

# MOSFET – P-Channel, Shielded Gate, POWERTRENCH®

**-150 V, -2.2 A, 255 mΩ**

## FDS86267P

### General Description

This P-Channel MOSFET is produced using onsemi's advanced POWERTRENCH process that incorporates shielded gate technology. The process has been optimized for the on-state resistance and yet maintain superior switching performance.

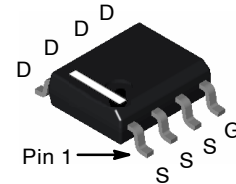
### Features

- Shielded Gate MOSFET Technology
- Max  $R_{DS(ON)} = 255 \text{ m}\Omega$  @  $V_{GS} = -10 \text{ V}$ ,  $I_D = -2.2 \text{ A}$
- Max  $R_{DS(ON)} = 290 \text{ m}\Omega$  @  $V_{GS} = -6 \text{ V}$ ,  $I_D = -2 \text{ A}$
- Very Low  $R_{DS(ON)}$  Mid Voltage P-channel Silicon Technology Optimised for Low  $Q_g$
- This Product is Optimised for Fast Switching Applications as well as Load Switch Applications
- 100% UIL Tested
- This Device is Pb-Free, Halide Free and is RoHS Compliant

### Applications

- Active Clamp Switch
- Load Switch

$V_{DS}$	$R_{DS(on)}$ MAX	$I_D$ MAX
-150 V	255 mΩ @ -10 V	-2.2 A
	290 mΩ @ -6 V	



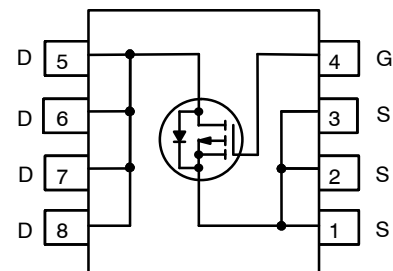
**SOIC8**  
**CASE 751EB**

### MARKING DIAGRAM

&Z&2&K
FDS
86267P

&Z = Assembly Plant Code  
&2 = 2-Digit Date Code (Year & Week)  
&K = 2-Digit Lot Run Traceability Code  
FDS86267P = Specific Device Code

### PIN CONNECTIONS



### ORDERING INFORMATION

Device	Package	Shipping†
FDS86267P	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](#).

# FDS86267P

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

Symbol	Parameter		Ratings	Unit
$V_{DS}$	Drain to Source Voltage		-150	V
$V_{GS}$	Gate to Source Voltage		$\pm 25$	V
$I_D$	Drain Current	Continuous (Note 1a)	-2.2	A
		Pulsed (Note 4)	-34	
$E_{AS}$	Single Pulse Avalanche Energy (Note 3)		54	mJ
$P_D$	Power Dissipation	$T_A = 25^\circ\text{C}$ (Note 1a)	2.5	W
		$T_A = 25^\circ\text{C}$ (Note 1b)	1.0	
$T_J, T_{STG}$	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)	50	$^\circ\text{C/W}$
	Thermal Resistance, Junction to Ambient (Note 1b)	125	

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

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

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = -250\ \mu\text{A}, V_{GS} = 0\ \text{V}$	-150	-	-	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	-	-121	-	$\text{mV}/^\circ\text{C}$
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -120\ \text{V}, V_{GS} = 0\ \text{V}$	-	-	-1	$\mu\text{A}$
$I_{GSS}$	Gate to Source Leakage Current	$V_{GS} = \pm 25\ \text{V}, V_{DS} = 0\ \text{V}$	-	-	$\pm 100$	nA

### ON CHARACTERISTICS

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = -250\ \mu\text{A}$	-2	-3	-4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = -250\ \mu\text{A}$ , Referenced to $25^\circ\text{C}$	-	5	-	$\text{mV}/^\circ\text{C}$
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = -10\ \text{V}, I_D = -2.2\ \text{A}$	-	191	255	$\text{m}\Omega$
		$V_{GS} = -6\ \text{V}, I_D = -2\ \text{A}$	-	214	290	
		$V_{GS} = -10\ \text{V}, I_D = -2.2\ \text{A}, T_J = 125^\circ\text{C}$	-	342	448	
$g_{FS}$	Forward Transconductance	$V_{DS} = -10\ \text{V}, I_D = -2.2\ \text{A}$	-	6.8	-	S

