

## 100V N-Channel Enhancement Mode Power MOSFET

### Description

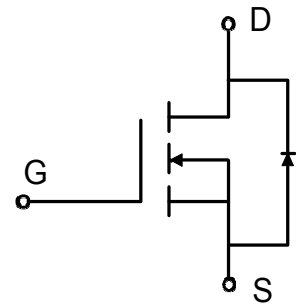
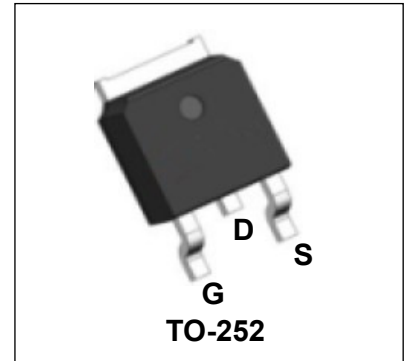
HNS15N10B uses advanced power trench technology that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Features

- ★  $V_{DS} = 100V$ ,  $I_D = 14.6A$   
 $R_{DS(on)} < 90m\Omega @ V_{GS} = 10V$   
 $R_{DS(on)} < 110m\Omega @ V_{GS} = 4.5V$
- ★ Green Device Available
- ★ Low Gate Charge
- ★ Advanced High Cell Density Trench Technology
- ★ 100% EAS Guaranteed

### Applications

- ★ Power Management Switches
- ★ DC/DC Converters



### Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		$V_{DS}$	100	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	V
Continuous Drain Current@10V <sup>1</sup>	$T_C = 25^\circ C$	$I_D$	14.6	A
	$T_C = 100^\circ C$		10	
Pulsed Drain Current <sup>2</sup>		$I_{DM}$	58	A
Avalanche Current		$I_{AS}$	8	A
Single Pulse Avalanche Energy <sup>3</sup>		<b>EAS</b>	3.2	mJ
Total Power Dissipation <sup>4</sup>	$T_C = 25^\circ C$	$P_D$	41.7	W
Operating Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	$^\circ C$

### Thermal Characteristics

Parameter	Symbol	Value	Unit
Thermal Resistance from Junction-to-Ambient <sup>1</sup>	$R_{\theta JA}$	50	$^\circ C/W$
Thermal Resistance from Junction-to-Case <sup>1</sup>	$R_{\theta JC}$	3	$^\circ C/W$

**Electrical Characteristics**  $T_c = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
<b>Static Characteristics</b>							
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	100	-	-	V	
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.2	-	2.5	V	
Drain-Source on-Resistance <sup>2</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 5A$	-	65	90	m $\Omega$	
		$V_{GS} = 4.5V, I_D = 3A$	-	75	110		
Gate-body Leakage current	$I_{GSS}$	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	$\pm 100$	nA	
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 100V, V_{GS} = 0V$	$T_J = 25^\circ\text{C}$	-	-	10	$\mu A$
			$T_J = 55^\circ\text{C}$	-	-	100	
Forward Transconductance <sup>2</sup>	$g_{fs}$	$V_{DS} = 5V, I_D = 5A$	-	15	-	S	
<b>Dynamic Characteristics</b>							
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1\text{MHz}$	-	1100	-	pF	
Output Capacitance	$C_{oss}$		-	55	-		
Reverse Transfer Capacitance	$C_{rss}$		-	40	-		
<b>Switching Characteristics</b>							
Gate Resistance	$R_g$	$V_{DS} = 0V, V_{GS} = 0V, f = 1\text{MHz}$	-	3	-	$\Omega$	
Total Gate Charge(10V)	$Q_g$	$V_{GS} = 10V, V_{DS} = 50V, I_D = 5A$	-	12	-	nC	
Gate-Source Charge	$Q_{gs}$		-	2.9	-		
Gate-Drain Charge	$Q_{gd}$		-	1.8	-		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 50V, R_G = 3\Omega, I_D = 5A$	-	3.9	-	nS	
Rise Time	$t_r$		-	26	-		
Turn-Off Delay Time	$t_{d(off)}$		-	16.2	-		
Fall Time	$t_f$		-	8.9	-		
<b>Drain-Source Body Diode Characteristics</b>							
Diode Forward Voltage <sup>2</sup>	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	-	1.2	V	
Continuous Source Current <sup>1,5</sup>	$I_S$	$V_G = V_D = 0V, \text{Force Current}$			14.6	A	

