

NTBGS1D5N06C

Product Preview

Power MOSFET

60 V, 1.5 mΩ, 294 A, Single N-Channel, D²PAK7

Features

- Low R_{DS(on)} to Minimize Conduction Losses
- Low Q_G and Capacitance to Minimize Driver Losses
- Lowers Switching Noise/EMI
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

- Power Tools, Battery Operated Vacuums
- UAV/Drones, Material Handling
- BMS/Storage, Home Automation

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

Parameter	Symbol	Value	Unit	
Drain-to-Source Voltage	V _{DSS}	60	V	
Gate-to-Source Voltage	V _{GS}	±20	V	
Continuous Drain Current R _{θJC} (Note 2)	I _D	294	A	
Power Dissipation R _{θJC} (Note 2)				P _D
Continuous Drain Current R _{θJA} (Notes 1, 2)	I _D	36	A	
Power Dissipation R _{θJA} (Notes 1, 2)				P _D
Pulsed Drain Current	T _A = 25°C, t _p = 10 μs	I _{DM}	TBD	A
Operating Junction and Storage Temperature	T _J , T _{stg}	-55 to +175	°C	
Source Current (Body Diode)	I _S	TBD	A	
Single Pulse Drain-to-Source Avalanche Energy (I _L = TBD A _{pk} , L = TBD mH)	E _{AS}	TBD	mJ	
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)	T _L	260	°C	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Surface-mounted on FR4 board using a 1 in², 1 oz. Cu pad.
2. The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

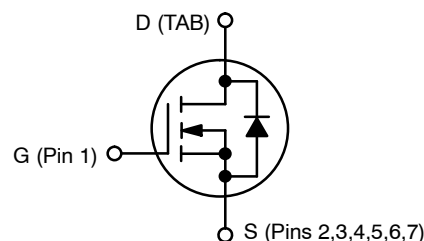
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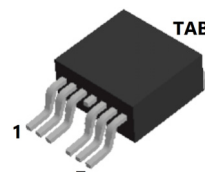
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V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
60 V	1.5 mΩ @ 10 V	294 A
	TBD mΩ @ 6 V	



N-CHANNEL MOSFET



D²PAK7
CASE 418AY

MARKING DIAGRAM

XXXXXXXXXX
AYWWG

XXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
G = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping†
NTBGS1D5N06C	D ² PAK7 (Pb-Free)	800 / Tape & Reel

†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.

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THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case – Steady State (Note 2)	$R_{\theta JC}$	0.61	°C/W
Junction-to-Ambient – Steady State (Note 2)	$R_{\theta JA}$	40	

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

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	60			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	$V_{(BR)DSS}/T_J$	$I_D = 318\ \mu\text{A}$, ref to 25°C		TBD		mV/°C
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS} = 0\text{ V}, V_{DS} = 60\text{ V}$	$T_J = 25^\circ\text{C}$		10	μA
			$T_J = 125^\circ\text{C}$		100	μA
Gate-to-Source Leakage Current	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = 20\text{ V}$			100	nA

ON CHARACTERISTICS (Note 3)

Gate Threshold Voltage	$V_{GS(TH)}$	$V_{GS} = V_{DS}, I_D = 318\ \mu\text{A}$	2.0	3.0	4.0	V
Negative Threshold Temperature Coefficient	$V_{GS(TH)}/T_J$	$I_D = 318\ \mu\text{A}$, ref to 25°C		TBD		mV/°C
Drain-to-Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 64\text{ A}$		TBD	1.5	m Ω
		$V_{GS} = 6\text{ V}, I_D = 32\text{ A}$		TBD		
Forward Transconductance	g_{FS}	$V_{DS} = 5\text{ V}, I_D = 64\text{ A}$		TBD		S
Gate-Resistance	R_G	$T_A = 25^\circ\text{C}$		1.0		Ω

CHARGES, CAPACITANCES & GATE RESISTANCE

Input Capacitance	C_{ISS}	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$		7181		pF
Output Capacitance	C_{OSS}			4265		
Reverse Transfer Capacitance	C_{RSS}			39		
Total Gate Charge	$Q_{G(TOT)}$	$V_{GS} = 10\text{ V}, V_{DS} = 30\text{ V}; I_D = 64\text{ A}$		88		nC
Threshold Gate Charge	$Q_{G(TH)}$			TBD		
Gate-to-Source Charge	Q_{GS}			31		
Gate-to-Drain Charge	Q_{GD}			13		
Total Gate Charge	$Q_{G(TOT)}$			TBD		

SWITCHING CHARACTERISTICS (Note 4)

Turn-On Delay Time	$t_{d(ON)}$	$V_{GS} = 10\text{ V}, V_{DS} = 30\text{ V}, I_D = 64\text{ A}, R_G = 6\ \Omega$		TBD		ns
Rise Time	t_r			TBD		
Turn-Off Delay Time	$t_{d(OFF)}$			TBD		
Fall Time	t_f			TBD		

