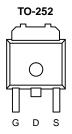


ROHS COMPLIANT

### STD95NF04-VB Datasheet N-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY						
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (Ω)	I <sub>D</sub> (A) <sup>a, c</sup>	Q <sub>g</sub> (Typ.)			
40	0.0050 at V <sub>GS</sub> = 10 V	85	80 nC			
40	0.0065 at V <sub>GS</sub> = 4.5 V	70	80 HC			

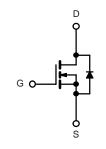


### FEATURES

- Trench Power MOSFET
- 100 % Rg and UIS Tested

#### APPLICATIONS

- Synchronous Rectification
- Power Supplies



N-Channel MOSFET

ABSOLUTE MAXIMUM RATING	<b>S</b> T <sub>A</sub> = 25 °C, unle	ss otherwise not	ed	
Parameter		Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	40	V	
Gate-Source Voltage		V <sub>GS</sub>	± 25	v
	T <sub>C</sub> = 25 °C		85 <sup>a, c</sup>	
Continuous Drain Current $(T = 175 °C)$	T <sub>C</sub> = 70 °C		70 <sup>c</sup>	
Continuous Drain Current ( $T_J = 175 \ ^{\circ}C$ )	T <sub>A</sub> = 25 °C	I <sub>D</sub>	59 <sup>b</sup>	A
	T <sub>A</sub> = 70 °C		53 <sup>b</sup>	A
Pulsed Drain Current	I <sub>DM</sub>	250		
valanche Current Pulse L = 0.1 mH		I <sub>AS</sub>	80	
Single Pulse Avalanche Energy	L = 0.1 IIIH	E <sub>AS</sub>	320	mJ
Continuous Source-Drain Diode Current	T <sub>C</sub> = 25 °C	I <sub>S</sub>	110 <sup>a, c</sup>	Α
Continuous Source-Drain Diode Current	T <sub>A</sub> = 25 °C	'S	2.6 <sup>b</sup>	A
	T <sub>C</sub> = 25 °C		312 <sup>a</sup>	
Maximum Davies Disainstics	T <sub>C</sub> = 70 °C	Б	200	14/
Maximum Power Dissipation	T <sub>A</sub> = 25 °C	P <sub>D</sub>	3.13 <sup>b</sup>	W
	T <sub>A</sub> = 70 °C		2.0 <sup>b</sup>	
Operating Junction and Storage Temperature Ra	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C	

THERMAL RESISTANCE RATINGS							
Parameter		Symbol	Typical	Maximum	Unit		
Maximum Junction-to-Ambient <sup>b</sup>	Steady State	R <sub>thJA</sub>	32	40	°C/W		
Maximum Junction-to-Case	Steady State	R <sub>thJC</sub>	0.33	0.4	C/VV		

Notes:

a. Based on  $T_C = 25$  °C.

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

c. Calculated based on maximum junction temperature. Package limitation current is 110 A.

