

MOSFET - Single N-Channel 150 V, 4.1 m Ω , 185 A

NTBGS4D1N15MC

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

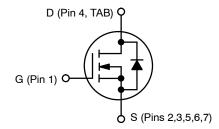
MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Parameter			Symbol	Value	Unit
Drain-to-Source Voltage			V _{DSS}	150	V
Gate-to-Source Voltage	Э		V_{GS}	±20	V
Continuous Drain Current $R_{\theta JC}$ (Note 2)	Steady State T _C = 25°C		I _D	185	Α
Power Dissipation $R_{\theta JC}$ (Note 2)			P _D	316	W
$\begin{array}{c} \text{Continuous Drain} \\ \text{Current R}_{\theta JA} \\ \text{(Notes 1, 2)} \end{array}$	Steady State	T _A = 25°C	I _D	20	Α
Power Dissipation R _{θJA} (Notes 1, 2)	State		P _D	3.7	W
Pulsed Drain Current	$T_A = 25^\circ$	°C, t _p = 10 μs	I _{DM}	2564	Α
Operating Junction and Storage Temperature Range			T _J , T _{stg}	-55 to +175	°C
Source Current (Body Diode)			Is	263	Α
Single Pulse Drain-to-Source Avalanche Energy (I _L = 81.5 A _{pk} , L = 0.1 mH)			E _{AS}	332	mJ
Lead Temperature for Soldering Purposes (1/8" from case for 10 s)			TL	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.
- The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.

V _{(BR)DSS}	R _{DS(ON)} MAX	I _D MAX
150 V	4.1 mΩ @ 10 V	185 A
150 V	4.7 mΩ @ 8 V	103 /



N-CHANNEL MOSFET



7 D²PAK7 CASE 418AY

MARKING DIAGRAM

AYWWG NTBG S4D1N15

A = Assembly Location

Y = Year WW = Work Week G = Pb-Free Package

ORDERING INFORMATION

Device	Package	Shipping [†]
NTBGS4D1N15MC	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.

THERMAL RESISTANCE MAXIMUM RATINGS

Parameter	Symbol	Value	Unit
Junction-to-Case - Steady State (Note 2)	$R_{ hetaJC}$	0.5	°C/W
Junction-to-Ambient - Steady State (Note 2)	$R_{ hetaJA}$	40	