### DYNAMIC CHARACTERISTICS

$C_{iss}$	Input Capacitance	$V_{DS} = -75\ \text{V}, V_{GS} = 0\ \text{V}, f = 1\ \text{MHz}$	-	806	1130	pF
$C_{oss}$	Output Capacitance		-	54	75	pF
$C_{rss}$	Reverse Transfer Capacitance		-	1.6	2.3	pF
$R_g$	Gate Resistance		0.1	3	6	$\Omega$

### SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -75\ \text{V}, I_D = -2.2\ \text{A}, V_{GS} = -10\ \text{V}, R_{GEN} = 6\ \Omega$	-	9.7	20	ns
$t_r$	Rise Time		-	2.5	10	ns
$t_{d(off)}$	Turn-Off Delay Time		-	17	30	ns
$t_f$	Fall Time		-	5.7	12	ns

**ELECTRICAL CHARACTERISTICS** ( $T_J = 25^\circ\text{C}$  unless otherwise noted) (continued)

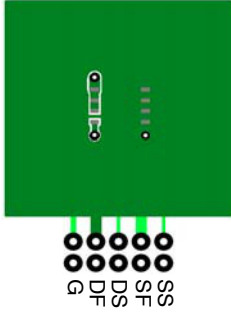
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
<b>SWITCHING CHARACTERISTICS</b>						
$Q_g$	Total Gate Charge	$V_{GS} = 0\text{ V to } -10\text{ V}, V_{DD} = -75\text{ V}, I_D = -2.2\text{ A}$	–	11	16	nC
		$V_{GS} = 0\text{ V to } -6\text{ V}, V_{DD} = -75\text{ V}, I_D = -2.2\text{ A}$	–	7	10	nC
$Q_{gs}$	Gate to Source Charge	$V_{DD} = -75\text{ V}, I_D = -2.2\text{ A}$	–	3.2	–	nC
$Q_{gd}$	Gate to Drain “Miller” Charge		–	1.9	–	nC

**DRAIN–SOURCE DIODE CHARACTERISTICS**

$V_{SD}$	Source–Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = -2.2\text{ A}$ (Note 2)	–	–0.8	–1.3	V
		$V_{GS} = 0\text{ V}, I_S = -2\text{ A}$ (Note 2)	–	–0.8	–1.2	
$t_{rr}$	Reverse Recovery Time	$I_F = -2.2\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	–	65	104	ns
$Q_{rr}$	Reverse Recovery Charge		–	157	251	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 determined with the device mounted on a 1 in<sup>2</sup> pad 2 oz copper pad on a 1.5 × 1.5 in. board of FR–4 material.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta CA}$  is determined by the user's board design.



a.  $50^\circ\text{C}/\text{W}$  when mounted on a 1 in<sup>2</sup> pad of 2 oz copper.



b.  $125^\circ\text{C}/\text{W}$  when mounted on a minimum pad.

- Pulse Test: Pulse Width < 300  $\mu\text{s}$ , Duty cycle < 2.0 %.
- Starting  $T_J = 25^\circ\text{C}$ ,  $L = 3\text{ mH}$ ,  $I_{AS} = -6\text{ A}$ ,  $V_{DD} = -150\text{ V}$ ,  $V_{GS} = -10\text{ V}$ . 100% tested at  $L = 0.3\text{ mH}$ ,  $I_{AS} = -13\text{ A}$ .
- Pulsed  $I_d$  please refer to Figure 11 SOA graph for more details.

TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted)

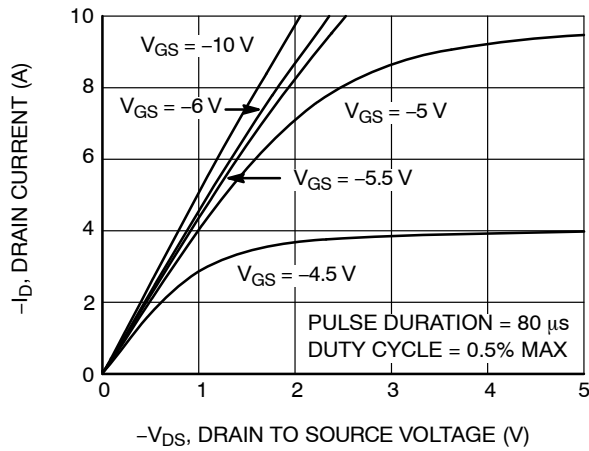


Figure 1. On Region Characteristics

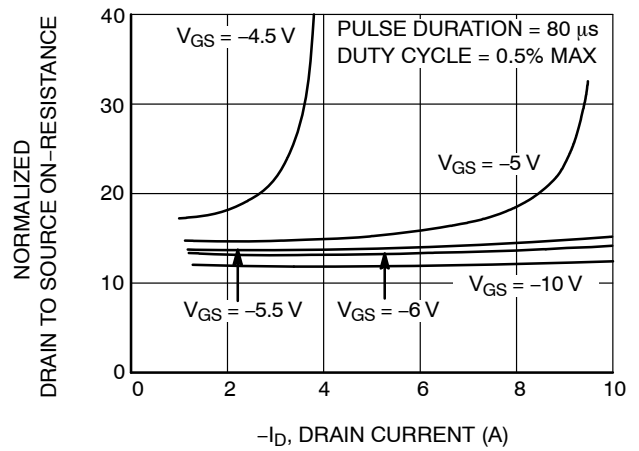


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

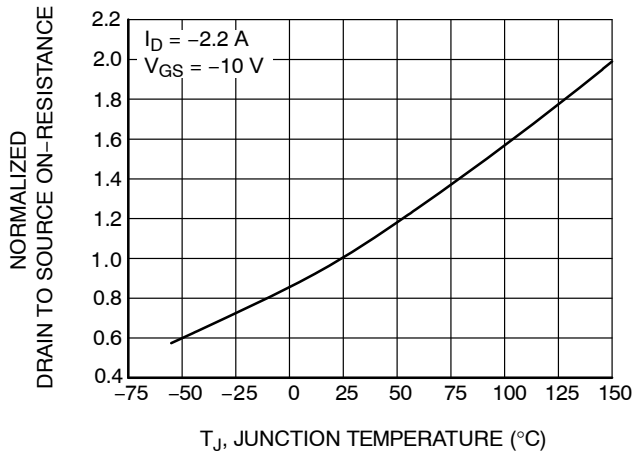


Figure 3. Normalized On Resistance vs. Junction Temperature

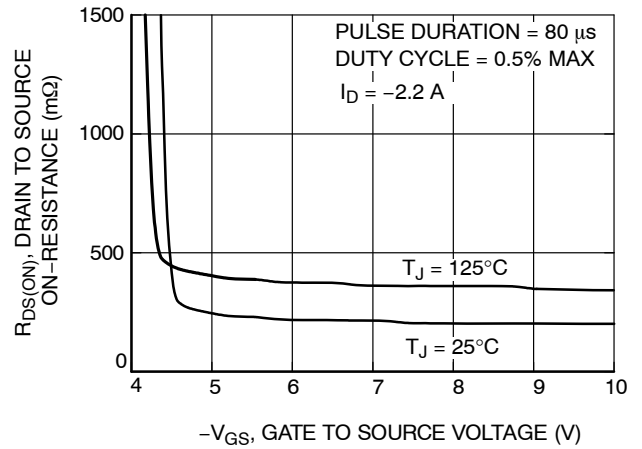