**Notes:**

- The data tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.
- The data tested by pulsed, pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$
- The EAS data shows Max. rating. The test condition is  $V_{DD} = 25V, V_{GS} = 10V, L = 0.1\text{mH}, I_{AS} = 8A$
- The power dissipation is limited by 150°C junction temperature
- The data is theoretically the same as  $I_D$  and  $I_{DM}$ , in real applications, should be limited by total power dissipation.

**Typical Characteristics**

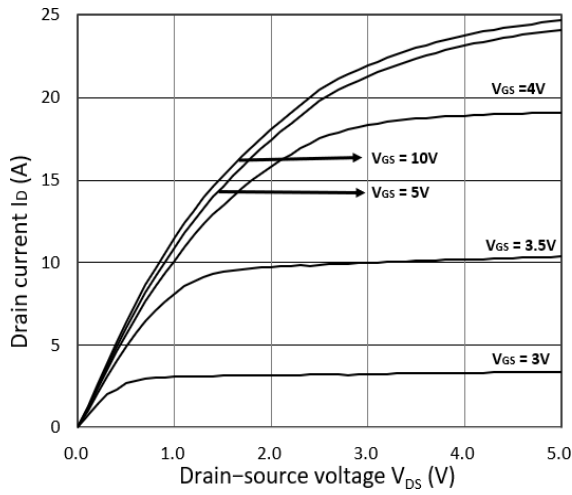


