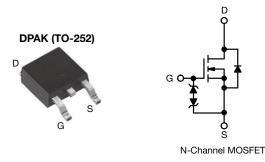
# SiHD5N80AE

**Vishay Siliconix** 



## **E Series Power MOSFET**



PRODUCT SUMMARY				
V <sub>DS</sub> (V) at T <sub>J</sub> max.	850			
R <sub>DS(on)</sub> typ. (Ω) at 25 °C	$V_{GS} = 10 V$	1.17		
Q <sub>g</sub> max. (nC)	16.5			
Q <sub>gs</sub> (nC)	3			
Q <sub>gd</sub> (nC)	6			
Configuration	Single			

### FEATURES

- Low figure-of-merit (FOM) Ron x Qg
- Low effective capacitance (C<sub>iss</sub>)
- · Reduced switching and conduction losses
- Ultra low gate charge (Qg)
- Avalanche energy rated (UIS)
- Integrated Zener diode ESD protection
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

#### APPLICATIONS

- Server and telecom power supplies
- Switch mode power supplies (SMPS)
- Power factor correction power supplies (PFC)
- Lighting
  - High-intensity discharge (HID)
  - Fluorescent ballast lighting
- Industrial
  - Welding
  - Induction heating
  - Motor drives
  - Battery chargers
  - Renewable energy

ORDERING INFORMATION				
Package	DPAK (TO-252)			
Lead (Pb)-free and halogen-free	SiHD5N80AE-GE3			

<b>ABSOLUTE MAXIMUM RATINGS</b> ( $T_c = 25 \degree C$ , unless otherwise noted)					
PARAMETER			SYMBOL	LIMIT	UNIT
Drain-source voltage			V <sub>DS</sub>	800	V
Gate-source voltage			V <sub>GS</sub>	± 30	v
Continuous drain current (T <sub>J</sub> = 150 °C)	V <sub>GS</sub> at 10 V	$T_{\rm C} = 25 \ ^{\circ}{\rm C}$ $T_{\rm C} = 100 \ ^{\circ}{\rm C}$	Ι <sub>D</sub>	4.4	
	VGS at 10 V	T <sub>C</sub> = 100 °C		2.8	А
Pulsed drain current <sup>a</sup>			I <sub>DM</sub>	7	
Linear derating factor				0.5	W/°C
Single pulse avalanche energy <sup>b</sup>			E <sub>AS</sub>	17	mJ
Maximum power dissipation			PD	62.5	W
Operating junction and storage temperature range			T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C
Drain-source voltage slope $T_J = 125 \text{ °C}$		dv/dt	70		
Reverse diode dv/dt <sup>d</sup>			0.3	V/ns	
Soldering recommendations (peak temperature) <sup>c</sup> For 10 s			260	°C	

#### Notes

a. Repetitive rating; pulse width limited by maximum junction temperature

b.  $V_{DD}$  = 140 V, starting T<sub>J</sub> = 25 °C, L = 28.2 mH, R<sub>g</sub> = 25  $\Omega$ , I<sub>AS</sub> = 1.1 A

