

# NTB60N06LG-VB Datasheet N-Channel 60-V (D-S) MOSFET

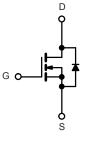
PRODUCT SUMMARY		
V <sub>DS</sub>	60	V
$R_{DS(on)}$ $V_{GS} = 10$ V	11	mΩ
$R_{DS(on)}$ $V_{GS} = 4.5$ V	12	mΩ
I <sub>D</sub>	75	А
Configuration	Sin	gle

#### FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ( $T_c = 2$	25 °C, unless othe	rwise noted)		
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V <sub>GS</sub>	± 20	V
	T <sub>C</sub> = 25 °C		75	
Continuous Drain Current (T <sub>J</sub> = 175 °C) <sup>b</sup>	T <sub>C</sub> = 100 °C		50 <sup>a</sup>	
Pulsed Drain Current	·	I <sub>DM</sub>	200	А
Continuous Source Current (Diode Conduction)		۱ <sub>S</sub>	50 <sup>a</sup>	
Avalanche Current		I <sub>AS</sub>	50	
Single Avalanche Energy (Duty Cycle $\leq$ 1 %)	L = 0.1 mH	E <sub>AS</sub>	125	mJ
Maximum Davies Dissignation	T <sub>C</sub> = 25 °C	Р	136	w
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	• P <sub>D</sub> —	3 <sup>b</sup> , 8.3 <sup>b, c</sup>	vv
Operating Junction and Storage Temperature Range	·	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum lunction to Ambienta	$t \le 10 \text{ sec}$	P	15	18	
Maximum Junction-to-Ambient <sup>a</sup>	Steady State	R <sub>thJA</sub>	40	50	°C/W
Maximum Junction-to-Case		R <sub>thJC</sub>	0.85	1.1	
Notes:				•	

a. Package limited.

b. Surface mounted on 1" x 1" FR4 board.

c. t  $\leq$  10 s.

## NTB60N06LG-VB



Parameter	Symbol	Test Conditions	Min.	Typ. <sup>a</sup>	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS}$ = 0 V, I <sub>D</sub> = 250 µA	60			V
Gate Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1		3	v
Gate-Body Leakage	I <sub>GSS</sub>	$V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V			± 100	nA
		$V_{DS}$ = 60 V, $V_{GS}$ = 0 V			1	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS}$ = 60 V, $V_{GS}$ = 0 V, $T_{J}$ = 125 °C			50	μA
		$V_{DS}$ = 60 V, $V_{GS}$ = 0 V, $T_{J}$ = 175 °C			250	
On-State Drain Current <sup>b</sup>	I <sub>D(on)</sub>	V <sub>DS</sub> = 5 V, V <sub>GS</sub> = 10 V	60			Α
		V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A		0.011		
	Б	$V_{GS}$ = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 125 °C		0.016		0
Drain-Source On-State Resistance <sup>b</sup>	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 20 A, T <sub>J</sub> = 175 °C		0.020		Ω
		V <sub>GS</sub> = 4.5 V, I <sub>D</sub> = 15 A		0.012		
Forward Transconductance <sup>b</sup>	9 <sub>fs</sub>	V <sub>DS</sub> = 15 V, I <sub>D</sub> = 20 A		60		S
Dynamic						
Input Capacitance	C <sub>iss</sub>			4300		
Output Capacitance	C <sub>oss</sub>	$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz		470		pF
Reverse Transfer Capacitance	C <sub>rss</sub>			225		
Total Gate Charge <sup>c</sup>	Qg			47		
Gate-Source Charge <sup>c</sup>	Q <sub>gs</sub>	$V_{\rm DS}$ = 30 V, $V_{\rm GS}$ = 10 V, $I_{\rm D}$ = 50 A		10		nC
Gate-Drain Charge <sup>c</sup>	Q <sub>gd</sub>			12		
Turn-On Delay Time <sup>c</sup>	t <sub>d(on)</sub>			10	20	
Rise Time <sup>c</sup>	t <sub>r</sub>	$V_{DD}$ = 30 V, $R_L$ = 0.6 $\Omega$		15	25	
Turn-Off Delay Time <sup>c</sup>	t <sub>d(off)</sub>	$\text{I}_\text{D} \cong$ 50 A, $\text{V}_\text{GEN}$ = 10 V, Rg = 2.5 $\Omega$		35	50	ns
Fall Time <sup>c</sup>	t <sub>f</sub>			20	30	
Source-Drain Diode Ratings and Cha	racteristics (	T <sub>C</sub> = 25 °C)		·	I	
Pulsed Current	I <sub>SM</sub>				60	А
Diode Forward Voltage	V <sub>SD</sub>	I <sub>F</sub> = 20 A, V <sub>GS</sub> = 0 V		1	1.5	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs		45	100	ns

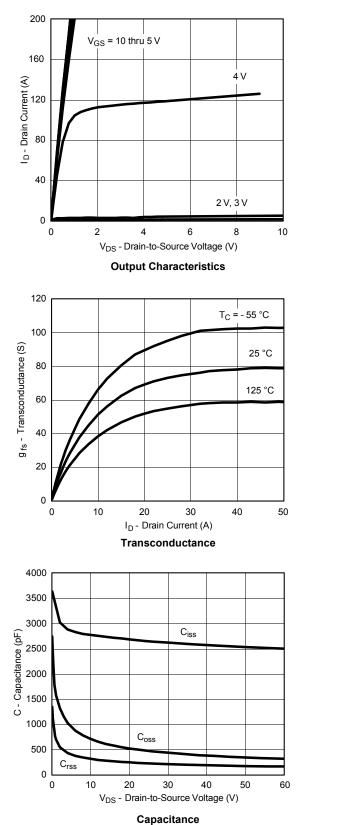
Notes:

a. For design aid only; not subject to production testing. b. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 %.