Figure 4. On-Resistance vs. Gate to Source Voltage

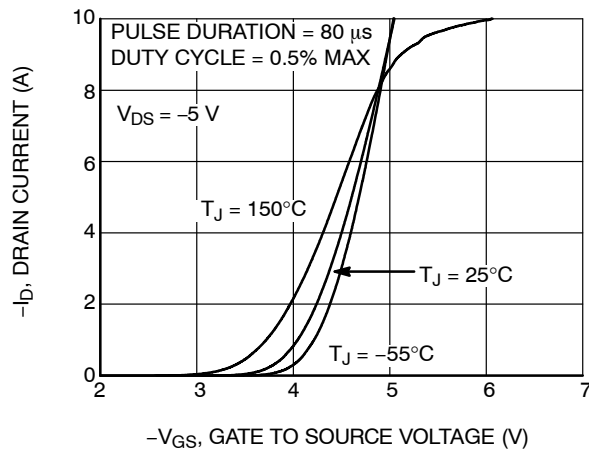


Figure 5. Transfer Characteristics

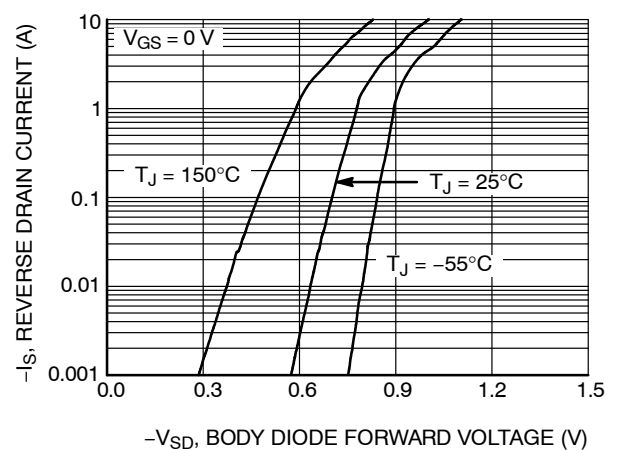


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

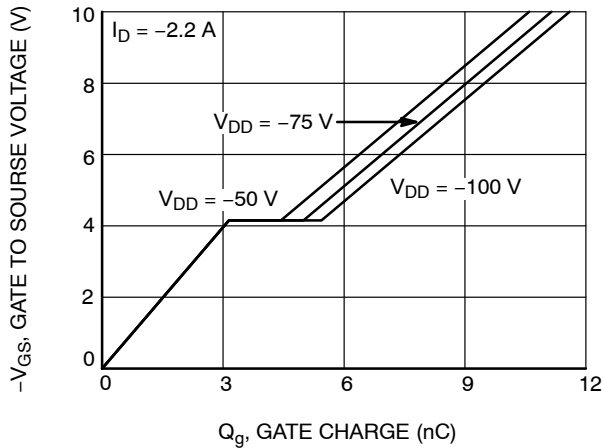
TYPICAL CHARACTERISTICS ( $T_J = 25^\circ\text{C}$  unless otherwise noted) (continued)