c. 1.6 mm from case

d.  $I_{SD} \leq I_D$ , di/dt = 100 A/µs, starting  $T_J$  = 25 °C

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COMPLIANT

HALOGEN

FREE



$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	THERMAL RESISTANCE RATINGS								
$\begin{tabular}{ c  c  c  c  c  c  c  c  c  c  c  c  c $	PARAMETER	SYMBOL	MAX.		UNIT				
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Maximum junction-to-ambient	R <sub>thJA</sub>	62		°C AN				
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Maximum junction-to-case (drain)	R <sub>thJC</sub>		2			°C/W		
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$									
	<b>SPECIFICATIONS</b> ( $T_J = 25 \ ^{\circ}C$ ,	unless otherwi	se noted)						
$\begin{array}{ c c c c c c c } \hline Drain-source breakdown voltage & V_{DS} & V_{GS} = 0 \ V, \ I_D = 250 \ \mu A & 800 & - & - & V \\ \hline V_{DS} temperature coefficient & \Delta V_{DS}/T_J & Reference to 25 \ ^{\circ}C, \ I_D = 1 \ mA & - & 0.8 & - & V^{\circ}C \\ \hline Gate-source threshold voltage (N) & V_{GS}(N) & V_{DS} = V_{GS}, \ I_D = 250 \ \mu A & 2 & - & 4 & V \\ \hline Gate-source threshold voltage (N) & V_{GS}(N) & V_{DS} = V_{DS} + 20 \ V & - & - & \pm 10 \\ \hline V_{GS} = \pm 20 \ V & - & - & \pm 50 \\ \hline V_{GS} = \pm 30 \ V & - & - & \pm 50 \\ \hline V_{DS} = 640 \ V, \ V_{GS} = 0 \ V & - & - & 10 \\ \hline V_{DS} = 640 \ V, \ V_{GS} = 0 \ V & - & - & 10 \\ \hline Drain-source on-state resistance & R_{DS(on)} & V_{GS} = 10 \ V & I_D = 1.5 \ A & - & 1.2 & - & S \\ \hline Drain-source on-state resistance & R_{DS(on)} & V_{DS} = 30 \ V, \ V_{DS} = 30 \ V, \ I_D = 2 \ A & - & 1.2 & - & S \\ \hline Drain-source on-state resistance & R_{DS(on)} & V_{DS} = 100 \ V, \ V_{DS} = 0 \ V \ V_{DS} = 100 \ V, \ V_{DS} = 0 \ V \ V_{DS} = 100 \ V, \ V_{DS} = 0 \ V \ V_{DS} = 100 \ V, \ V_{DS} = 0 \ V \$	PARAMETER	SYMBOL	TES	T CONDITIONS	MIN.	TYP.	MAX.	UNIT	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Static								
$ \begin{array}{ c c c c c c } \hline Gate-source threshold voltage (N) & V_{GS(th)} & V_{GS(th)} & V_{GS} = V_{GS}, \ b_{2} = 250 \ \mu A & 2 & - & 4 & V \\ \hline Gate-source leakage & l_{GSS} & V_{GS} = 20 V & - & - & \pm 10 \\ \hline V_{GS} = \pm 20 V & - & - & \pm 50 \\ \hline V_{GS} = \pm 20 V & - & - & \pm 50 \\ \hline V_{GS} = \pm 20 V & V_{GS} = 0 V & - & - & \pm 50 \\ \hline V_{DS} = 800 V, V_{GS} = 0 V & - & - & 10 \\ \hline V_{DS} = 800 V, V_{GS} = 0 V & - & - & 10 \\ \hline V_{DS} = 800 V, V_{GS} = 0 V & - & - & 10 \\ \hline V_{DS} = 800 V, V_{GS} = 0 V & J_{D} = 1.5 A & - & 1.17 & 1.35 \ \Omega \\ \hline \text{Forward transconductance } & g_{fs} & V_{DS} = 30 V, \ J_{D} = 2 A & - & 1.2 & - & S \\ \hline \text{Dyname} & & & & & & & & & & \\ \hline \text{Input capacitance} & C_{Gs} & V_{GS} = 0 V, & & & & & & & & & & \\ \hline \text{Output capacitance} & C_{Gs} & V_{DS} = 100 V, & & & & & & & & & & & & \\ \hline \text{Reverse transfer capacitance} & C_{rss} & & & & & & & & & & & & & & \\ \hline \text{Effective output capacitance, energy} & C_{O(eff)} & & & & & & & & & & & & & & & & \\ \hline \text{Total gate charge} & Q_{g} & & & & & & & & & & & & & & & & \\ \hline \text{Gate-source charge} & Q_{gd} & & & & & & & & & & & & & & & \\ \hline \text{Turm-on delay time} & t_{d(cn)} & & & & & & & & & & & & & & & & \\ \hline \text{Turm-on delay time} & t_{d(cn)} & & & & & & & & & & & & & & & & & \\ \hline \text{Turm-on delay time} & t_{d(cn)} & & & & & & & & & & & & & & & & \\ \hline \text{Turm-on delay time} & t_{d(cn)} & & & & & & & & & & & & & & & & & \\ \hline \text{Fall time} & t_{f} & & & & & & & & & & & & & & & & & \\ \hline \text{Turm-on delay time} & t_{f} & & & & & & & & & & & & & & & & & \\ \hline \text{Turm-on delay time} & t_{f} & & & & & & & & & & & & & & & & & & &$	Drain-source breakdown voltage	V <sub>DS</sub>	V <sub>GS</sub> =	= 0 V, I <sub>D</sub> = 250 μA	800	-	-	V	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	V <sub>DS</sub> temperature coefficient	$\Delta V_{DS}/T_{J}$	Referenc	e to 25 °C, I <sub>D</sub> = 1 mA	-	0.8	-	V/°C	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-source threshold voltage (N)	V <sub>GS(th)</sub>	V <sub>DS</sub> =	· V <sub>GS</sub> , I <sub>D</sub> = 250 μA	2	-	4	V	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			, v	$V_{\rm GS}$ = ± 20 V	-	-	± 10		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-source leakage	IGSS	, v	V <sub>GS</sub> = ± 30 V	-	-	± 50	μΑ	
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Zava gata valtaga dvain avvent		V <sub>DS</sub> =	800 V, V <sub>GS</sub> = 0 V	-	-	1		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Zero gate voltage drain current	IDSS	V <sub>DS</sub> = 640 V	', V <sub>GS</sub> = 0 V, T <sub>J</sub> = 125 °C	-	-	10	μA	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Drain-source on-state resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V	I <sub>D</sub> = 1.5 A	-	1.17	1.35	Ω	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Forward transconductance <sup>a</sup>		V <sub>DS</sub>	= 30 V, I <sub>D</sub> = 2 A	-	1.2	-	S	
$ \begin{array}{ c c c c c c } \hline \text{Output capacitance} & C_{\text{oss}} & V_{\text{DS}} = 100 \ \text{V}, \\ \hline \text{Reverse transfer capacitance} & C_{\text{rss}} & \hline \text{f} = 1 \ \text{MHz} & - & 4 & - \\ \hline \text{Ff ctive output capacitance, energy} & C_{\text{oler}} & \\ \hline \text{Effective output capacitance, time} & C_{\text{o}(tr)} & \\ \hline \text{Effective output capacitance, time} & C_{\text{o}(tr)} & \\ \hline \text{Cotal gate charge} & Q_{\text{g}} & \\ \hline \text{Cotal gate charge} & Q_{\text{g}} & \\ \hline \text{Cate data charge} & Q_{\text{g}} & \\ \hline \text{Gate-source charge} & Q_{\text{g}d} & \\ \hline \text{Turn-on delay time} & t_{d(on)} & \\ \hline \text{Reverse transfer capacitance} & t_{r} & \\ \hline \text{V}_{\text{GS}} = 10 \ \text{V}, \ \text{N}_{\text{S}} = 640 \ \text{V}, \ \text{N}_{\text{D}} = 640 \ \text{V}, \ \text{N}_{\text{D}} = 640 \ \text{V}, \ \text{N}_{\text{B}} = 2 \ \text{A}, \ \text{V}_{\text{DS}} = 640 \ \text{V}, \ \text{D} = 2 \ \text{A}, \ \text{V}_{\text{D}} = 640 \ \text{V}, \ \text{D} = 2 \ \text{A}, \ \text{V}_{\text{B}} = 91 \ \text{O} & \hline \begin{array}{c} - & 11 & 16.5 \\ - & 111 & 16.5 \\ - & 3 & - \\ \hline - & 6 & - \\ \hline - & 6 & - \\ \hline \hline \text{Cate-drain charge} & Q_{\text{gd}} & \\ \hline \text{Turn-on delay time} & t_{d(on)} & \\ \hline \text{Rise time} & t_{r} & \\ \hline \text{Turn-off delay time} & t_{d(off)} & \\ \hline \text{Fall time} & t_{r} & \\ \hline \text{Gate input resistance} & \text{Rg} & \text{f} = 1 \ \text{MHz, open drain} & 1.6 \ \text{3.2} \ \text{6.4} \ \Omega & \Omega & \\ \hline \hline \text{Drain-Source Body Diode Characteristics} & \\ \hline \hline \text{Continuous source-drain diode current} & I_{\text{S}} & \\ \hline \text{Pulsed diode forward current} & I_{\text{S}} & \\ \hline \text{MOSFET symbol} & \\ \text{showing the} & \\ \text{integral reverse} & p \ n \text{ junction diode} & \\ \hline \hline \text{Continuous source-drain diode current} & I_{\text{S}} & \\ \hline \text{Pulsed diode forward voltage} & V_{\text{SD}} & \\ \hline \text{TJ} = 25 \ \ ^{\circ}, \ \text{Ig} = 2 \ \text{A}, \ \text{V}_{\text{G}} = 2 \ \text{A}, \\ \hline \text{C}, \ \text{I}, \ \text{I},$								•	
