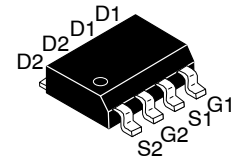


# MOSFET – Dual, N-Channel, POWERTRENCH®

2.5 V Specified

## FDS9926A



SOIC8  
CASE 751EB

### General Description

These N-Channel 2.5 V specified MOSFETs use onsemi's advanced POWERTRENCH process. It has been optimized for power management applications with a wide range of gate drive voltage (2.5 V – 10 V).

### Features

- 6.5 A, 20 V.  $R_{DS(ON)} = 30\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$   
 $R_{DS(ON)} = 43\text{ m}\Omega @ V_{GS} = 2.5\text{ V}$
- Optimized for Use in Battery Protection Circuits
- Low Gate Charge
- This Device is Pb-Free and Halide Free

### Applications

- Battery Protection
- Load Switch
- Power Management

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

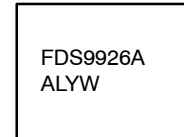
Symbol	Parameter	Ratings	Unit
$V_{DSS}$	Drain-Source Voltage	20	V
$V_{GSS}$	Gate-Source Voltage	$\pm 10$	V
$I_D$	Drain Current	Continuous (Note 1a)	6.5
		Pulsed	20
$P_D$	Power Dissipation	for Dual Operation	2
		for Single Operation (Note 1a)	1.6
		(Note 1b)	1
	(Note 1c)	0.9	
$T_J, T_{STG}$	Operating and Storage Junction Temperature Range	-55 to +150	$^\circ\text{C}$

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.

### THERMAL CHARACTERISTICS

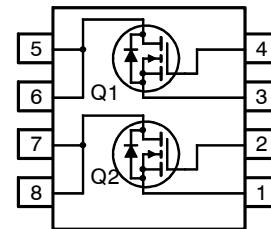
Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	78	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	40	$^\circ\text{C/W}$

### MARKING DIAGRAM



FDS9926A = Specific Device Code  
A = Assembly Site  
L = Wafer Lot Number  
YW = Assembly Start Week

### ELECTRICAL CONNECTION



### ORDERING INFORMATION

Device	Package	Shipping†
FDS9926A	SOIC8	2500 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, [BRD8011/D](#).

# FDS9926A

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
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### OFF CHARACTERISTICS

$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_D = 250\ \mu\text{A}$	20	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	-	14	-	mV/ $^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 16\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	$\mu\text{A}$
$I_{GSS}$	Gate-Body Leakage	$V_{GS} = \pm 8\text{ V}, V_{DS} = 0\text{ V}$	-	-	$\pm 100$	nA

### ON CHARACTERISTICS (Note 2)

$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = 250\ \mu\text{A}$	0.6	1	1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	$I_D = 250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	-	-3	-	mV/ $^\circ\text{C}$
$R_{DS(on)}$	Static Drain-Source On-Resistance	$V_{GS} = 4.5\text{ V}, I_D = 6.5\text{ A}$	-	25	30	m $\Omega$
		$V_{GS} = 2.5\text{ V}, I_D = 5.4\text{ A}$	-	35	43	
		$V_{GS} = 4.5\text{ V}, I_D = 6.5\text{ A}, T_J = 125^\circ\text{C}$	-	35	50	
$I_{D(on)}$	On-State Drain Current	$V_{GS} = 4.5\text{ V}, V_{DS} = 5\text{ A}$	15	-	-	A
$g_{FS}$	Forward Transconductance	$V_{DS} = 5\text{ V}, I_D = 6.5\text{ A}$	-	22	-	S

### DYNAMIC CHARACTERISTICS

$C_{iss}$	Input Capacitance	$V_{DS} = 10\text{ V}, V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}$	-	650	-	pF
$C_{oss}$	Output Capacitance		-	150	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	85	-	pF
$R_G$	Gate Resistance	$V_{GS} = 15\text{ mV}, f = 1.0\text{ MHz}$	-	1.4	-	$\Omega$