Figure 1. Output Characteristics

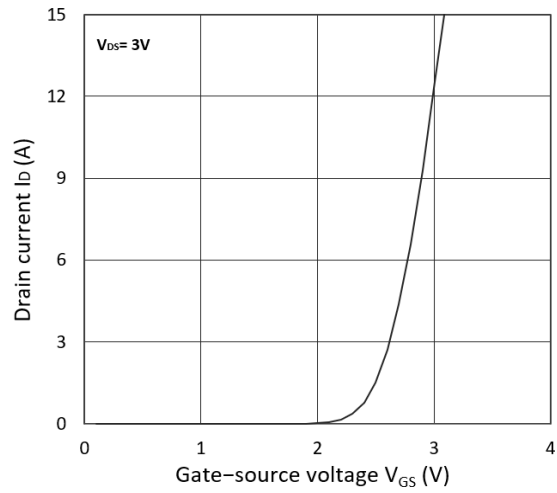


Figure 2. Transfer Characteristics

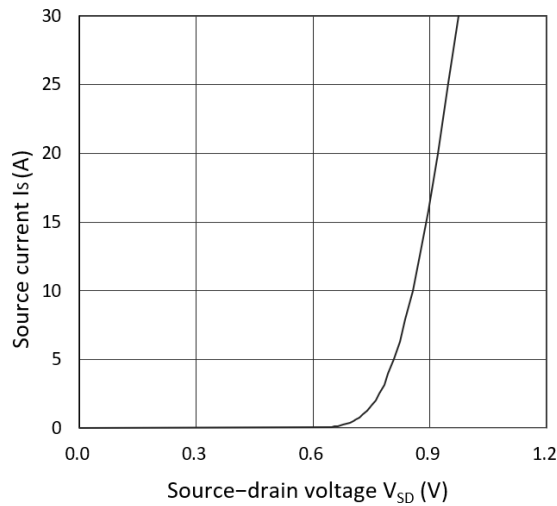


Figure 3. Forward Characteristics of Reverse

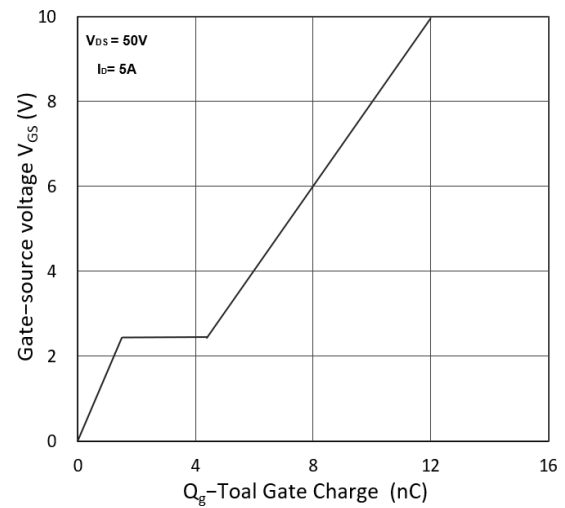


Figure 4. Gate Charge Characteristics

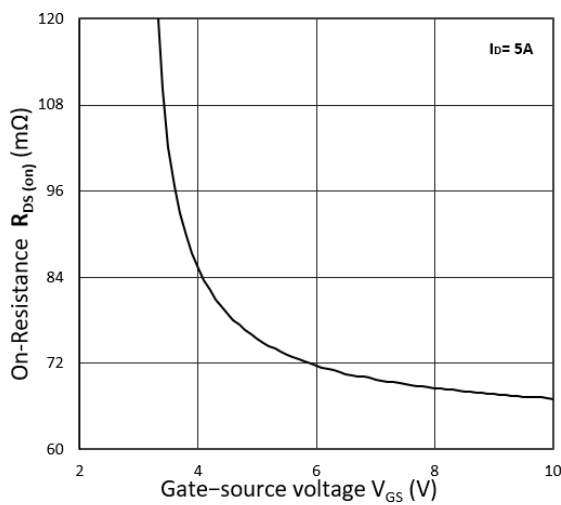


Figure 5.  $R_{DS(on)}$  vs.  $V_{GS}$

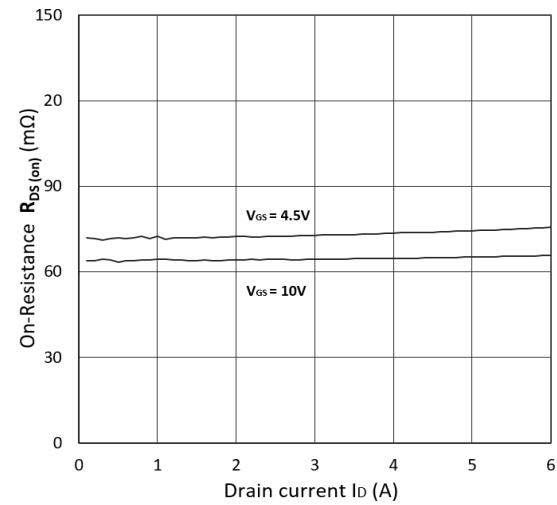


Figure 6.  $R_{DS(on)}$  vs.  $I_D$

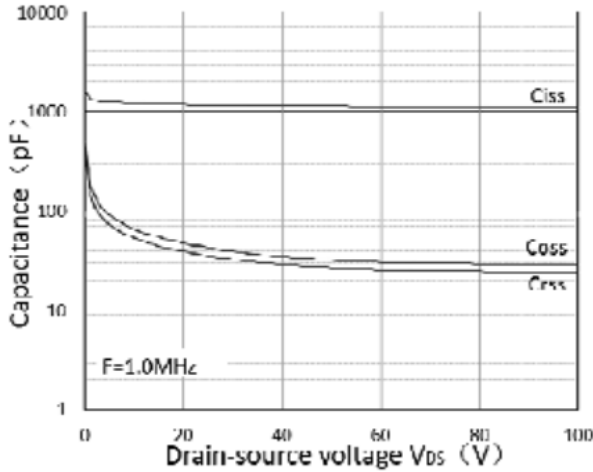