$ \begin{array}{ c c c c c c } \hline \text{Output capacitance} & C_{\text{oss}} & V_{\text{DS}} = 100 \ \text{V}, \\ \hline \text{Reverse transfer capacitance} & C_{\text{rss}} & \hline \text{f} = 1 \ \text{MHz} & - & 4 & - \\ \hline \text{Ff ctive output capacitance, energy} & C_{\text{oler}} & \\ \hline \text{Effective output capacitance, time} & C_{\text{o}(tr)} & \\ \hline \text{Effective output capacitance, time} & C_{\text{o}(tr)} & \\ \hline \text{Cotal gate charge} & Q_{\text{g}} & \\ \hline \text{Cotal gate charge} & Q_{\text{g}} & \\ \hline \text{Cate data charge} & Q_{\text{g}} & \\ \hline \text{Gate-source charge} & Q_{\text{g}d} & \\ \hline \text{Turn-on delay time} & t_{d(on)} & \\ \hline \text{Reverse transfer capacitance} & t_{r} & \\ \hline \text{V}_{\text{GS}} = 10 \ \text{V}, \ \text{N}_{\text{S}} = 640 \ \text{V}, \ \text{N}_{\text{D}} = 640 \ \text{V}, \ \text{N}_{\text{D}} = 640 \ \text{V}, \ \text{N}_{\text{B}} = 2 \ \text{A}, \ \text{V}_{\text{DS}} = 640 \ \text{V}, \ \text{D} = 2 \ \text{A}, \ \text{V}_{\text{D}} = 640 \ \text{V}, \ \text{D} = 2 \ \text{A}, \ \text{V}_{\text{B}} = 91 \ \text{O} & \hline \begin{array}{c} - & 11 & 16.5 \\ - & 111 & 16.5 \\ - & 3 & - \\ \hline - & 6 & - \\ \hline - & 6 & - \\ \hline \hline \text{Cate-drain charge} & Q_{\text{gd}} & \\ \hline \text{Turn-on delay time} & t_{d(on)} & \\ \hline \text{Rise time} & t_{r} & \\ \hline \text{Turn-off delay time} & t_{d(off)} & \\ \hline \text{Fall time} & t_{r} & \\ \hline \text{Gate input resistance} & \text{Rg} & \text{f} = 1 \ \text{MHz, open drain} & 1.6 \ \text{3.2} \ \text{6.4} \ \Omega & \Omega & \\ \hline \hline \text{Drain-Source Body Diode Characteristics} & \\ \hline \hline \text{Continuous source-drain diode current} & I_{\text{S}} & \\ \hline \text{Pulsed diode forward current} & I_{\text{S}} & \\ \hline \text{MOSFET symbol} & \\ \text{showing the} & \\ \text{integral reverse} & p \ n \text{ junction diode} & \\ \hline \hline \text{Continuous source-drain diode current} & I_{\text{S}} & \\ \hline \text{Pulsed diode forward voltage} & V_{\text{SD}} & \\ \hline \text{TJ} = 25 \ \ ^{\circ}, \ \text{Ig} = 2 \ \text{A}, \ \text{V}_{\text{G}} = 2 \ \text{A}, \\ \hline \text{C}, \ \text{I}, \ \text{I},$	Input capacitance	C <sub>iss</sub>		$V_{cc} = 0 V$	-	321	-		
$ \begin{array}{ c c c c c c } \hline Reverse transfer capacitance & C_{rss} & f = 1 \ MHz & - & 4 & - \\ \hline Effective output capacitance, energy related a & & & \\ \hline Effective output capacitance, time related b & & \\ \hline C_{o(tr)} & C_{o(tr)} & & & \\ \hline V_{DS} = 0 \ V \ to \ 480 \ V, \ V_{GS} = 0 \ V \\ \hline P & & & \\ \hline P & & & \\ \hline Total gate charge & Q_g & & \\ \hline C_{ate-drain charge} & Q_{gd} & & \\ \hline Turn-on \ delay time & t_{d(on)} & & \\ \hline Turn-onf \ delay time & t_{d(off)} & & \\ \hline Fall time & t_{f} & & \\ \hline Turn-off \ delay time & t_{f} & & \\ \hline C_{ate-drain charge & Q_{gd} & & \\ \hline Turn-off \ delay time & t_{f} & & \\ \hline Turn-off \ delay time & t_{f} & & \\ \hline Fall time & t_{f} & & \\ \hline Continuous source-drain \ diode \ current & I_{S} & & \\ \hline Pulsed \ diode \ forward \ current & I_{SM} & & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & V_{SD} & \\ \hline Pulsed \ diode \ forward \ voltage & \\ \hline Pulsed \ diode \ forward \ voltage & \\ \hline Pulsed \ diode \ forward \ voltage & \\ \hline Pulsed \ diode \ forward \ voltage & \\ \hline Pulsed \ diode \ forward \ forward \ for$	Output capacitance		, ,		-	20	-		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Reverse transfer capacitance				-	4	-		