### SWITCHING CHARACTERISTICS (Note 2)

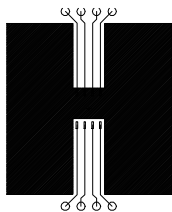
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 10\text{ V}, I_D = 1\text{ A}, V_{GS} = 4.5\text{ V}, R_{GEN} = 6\ \Omega$	-	8	16	ns
$t_r$	Turn-On Rise Time		-	9	17	ns
$t_{d(off)}$	Turn-Off Delay Time		-	15	26	ns
$t_f$	Turn-Off Fall Time		-	4	9	ns
$Q_g$	Total Gate Charge	$V_{DS} = 10\text{ V}, I_D = 3\text{ A}, V_{GS} = 4.5\text{ V}$	-	6.2	9	nC
$Q_{gs}$	Gate-Source Charge		-	1.2	-	nC
$Q_{gd}$	Gate-Drain Charge		-	1.7	-	nC

### DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS

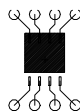
$V_{SD}$	Drain-Source Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1.3\text{ A}$ (Note 2)	-	0.73	1.3	V
$t_{rr}$	Diode Reverse Recovery Time	$I_F = 6.5\text{ A}, dI_F/dt = 100\text{ A}/\mu\text{s}$	-	15	-	ns
$Q_{rr}$	Diode Reverse Recovery Charge		-	5	-	nC

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.

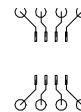
- $R_{\theta JA}$  is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



a)  $78^\circ\text{C}/\text{W}$  when mounted on a  $0.5\text{ in}^2$  pad of 2 oz. Copper



b)  $125^\circ\text{C}/\text{W}$  when mounted on a  $0.02\text{ in}^2$  pad of 2 oz. copper



c)  $135^\circ\text{C}/\text{W}$  when mounted on a minimum pad.