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

Parameter	Symbol	Test Condition		Min	Тур	Max	Unit
OFF CHARACTERISTICS	•					1	
Drain-to-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$		150			V
Drain-to-Source Breakdown Voltage Temperature Coefficient	V _{(BR)DSS} /T _J	I _D = 250 μA, referenced to 25°C			20.28		mV/°C
Zero Gate Voltage Drain Current	I _{DSS}	$V_{GS} = 0 V$, $V_{J} = 25^{\circ}C$				1	μΑ
		$V_{DS} = 120 \text{ V}$	T _J = 125°C			10	μΑ
Gate-to-Source Leakage Current	I _{GSS}	$V_{GS} = \pm 20 \text{ V}, V_{I}$	_{DS} = 0 V			±100	nA
ON CHARACTERISTICS (Note 3)						1	
Gate Threshold Voltage	V _{GS(TH)}	V _{GS} = V _{DS} , I _D = 574 μA		2.5	3.5	4.5	V
Negative Threshold Temperature Coefficient	V _{GS(TH)} /T _J	I _D = 250 μA, referenced to 25°C			-10.21		mV/°C
Drain-to-Source On Resistance	R _{DS(on)}	V _{GS} = 10 V, I _D = 104 A			3.3	4.1	mΩ
		V _{GS} = 8 V, I _D	= 52 A		3.5	4.7	
Forward Transconductance	9 _{FS}	V _{DS} = 5 V, I _D = 90 A			177		S
Gate-Resistance	R _G	T _A = 25°C			1.2		Ω
CHARGES & CAPACITANCES						•	
Input Capacitance	C _{ISS}	V _{GS} = 0 V, f = 1 MHz, V _{DS} = 75 V			7285		pF
Output Capacitance	C _{OSS}				2025		1
Reverse Transfer Capacitance	C _{RSS}				10.6		
Total Gate Charge	Q _{G(TOT)}				88.9		nC
Threshold Gate Charge	Q _{G(TH)}	V _{GS} = 10 V, V _{DS} = 75 V, I _D = 104 A			22.8		
Gate-to-Source Charge	Q _{GS}				37.5		
Gate-to-Drain Charge	Q_{GD}				13.0		
Output Charge	Q _{OSS}	V _{GS} = 0 V, V _{DS} = 75 V			272		nC
SWITCHING CHARACTERISTICS, VGS	5 = 10 V (Note 3)						
Turn-On Delay Time	t _{d(ON)}				49		ns
Rise Time	t _r	V_{GS} = 10 V, V_{DS} = 75 V, I_{D} = 104 A, R_{G} = 6 Ω			38		
Turn-Off Delay Time	t _{d(OFF)}	$I_D = 104 \text{ A}, R_G$	= 6 Ω		64		
Fall Time	t _f				10		
DRAIN-SOURCE DIODE CHARACTER	ISTICS						
Forward Diode Voltage	V _{SD}	V _{GS} = 0 V, I _S = 104 /	A, T _J = 25°C		0.88	1.2	V
		V _{GS} = 0 V, I _S = 104 A	A, T _J = 125°C		0.79		1
Reverse Recovery Time	t _{RR}				89		ns
Charge Time	t _a	$V_{GS} = 0 \text{ V, I}_{S} = 104 \text{ A,}$ $dI_{S}/dt = 100 \text{ A/}\mu\text{s}$			47		1
Discharge Time	t _b				42		1
Reverse Recovery Charge	Q _{RR}				164		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. Switching characteristics are independent of operating junction temperature

TYPICAL CHARACTERISTICS

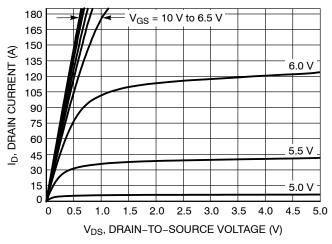


Figure 1. On-Region Characteristics

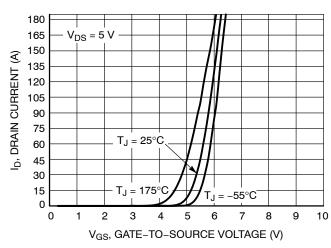


Figure 2. Transfer Characteristics

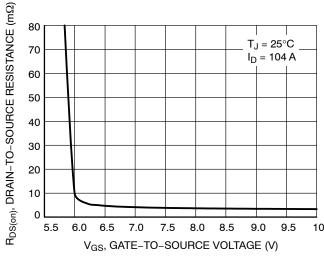


Figure 3. On-Resistance vs. Gate-to-Source Voltage

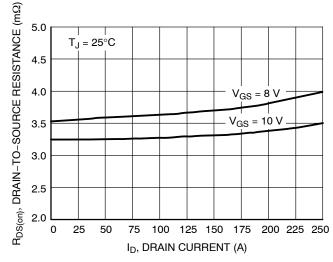


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

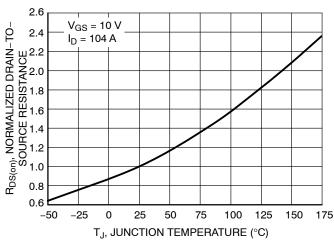


Figure 5. On–Resistance Variation with Temperature

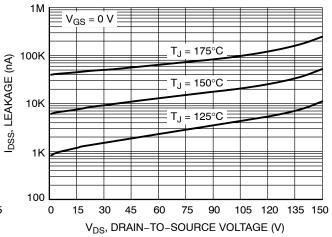


Figure 6. Drain-to-Source Leakage Current vs. Voltage

TYPICAL CHARACTERISTICS

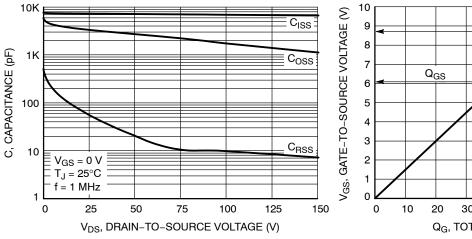
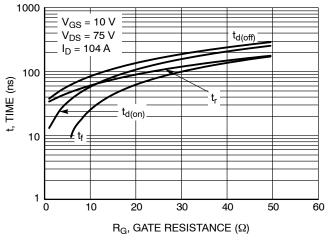