<b>SPECIFICATIONS</b> $T_J = 25 \text{ °C}$ , unless otherwise noted							
Parameter	Symbol	Test Conditions	Min.	Тур.	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V <sub>DS</sub>	$V_{GS} = 0 V, I_{D} = 250 \mu A$	40			V	
V <sub>DS</sub> Temperature Coefficient	$\Delta V_{DS}/T_{J}$	I <sub>D</sub> = 250 μA		41		mV/°0	
V <sub>GS(th)</sub> Temperature Coefficient	$\Delta V_{GS(th)}/T_J$	_		- 8		11107 C	
Gate-Source Threshold Voltage	V <sub>GS(th)</sub>	$V_{DS} = V_{GS}, I_D = 250 \ \mu A$	1.2		2.5	V	
Gate-Source Leakage	I <sub>GSS</sub>	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	$V_{DS} = 40 \text{ V}, V_{GS} = 0 \text{ V}$			1	۸	
Zero Gale voltage Drain Current		$V_{DS} = 40$ V, $V_{GS} = 0$ V, $T_{J} = 55$ °C			10	μA	
On-State Drain Current <sup>a</sup>	I <sub>D(on)</sub>	$V_{DS} \ge 5$ V, $V_{GS}$ = 10 V	120			Α	
	P	$V_{GS} = 10 \text{ V}, \text{ I}_{D} = 30 \text{ A}$		0.0050		Ω	
Drain-Source On-State Resistance <sup>a</sup>	R <sub>DS(on)</sub>	$V_{GS} = 4.5 \text{ V}, \text{ I}_{D} = 20 \text{ A}$		0.0065			
Forward Transconductance <sup>a</sup>	9 <sub>fs</sub>	$V_{DS} = 15 \text{ V}, \text{ I}_{D} = 30 \text{ A}$		180		S	
Dynamic <sup>b</sup>							
Input Capacitance	C <sub>iss</sub>			2380		pF	
Output Capacitance	C <sub>oss</sub>	$V_{DS}$ = 20 V, $V_{GS}$ = 0 V, f = 1 MHz		550			
Reverse Transfer Capacitance	C <sub>rss</sub>			250			
Total Gate Charge	Qg			80	120		
Gate-Source Charge	Q <sub>gs</sub>	$V_{DS}$ = 20 V, $V_{GS}$ = 10 V, $I_D$ = 20 A		20		nC	
Gate-Drain Charge	Q <sub>gd</sub>			12			
Gate Resistance	Rg	f = 1 MHz		0.85	1.3	Ω	
Turn-On Delay Time	t <sub>d(on)</sub>			20	30	_	
Rise Time	t <sub>r</sub>	$V_{DD}$ = 20 V, $R_L$ = 1.0 $\Omega$		11	17		
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong$ 20 A, $V_{GEN}$ = 10 V, $R_g$ = 1 $\Omega$		77	115		
Fall Time	t <sub>f</sub>			10	15		
Turn-On Delay Time	t <sub>d(on)</sub>			102	155	ns	
Rise Time	t <sub>r</sub>	$V_{DD}$ = 20 V, $R_L$ = 1.0 $\Omega$		62	95	-	
Turn-Off Delay Time	t <sub>d(off)</sub>	$I_D \cong 20$ A, $V_{GEN}$ = 4.5 V, $R_g$ = 1 $\Omega$		180	270		
Fall Time	t <sub>f</sub>			60	90		
Drain-Source Body Diode Characteristic	s						
Continuous Source-Drain Diode Current	۱ <sub>S</sub>	T <sub>C</sub> = 25 °C			110	A	
Pulse Diode Forward Current <sup>a</sup>	I <sub>SM</sub>				200		
Body Diode Voltage	V <sub>SD</sub>	I <sub>S</sub> = 20 A		0.8	1.2	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>			50	75	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>	I <sub>F</sub> = 20 A, di/dt = 100 A/μs, T <sub>J</sub> = 25 °C		70	105	nC	
Reverse Recovery Fall Time	t <sub>a</sub>	$r_F = 20$ A, $u/ul = 100$ A/µs, $r_J = 25$ °C		30			
Reverse Recovery Rise Time	t <sub>b</sub>	7		20		ns	

Notes:

a. Pulse test; pulse width  $\leq$  300  $\mu s,$  duty cycle  $\leq$  2 %.

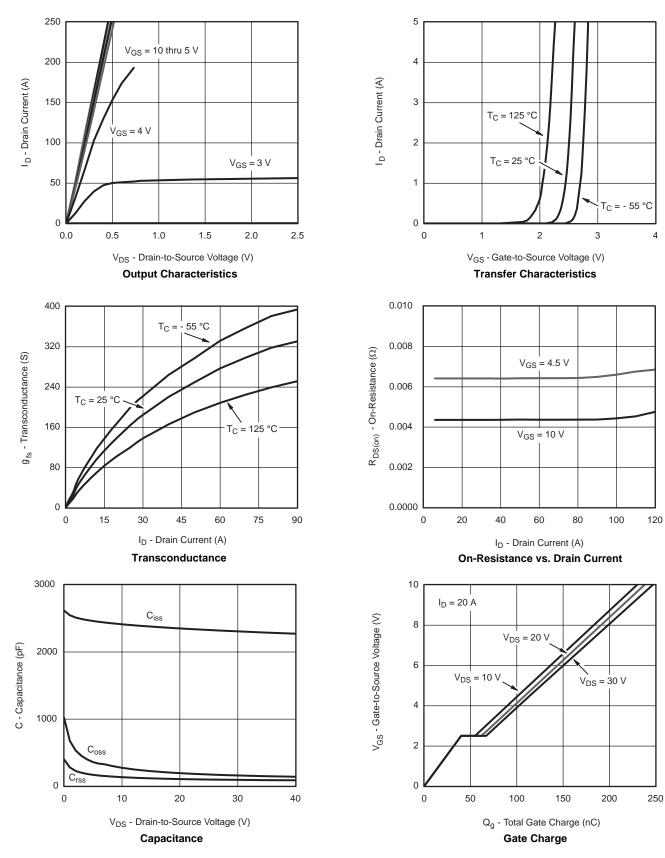
b. Guaranteed by design, not subject to production testing.

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.

