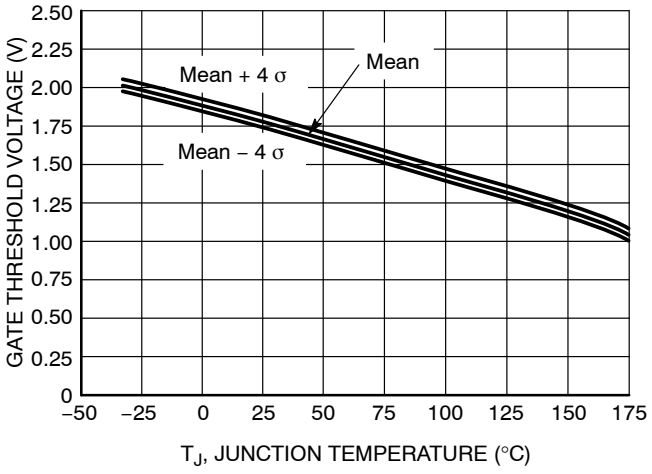


Figure 9. Gate Threshold Voltage vs. Temperature

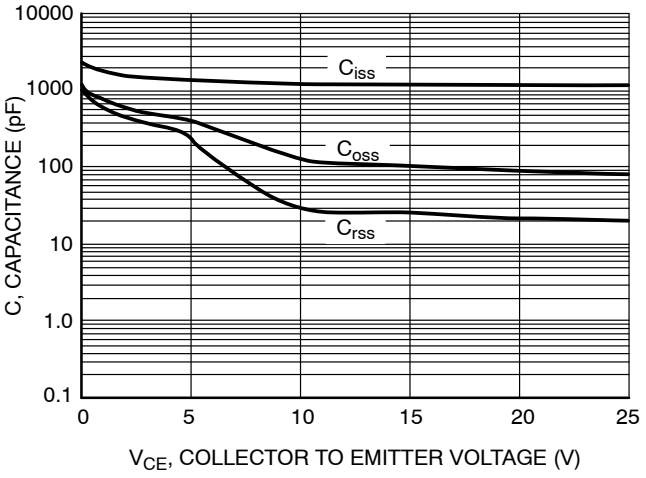


Figure 10. Capacitance vs. Collector−to−Emitter Voltage

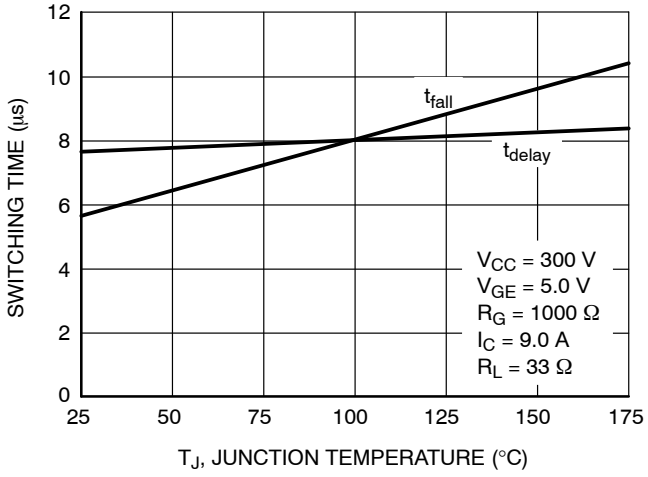


Figure 11. Resistive Switching Fall Time vs. Temperature

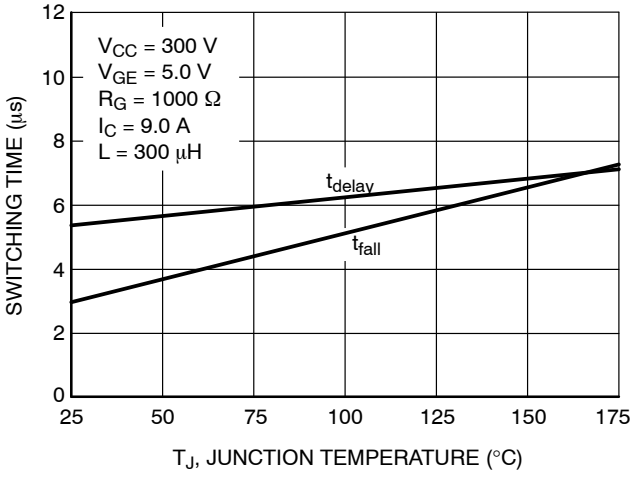


Figure 12. Inductive Switching Fall Time vs. Temperature

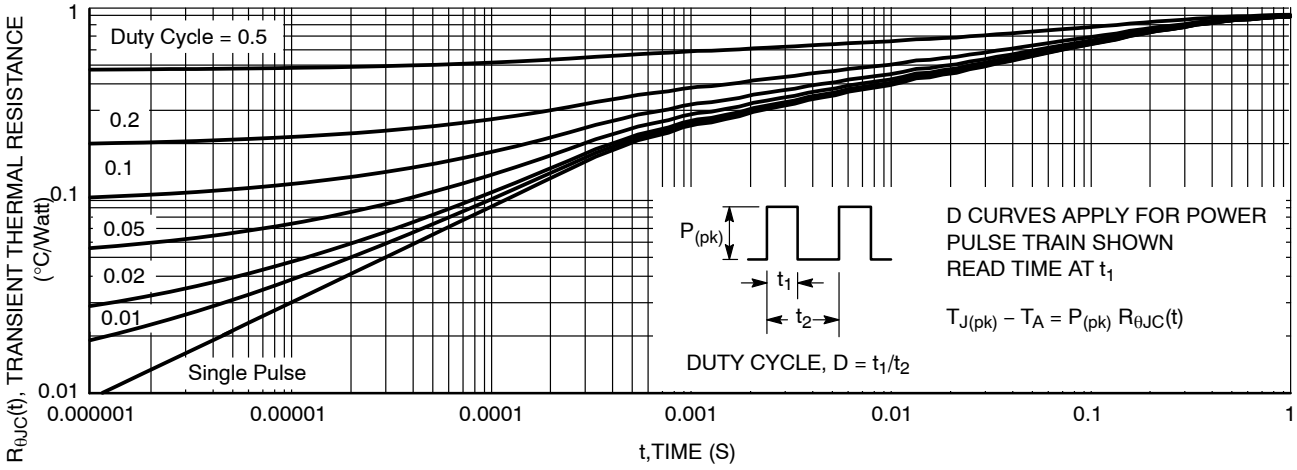


Figure 13. Best Case Transient Thermal Resistance (Non−normalized Junction−to−Case Mounted on Cold Plate)

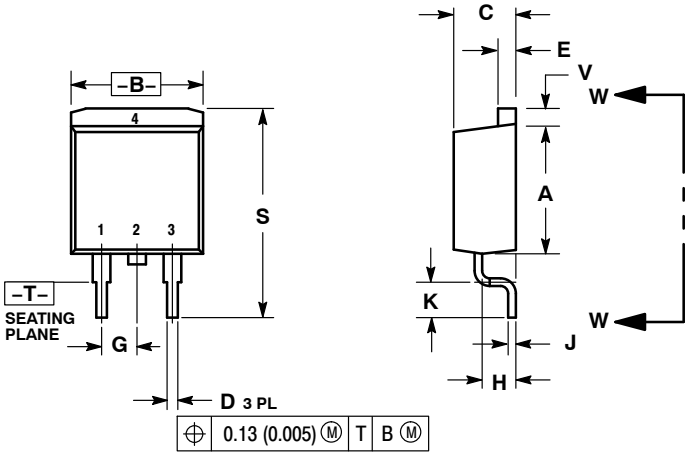
ORDERING INFORMATION

Device	Package	Shipping†
NGB8206NG	D^2PAK (Pb−Free)	50 Units / Rail
NGB8206NT4G	D^2PAK (Pb−Free)	800 / Tape & Reel
NGB8206ANT4G	D^2PAK (Pb−Free)	800 / Tape & Reel
NGB8206ANTF4G	D^2PAK (Pb−Free)	700 / Tape & Reel
NGB8206ANSL3G	D^2PAK (Pb−Free)	50 Units / Rail

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

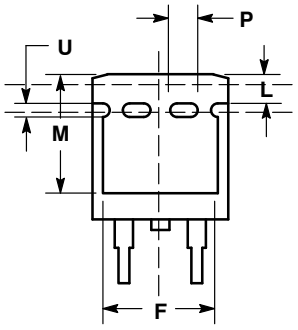
D²PAK 3
CASE 418B−04
ISSUE K



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 418B−01 THRU 418B−03 OBSOLETE, NEW STANDARD 418B−04.

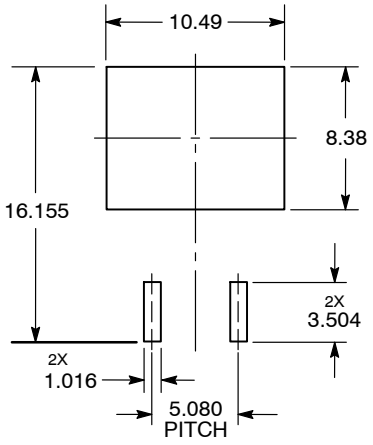
	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.340	0.380	8.64	9.65
B	0.380	0.405	9.65	10.29
C	0.160	0.190	4.06	4.83
D	0.020	0.035	0.51	0.89
E	0.045	0.055	1.14	1.40
F	0.310	0.350	7.87	8.89
G	0.100 BSC		2.54 BSC	
H	0.080	0.110	2.03	2.79
J	0.018	0.025	0.46	0.64
K	0.090	0.110	2.29	2.79
L	0.052	0.072	1.32	1.83
M	0.280	0.320	7.11	8.13
N	0.197 REF		5.00 REF	
P	0.079 REF		2.00 REF	
R	0.039 REF		0.99 REF	