$ \begin{array}{c c c c c c c } \hline \mbox{Hective output capacitance, time} & C_{0(tr)} & & & & & & & & & & & & & & & & & & &$					-	14	-	pF	
$ \begin{array}{c c c c c c c c c } \hline Gate-source charge & $Q_{gs}$ & $V_{GS} = 10 \ V$ & $I_D = 2 \ A, \ V_{DS} = 640 \ V$ & $-$ & $3$ & $-$ & $nC$ \\ \hline Gate-drain charge & $Q_{gd}$ & $V_{GS} = 10 \ V$ & $I_D = 2 \ A, \ V_{DS} = 640 \ V$ & $-$ & $6$ & $-$ & $-$ & $12$ & $24$ \\ \hline $-$ & $12$ & $24$ & $-$ & $8$ & $16$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $28$ & $56$ & $-$ & $-$ & $-$ & $28$ & $56$ & $-$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $10$ & $-$ & $-$ & $10$ & $20$ & $-$ & $-$ & $10$ & $10$ & $-$ & $-$ & $10$ & $10$ & $-$ & $-$ & $10$ & $10$ & $-$ & $-$ & $10$ & $10$ & $-$ & $-$ & $10$ & $-$ & $-$ & $1.2$ & $V$ \\ \hline \hline $Pulsed diode forward current & $I_{S}$ & $I_{J} = 25 \ \ \ \ C, \ $I_{S} = 2 \ A, \ V_{GS} = 0 \ V$ & $-$ & $-$ & $1.2$ & $V$ \\ \hline $Reverse recovery time & $t_{rr}$ & $-$ & $1.2$ & $V$ & $-$ & $-$ & $		C <sub>o(tr)</sub>	$v_{\rm DS} = 0$	$V_{DS} = 0 V$ to 480 V, $V_{GS} = 0 V$		71	-		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Total gate charge	Qg			-	11	16.5		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-source charge	Q <sub>gs</sub>	$V_{GS} = 10 V$	$I_D = 2 \text{ A}, V_{DS} = 640 \text{ V}$	-	3	-	nC	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate-drain charge	Q <sub>gd</sub>			-	6	-		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Turn-on delay time	t <sub>d(on)</sub>			-	12	24		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Rise time		V <sub>DD</sub> =	= 640 V, I <sub>D</sub> = 2 A,	-	8	16		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Turn-off delay time	t <sub>d(off)</sub>	V <sub>GS</sub> =			10	20	ns	
Drain-Source Body Diode CharacteristicsContinuous source-drain diode currentIsMOSFET symbol showing the integral reverse p - n junction diode-4.4APulsed diode forward currentIsM $I_{SM}$ $T_J = 25 \ ^{\circ}C$ , Is = 2 A, V_{GS} = 0 V7Diode forward voltageV_{SD} $T_J = 25 \ ^{\circ}C$ , Is = 2 A, V_{GS} = 0 V1.2VReverse recovery time $t_{rr}$ $T_J = 25 \ ^{\circ}C$ , Is = 1s = 2 A, 	Fall time	t <sub>f</sub>				28	56		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate input resistance	Rg	f = 1	MHz, open drain	1.6	3.2	6.4	Ω	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Drain-Source Body Diode Characterist	ics							
Pulsed diode forward currentIIII7Diode forward voltageVSDTJ = 25 °C, IS = 2 A, VGS = 0 V1.2VReverse recovery time $t_{rr}$ TJ = 25 °C, IF = IS = 2 A, di/dt = 100 A/µS, VR = 25 V-267534ns	Continuous source-drain diode current	I <sub>S</sub>	showing the integral reverse		-	-	4.4		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Pulsed diode forward current	I <sub>SM</sub>			-	-	7		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Diode forward voltage	V <sub>SD</sub>	T <sub>J</sub> = 25 °	C, I <sub>S</sub> = 2 A, V <sub>GS</sub> = 0 V	-	- 1	1.2	V	
Reverse recovery charge $Q_{rr}$ $T_J = 25 \ ^{\circ}C$ , $I_F = I_S = 2 \ ^{\circ}A$ , $di/dt = 100 \ ^{\circ}A/\mu s$ , $V_B = 25 \ ^{\circ}V$ -1.22.4 $\mu C$	Reverse recovery time	-			-	267		ns	
$di/dt = 100 \text{ A/}\mu\text{s}, \forall R = 25 \text{ V}$					-				
			ai/at = 1	dı/dt = 100 A/µs, V <sub>R</sub> = 25 V			- 1		