Bsemi



### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

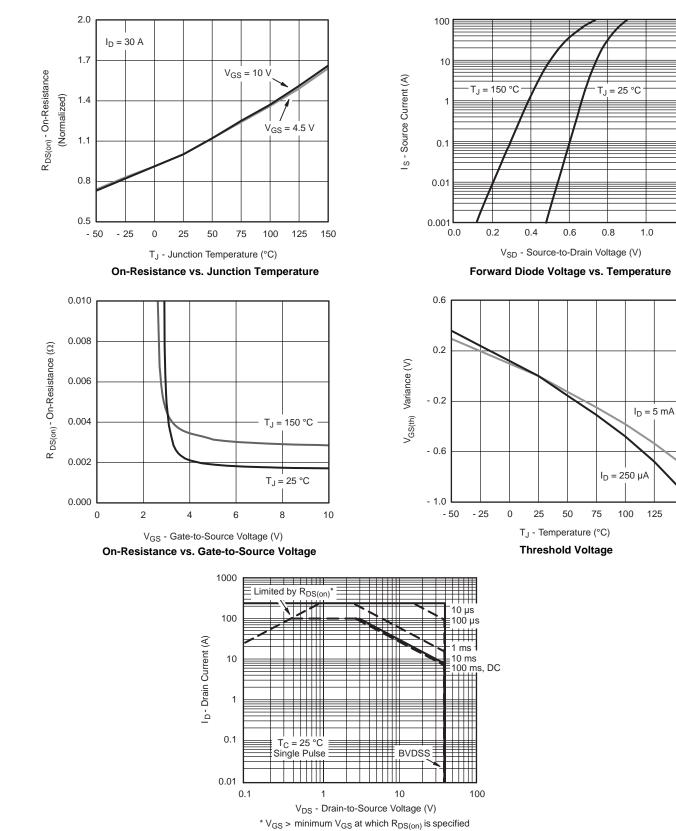


服务热线:400-655-8788



1.2

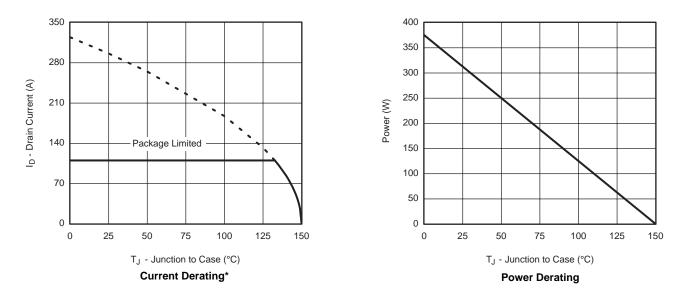
150



Safe Operating Area, Junction-to-Ambient

### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted





#### TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

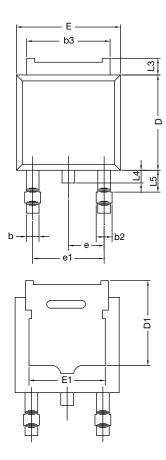
\* The power dissipation  $P_D$  is based on  $T_{J(max)}$  = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.



Normalized Thermal Transient Impedance, Junction-to-Case



### **TO-252AA CASE OUTLINE**





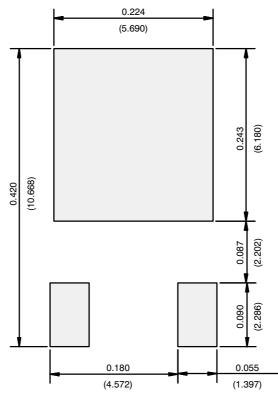
	MILLIMETERS		INC	HES	
DIM.	MIN.	MAX.	MIN.	MAX.	
А	2.18	2.38	0.086	0.094	
A1	-	0.127	-	0.005	
b	0.64	0.88	0.025	0.035	
b2	0.76	1.14	0.030	0.045	
b3	4.95	5.46	0.195	0.215	
С	0.46	0.61	0.018	0.024	
C2	0.46	0.89	0.018	0.035	
D	5.97	6.22	0.235	0.245	
D1	5.21	-	0.205	-	
E	6.35	6.73	0.250	0.265	
E1	4.32	-	0.170	-	
Н	9.40	10.41	0.370	0.410	
е	2.28 BSC		0.090 BSC		
e1	4.56 BSC		0.180 BSC		
L	1.40	1.78	0.055	0.070	
L3	0.89	1.27	0.035	0.050	
L4	-	1.02	-	0.040	
L5	1.14	1.52	0.045	0.060	
ECN: X12-0247-Rev. M, 24-Dec-12 DWG: 5347					

#### Note

• Dimension L3 is for reference only.



### **RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)**



Recommended Minimum Pads Dimensions in Inches/(mm)



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