- Pulse Test Pulse Width  $< 300\ \mu\text{s}$ , Duty Cycle  $< 2.0\%$

TYPICAL CHARACTERISTICS

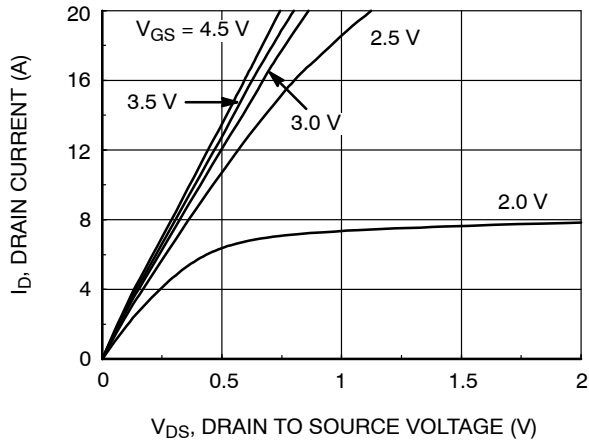


Figure 1. On-Region Characteristics

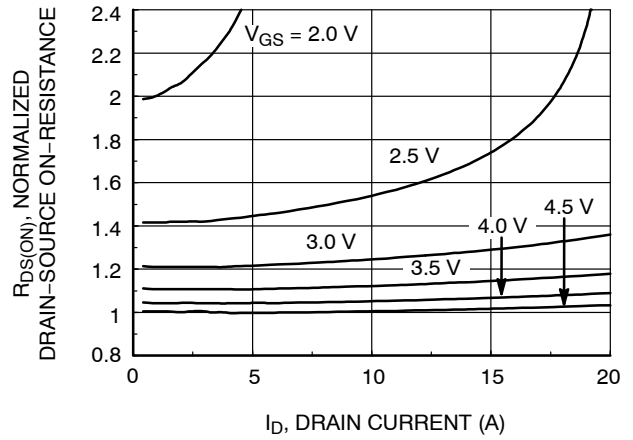


Figure 2. On-Resistance Variation with Drain Current and Gate Voltage

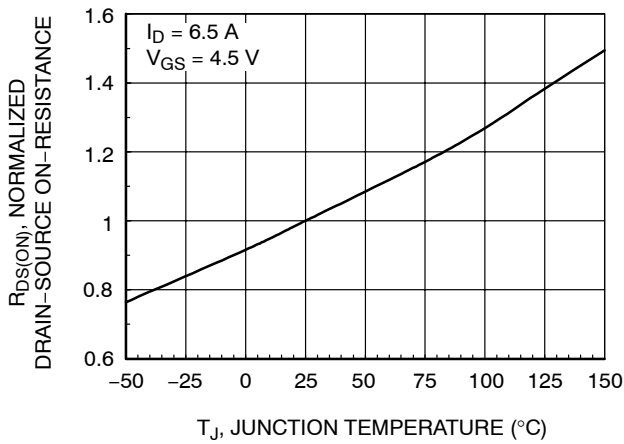


Figure 3. On-Resistance Variation with Temperature

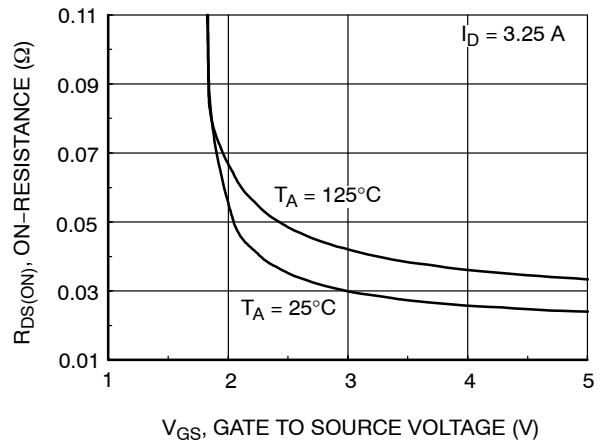


Figure 4. On-Resistance Variation with Gate-to-Source Voltage

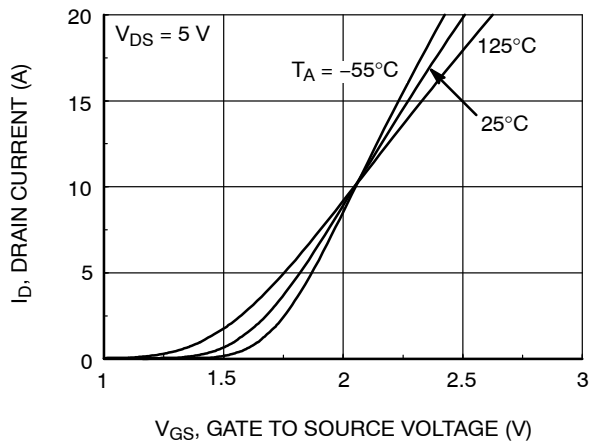


Figure 5. Transfer Characteristics

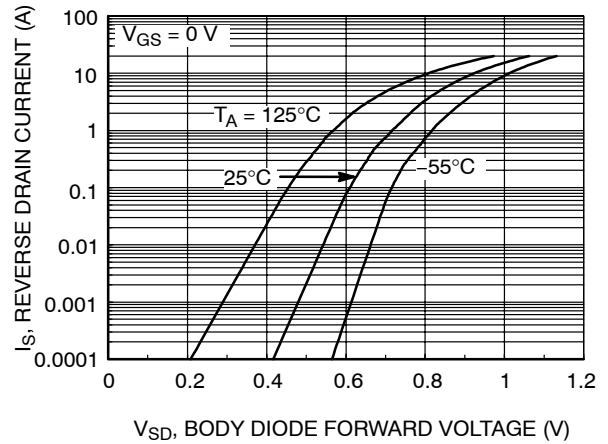


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

TYPICAL CHARACTERISTICS (continued)