#### Notes

a.  $C_{oss(er)}$  is a fixed capacitance that gives the same energy as  $C_{oss}$  while  $V_{DS}$  is rising from 0 V to 480 V  $V_{DSS}$ 

b.  $C_{oss(tr)}$  is a fixed capacitance that gives the same charging time as  $C_{oss}$  while  $V_{DS}$  is rising from 0 V to 480 V  $V_{DSS}$ 



# SiHD5N80AE

**Vishay Siliconix** 

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

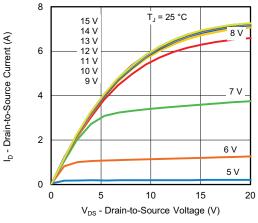


Fig. 1 - Typical Output Characteristics

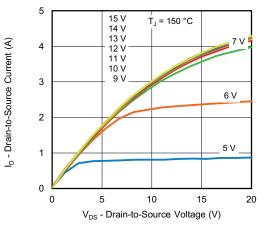


Fig. 2 - Typical Output Characteristics

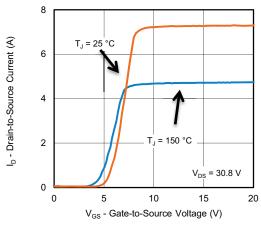


Fig. 3 - Typical Transfer Characteristics

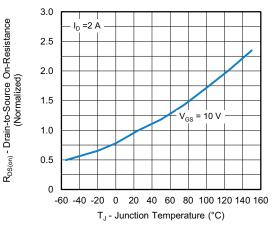


Fig. 4 - Normalized On-Resistance vs. Temperature

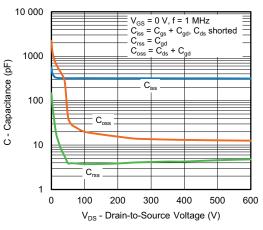
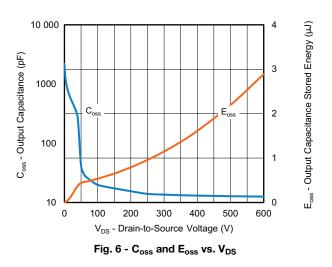