Figure 7. Capacitance Characteristics

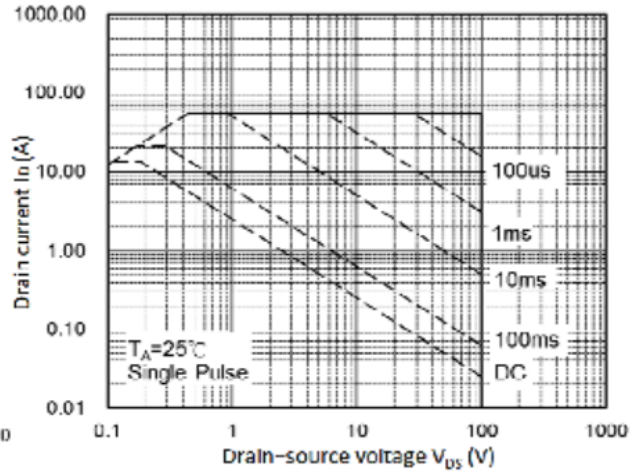


Figure 8. Safe Operating Area

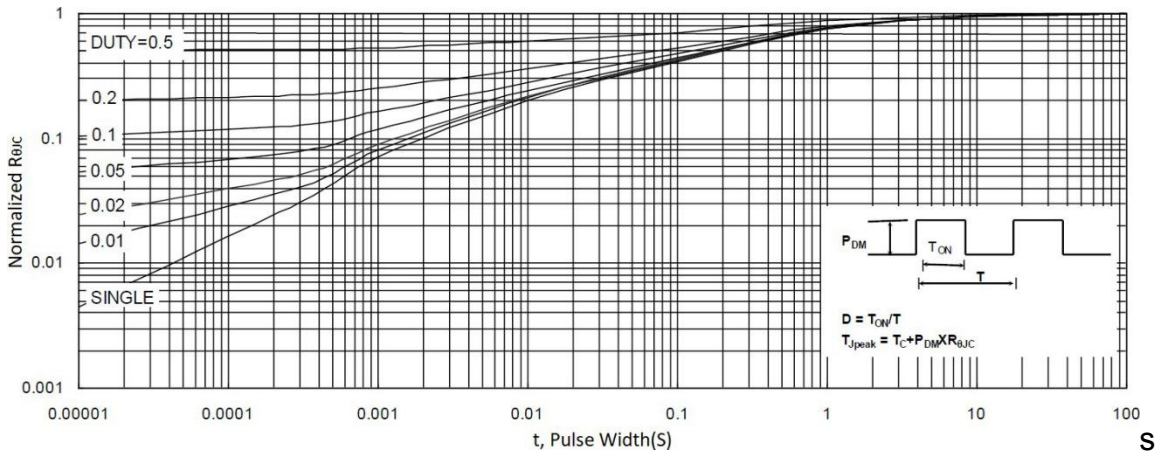


Figure 9. Normalized Maximum Transient Thermal Impedance

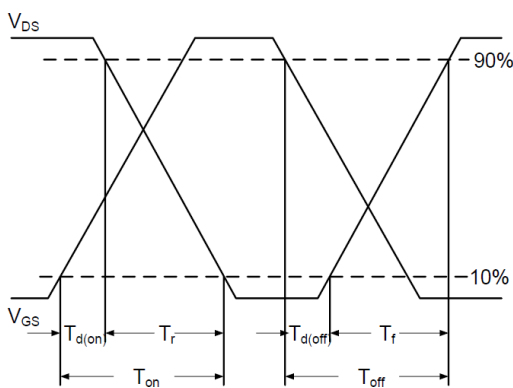


Figure 10. Switching Time Waveform

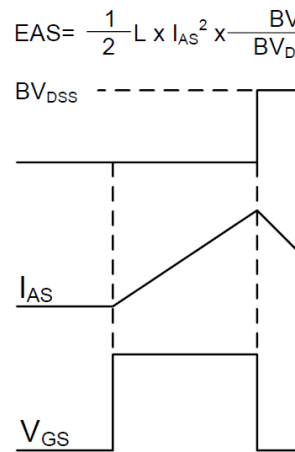
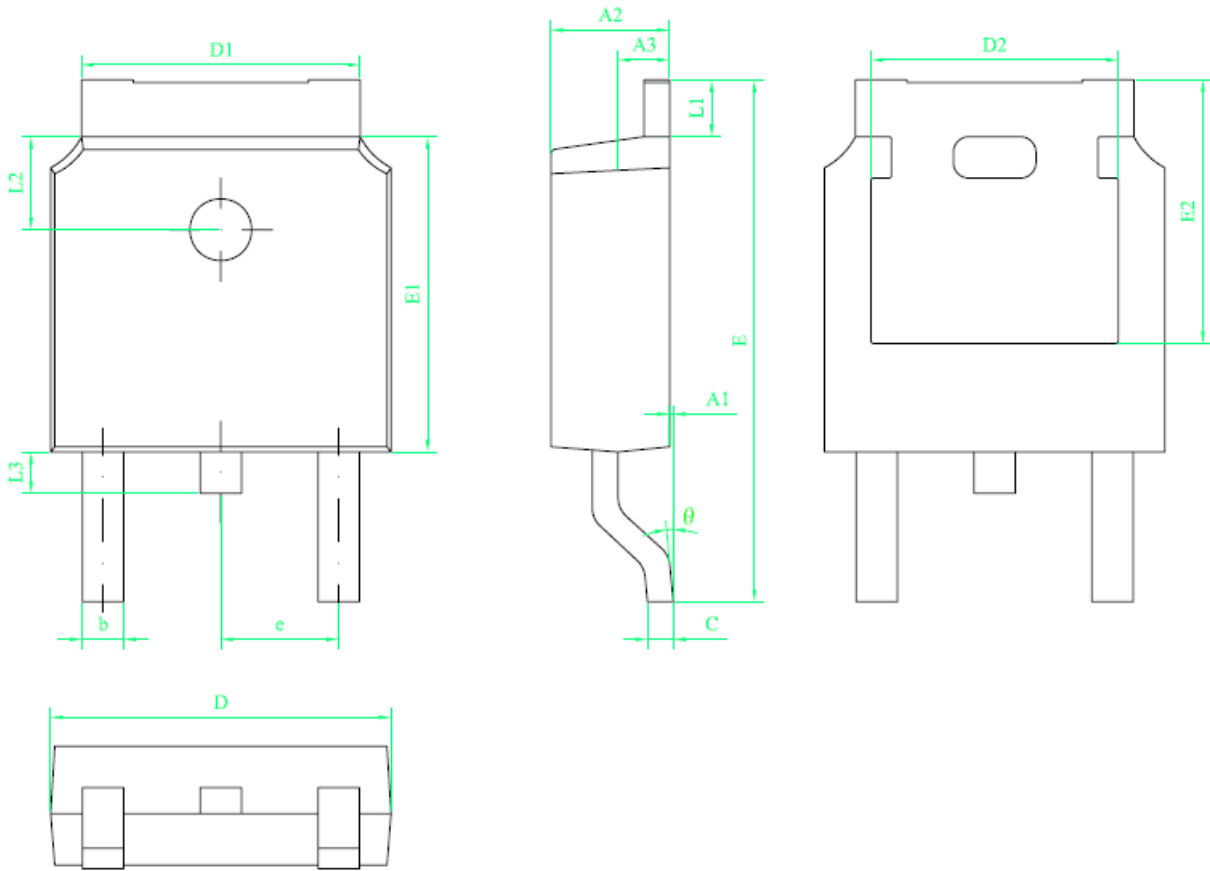


Figure 11. Unclamped Inductive Switching Waveform



Mechanical Dimensions for TO-252

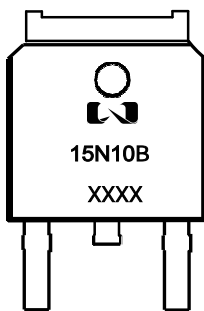


符号	尺寸		
	min	nom	max
A1	0	---	0.10
A2	2.20	2.30	2.40
A3	0.90	1.00	1.10
b	0.75	---	0.85
e	0.50	---	0.60
D	6.50	6.60	6.70
D1	5.30	5.40	5.50
D2	4.70	4.80	4.90
E	9.90	10.10	10.30
E1	6.00	6.10	6.20
E2	5.20	5.30	5.40
e	2.20	2.286	2.40
L1	0.90	---	1.25
L2	1.70	1.80	1.90
L3	0.60	0.80	1.00
θ	0°	---	8°

**Ordering Information**

Part	Package	Marking	Packing method
HNS15N10B	TO-252	15N10B	Tape and Reel

**Marking Information**



15N10B = Device code

XXXX = LOT# +Date code

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