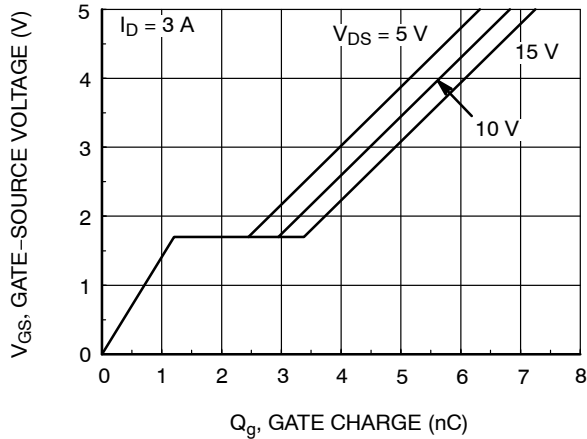


Figure 7. Gate-Charge Characteristics

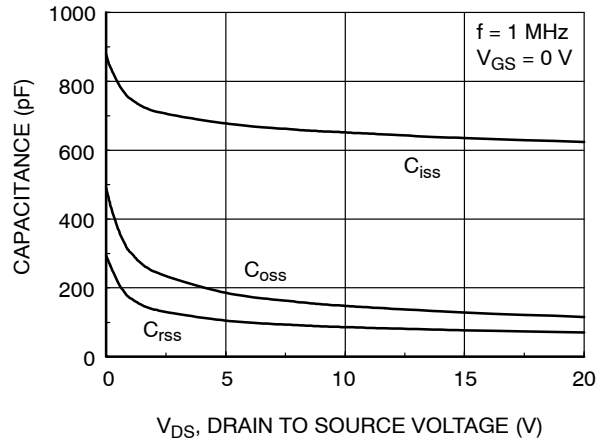


Figure 8. Capacitance Characteristics

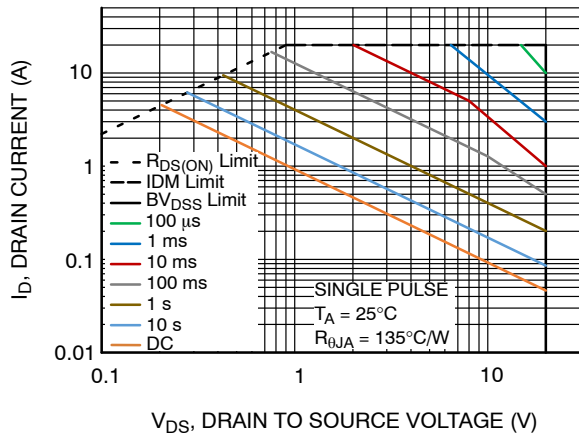


Figure 9. Maximum Safe Operating Area

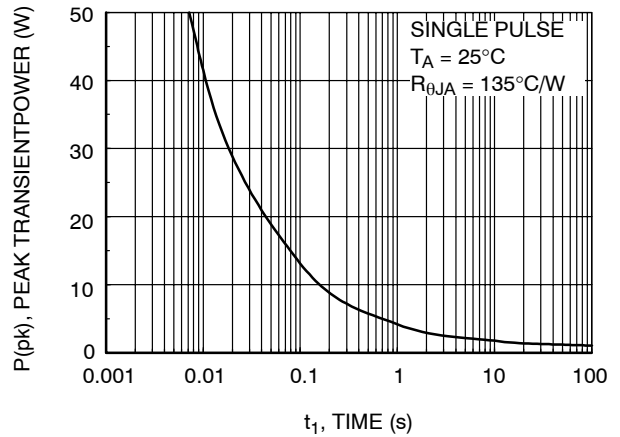


Figure 10. Single Pulse Maximum Power Dissipation

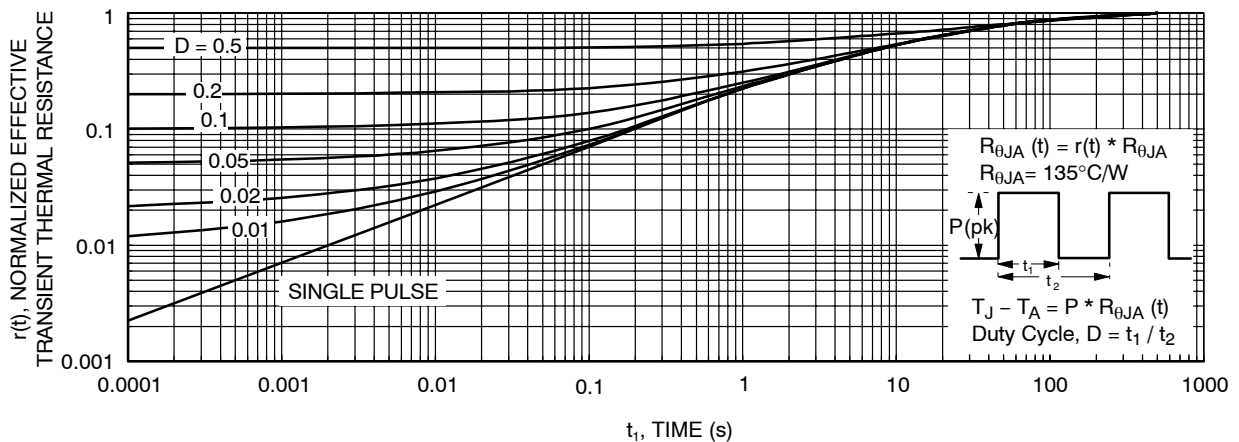


Figure 11. Transient Thermal Response Curve

Thermal characterization performed using the conditions described in Note 1c.  
 Transient thermal response will change depending on the circuit board design.