Figure 7. Capacitance Variation

Figure 8. Gate-to-Source Voltage vs. Total Charge



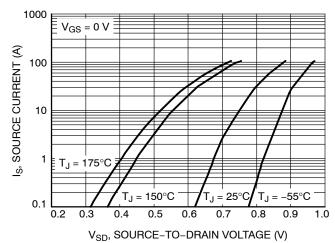
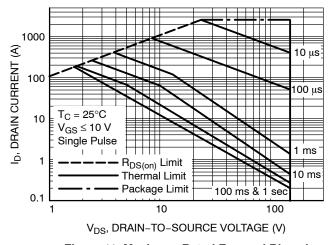


Figure 9. Resistive Switching Time Variation vs. Gate Resistance

Figure 10. Diode Forward Voltage vs. Current



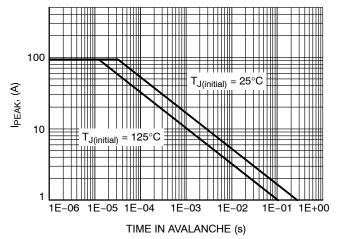


Figure 11. Maximum Rated Forward Biased Safe Operating Area

Figure 12. Maximum Drain Current vs. Time in Avalanche

TYPICAL CHARACTERISTICS

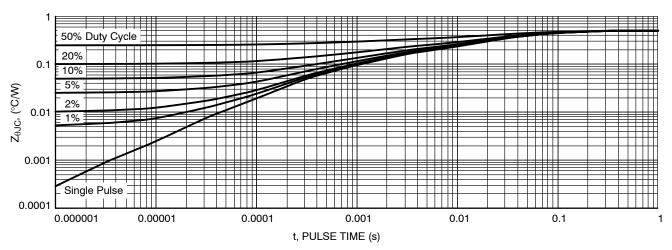
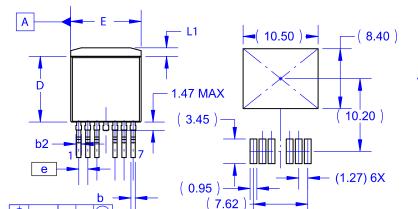


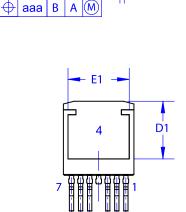
Figure 13. Thermal Response



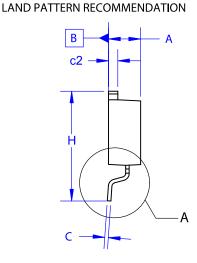
D2PAK7 (TO-263 7 LD) CASE 418AY ISSUE C

DATE 15 JUL 2019





(M)



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		
DIM	MIN	NOM	MAX
Α	4.30	4.50	4.70
A 1	0.00	0.10	0.20
b2	0.70	0.80	0.90
b	0.50	0.60	0.70
С	0.40	0.50	0.60
c2	1.20	1.30	1.40
D	9.00	9.20	9.40
D1	7.70	~	~
E	9.70	9.90	10.20
E1	8.38	8.58	8.78
е	~	1.27	~
Н	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

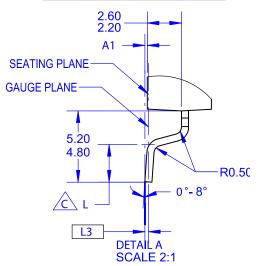
GENERIC MARKING DIAGRAM*



XXXX = Specific Device Code = Assembly Location

= Year WW = Work Week = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "=", may or may not be present. Some products may not follow the Generic Marking.



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