DRAIN-SOURCE DIODE CHARACTERISTICS

Forward Diode Voltage	V_{SD}	$V_{GS} = 0\text{ V}, I_S = 64\text{ A}$	$T_J = 25^\circ\text{C}$		TBD	1.2	V
			$T_J = 125^\circ\text{C}$		TBD		
Reverse Recovery Time	t_{RR}	$V_{GS} = 0\text{ V}, di_S/dt = 100\text{ A}/\mu\text{s}, I_S = 32\text{ A}$		TBD		ns	
Charge Time	t_a			TBD			
Discharge Time	t_b			TBD			
Reverse Recovery Charge	Q_{RR}			TBD			nC

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

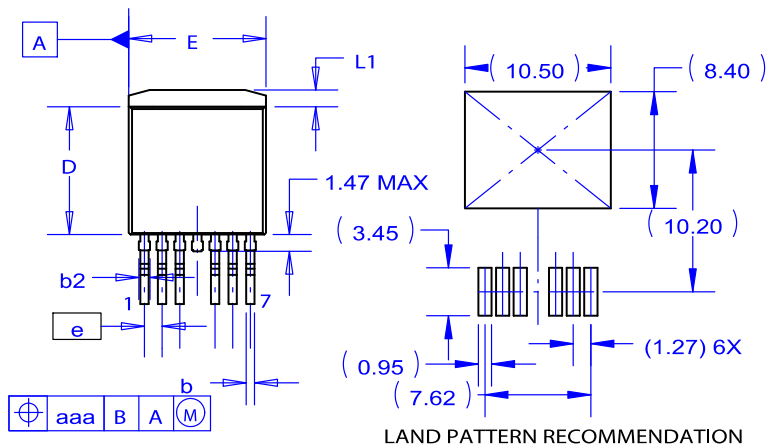
3. Pulse Test: pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

4. Switching characteristics are independent of operating junction temperatures.

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PACKAGE DIMENSIONS

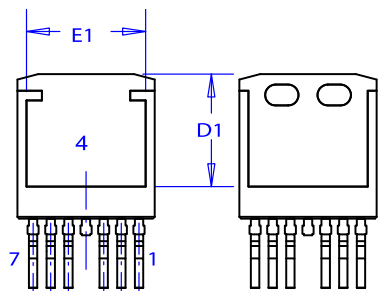
D²PAK7 (TO-263 7 LD)
CASE 418AY
ISSUE B



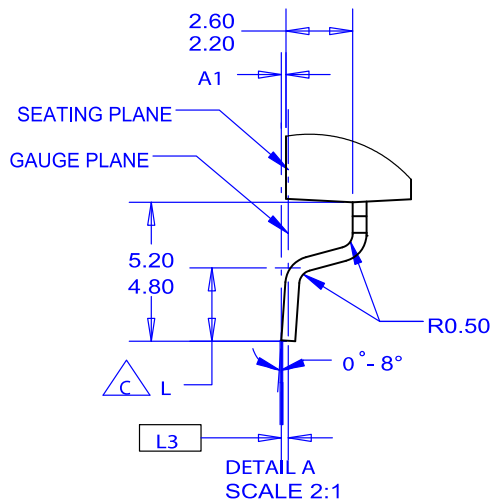
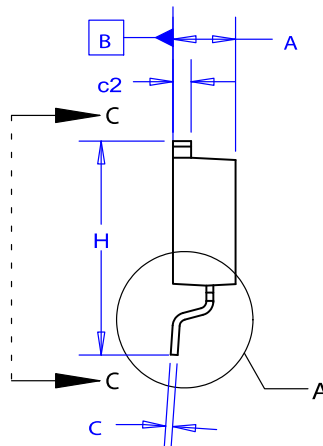
NOTES:

- A. PACKAGE CONFORMS TO JEDEC TO-263 VARIATION CB EXCEPT WHERE NOTED.
- B. ALL DIMENSIONS ARE IN MILLIMETERS.
- △ OUT OF JEDEC STANDARD VALUE.
- D. DIMENSION AND TOLERANCE AS PER ASME Y14.5-1994.
- E. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH AND TIE BAR PROTRUSIONS.
- F. LAND PATTERN RECOMMENDATION PER IPC. TO127P1524X465-8N.


DIM	MILLIMETERS		
	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	0.00	0.10	0.20
b2	0.70	0.80	0.90
b	0.51	0.60	0.70
c	0.40	0.50	0.60
c2	1.20	1.30	1.40
D	9.00	9.20	9.40
D1	6.70	6.80	6.95
E	9.70	9.90	10.20
E1	7.80	7.90	8.00
e	~	1.27	~
H	15.10	15.40	15.70
L	2.44	2.64	2.84
L1	1.00	1.20	1.40
L3	~	0.25	~
aaa	~	~	0.25



OPTIONAL CONSTRUCTIONS
 VIEW C-C
 SCALE 2 : 1



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