Fig. 5 - Typical Capacitance vs. Drain-to-Source Voltage



S20-0945-Rev. A, 14-Dec-2020

**3** For technical questions, contact: <u>hvm@vishay.com</u> Document Number: 92374

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SiHD5N80AE

**Vishay Siliconix** 

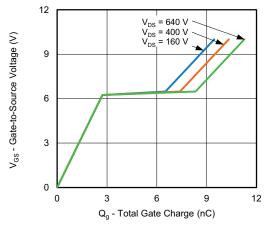


Fig. 7 - Typical Gate Charge vs. Gate-to-Source Voltage

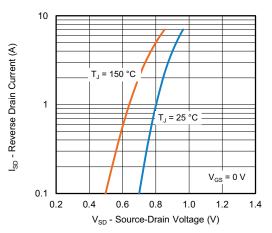


Fig. 8 - Typical Source-Drain Diode Forward Voltage

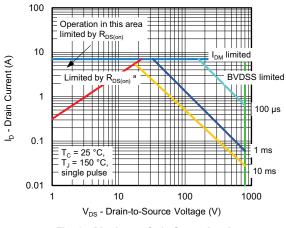


Fig. 9 - Maximum Safe Operating Area

Note

a.  $V_{GS}$  > minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

4

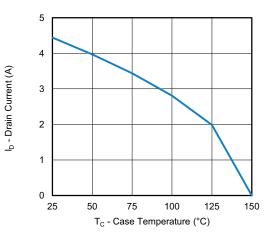


Fig. 10 - Maximum Drain Current vs. Case Temperature

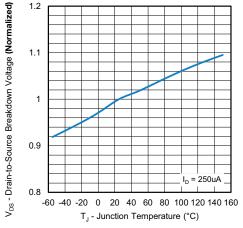


Fig. 11 - Normalized Breakdown Voltage vs. Temperature



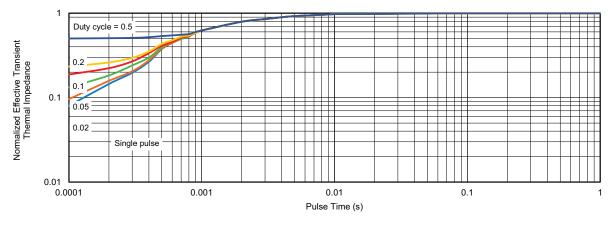


Fig. 12 - Normalized Transient Thermal Impedance, Junction-to-Case

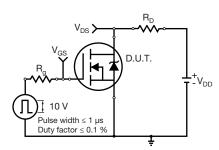


Fig. 13 - Switching Time Test Circuit

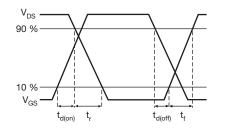


Fig. 14 - Switching Time Waveforms

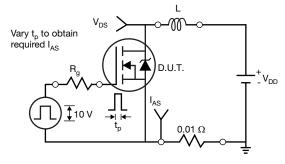


Fig. 15 - Unclamped Inductive Test Circuit

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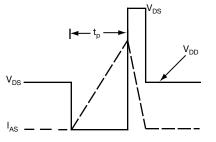


Fig. 16 - Unclamped Inductive Waveforms

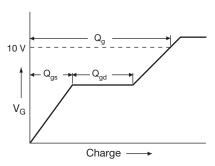
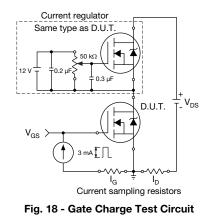