# MECHANICAL CASE OUTLINE

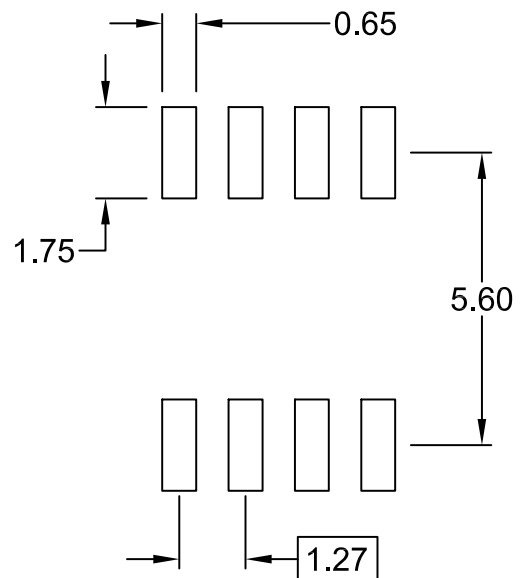
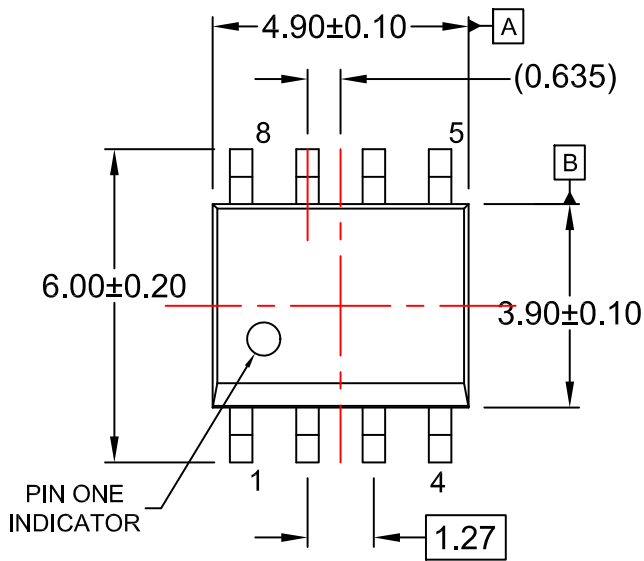
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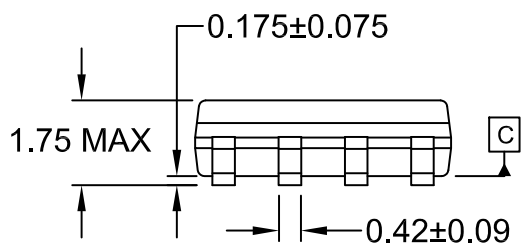


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CASE 751EB  
ISSUE A

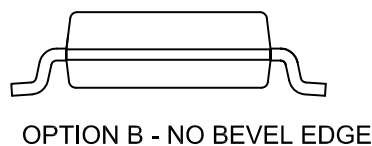
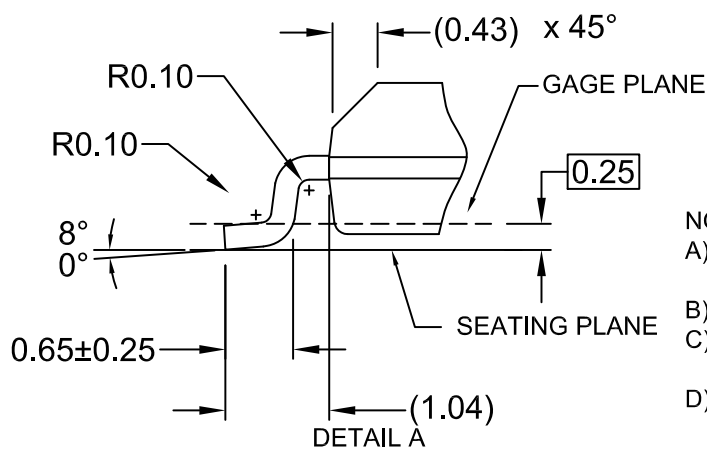
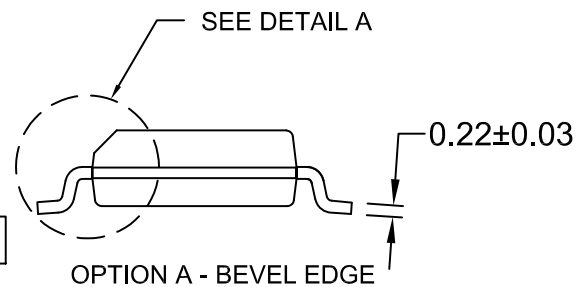
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NOTES:

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