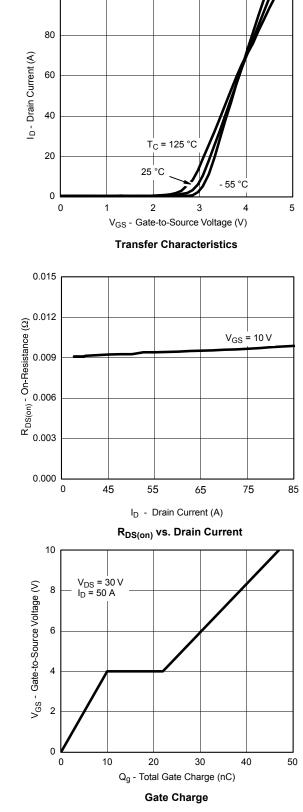
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



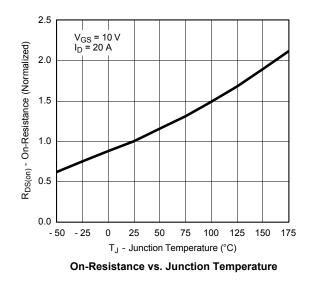




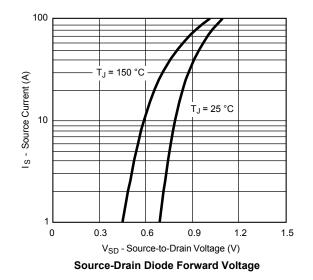


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## NTB60N06LG-VB



#### TYPICAL CHARACTERISTICS (25 °C unless noted)

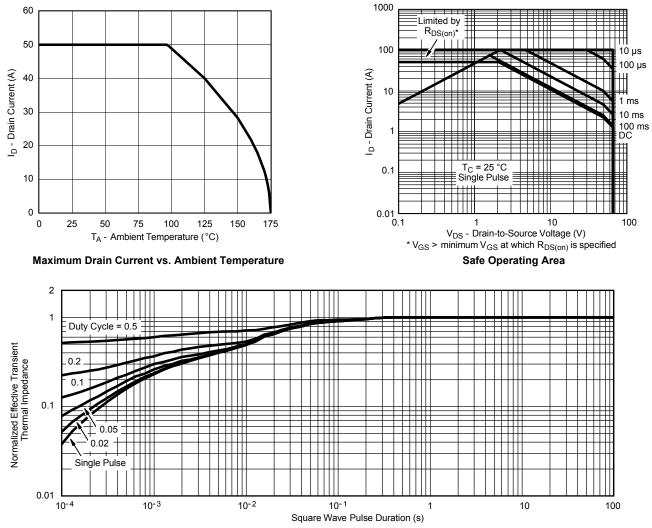


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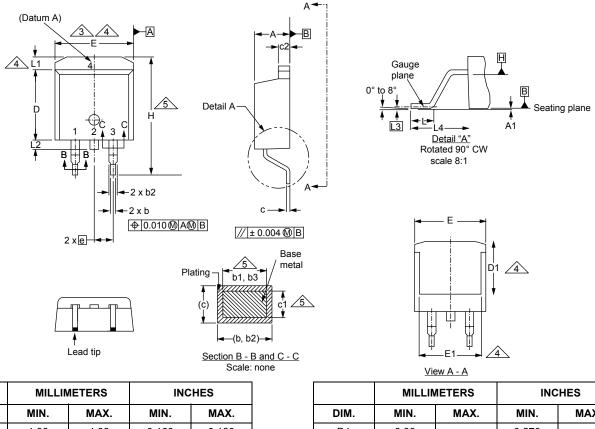
#### THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Case



#### **TO-263AB (HIGH VOLTAGE)**



	MILLI	METERS	INC	HES
DIM.	MIN.	MAX.	MIN.	MAX.
А	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
С	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

Notes

- 4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
- 5. Dimension b1 and c1 apply to base metal only.

6. Datum A and B to be determined at datum plane H.

7. Outline conforms to JEDEC outline to TO-263AB.

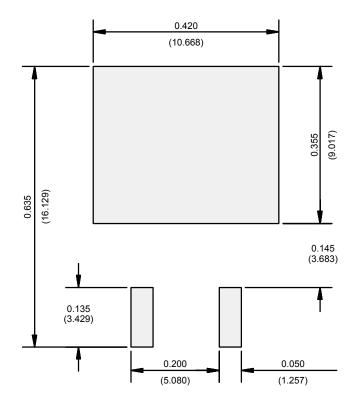
<sup>1.</sup> Dimensioning and tolerancing per ASME Y14.5M-1994.

<sup>2.</sup> Dimensions are shown in millimeters (inches).

Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.



#### **RECOMMENDED MINIMUM PADS FOR D<sup>2</sup>PAK: 3-Lead**



Recommended Minimum Pads Dimensions in Inches/(mm)



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