Fig. 17 - Basic Gate Charge Waveform





#### Peak Diode Recovery dv/dt Test Circuit

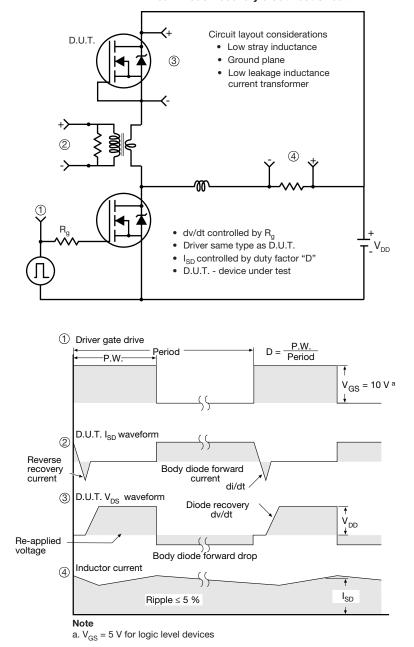


Fig. 19 - For N-Channel

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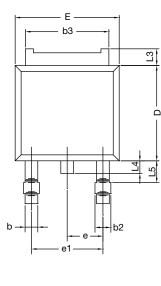
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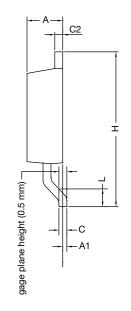


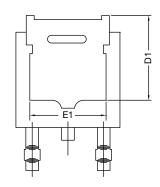


**TO-252AA Case Outline** 

### VERSION 1: FACILITY CODE = Y







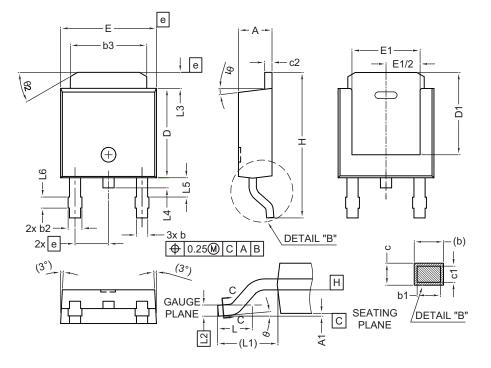
	MILLIMETERS			
DIM.	MIN.	MAX.		
А	2.18	2.38		
A1	-	0.127		
b	0.64	0.88		
b2	0.76	1.14		
b3	4.95	5.46		
С	0.46	0.61		
C2	0.46	0.89		
D	5.97	6.22		
D1	4.10	-		
E	6.35	6.73		
E1	4.32	-		
Н	9.40	10.41		
е	2.28	2.28 BSC		
e1	4.56	4.56 BSC		
L	1.40	1.78		
L3	0.89	1.27		
L4	-	1.02		
L5	1.01	1.52		

Note

• Dimension L3 is for reference only



### VERSION 2: FACILITY CODE = N



	MILLIMETERS		
DIM.	MIN.	MAX.	
A	2.18	2.39	
A1	-	0.13	
b	0.65	0.89	
b1	0.64	0.79	
b2	0.76	1.13	
b3	4.95	5.46	
С	0.46	0.61	
c1	0.41	0.56	
c2	0.46	0.60	
D	5.97	6.22	
D1	5.21	-	
E	6.35	6.73	
E1	4.32 -		
e	2.29 BSC		
Н	9.94 10.34		

	MILLIMETERS		
DIM.	MIN.	MAX.	
L	1.50	1.78	
L1	2.74 ref.		
L2	0.51 BSC		
L3	0.89	1.27	
L4	-	1.02	
L5	1.14	1.49	
L6	0.65	0.85	
θ	0°	10°	
θ1	0°	15°	
θ2	25° 35°		

#### Notes

• Dimensioning and tolerance confirm to ASME Y14.5M-1994

• All dimensions are in millimeters. Angles are in degrees

• Heat sink side flash is max. 0.8 mm

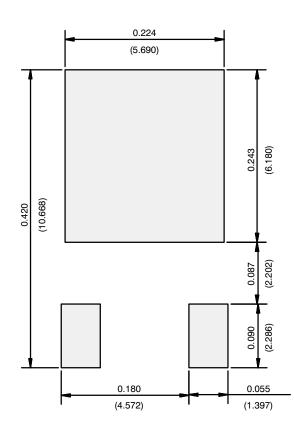
Radius on terminal is optional

ECN: E22-0399-Rev. R, 03-Oct-2022 DWG: 5347

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



Recommended Minimum Pads Dimensions in Inches/(mm)

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