S	0.575	0.625	14.60	15.88
V	0.045	0.055	1.14	1.40

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



VIEW W−W

SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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For additional information, please contact your local Sales Representative

ENTEGRECİ

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Entegreci, Eskişehir merkezli, Türkiye geneline satış yapan bir elektronik komponent mağazasıdır. Entegreler (IC), mikrodenetleyiciler, transistörler, diyotlar, pasif elemanlar, konnektörler, modüller ve geliştirme kartları tek adetten seri üretim adetlerine kadar satılır. Ürün sayfalarında güncel stok durumunu, fiyatı ve datasheet bağlantısını bulabilirsiniz.

Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

www.entegreci.com

Ürün kategorileri

Entegreden kapasitöre tüm elektronik komponent kategorileri.

Kategorilere göz atın

Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

Üreticileri görün

Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

Teklif isteyin

www.entegreci.com | **destek@entegreci.com** | **0850 305 90 34**

Entegreci is an online electronic components store based in Türkiye. Search by manufacturer part number to see stock, prices and datasheets for integrated circuits, microcontrollers, transistors, passive components and connectors, or request a quote for parts that are not listed.

Bu sayfa Entegreci tarafından eklenmiştir. Belgenin önceki sayfaları asıl yayıncısına aittir ve içeriği değiştirilmemiştir; en güncel sürüm için belgenin yayıncısına başvurun.