Figure 7. Gate Charge Characteristics

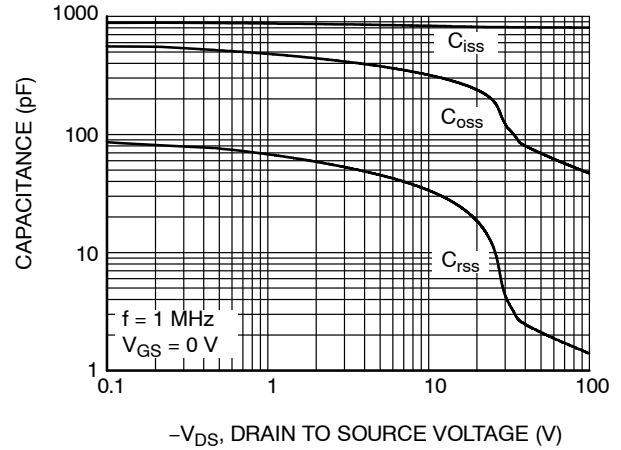


Figure 8. Capacitance vs. Drain to Source Voltage

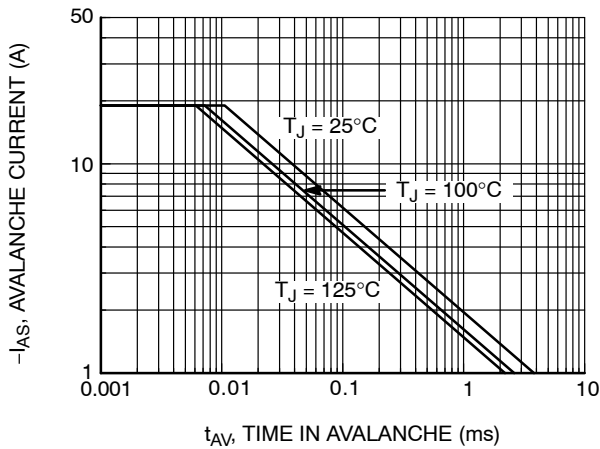


Figure 9. Unclamped Inductive Switching Capability

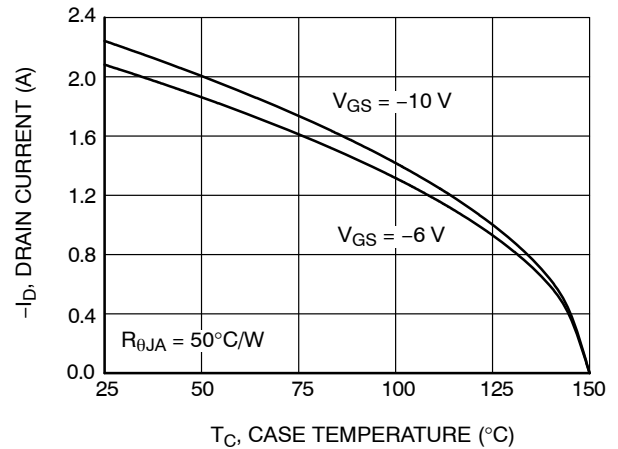


Figure 10. Maximum Continuous Drain Current vs. Ambient Temperature

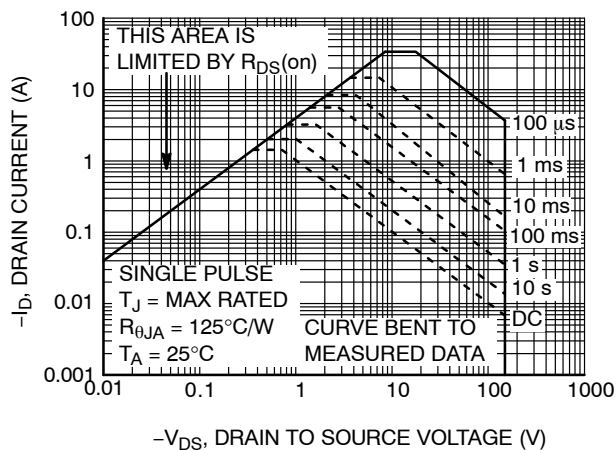


Figure 11. Forward Bias Safe Operating Area

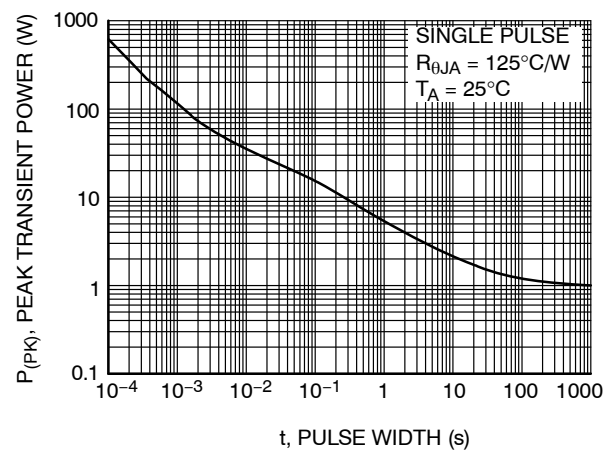
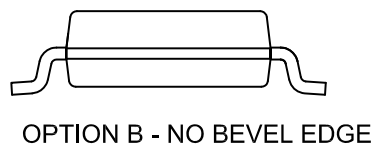
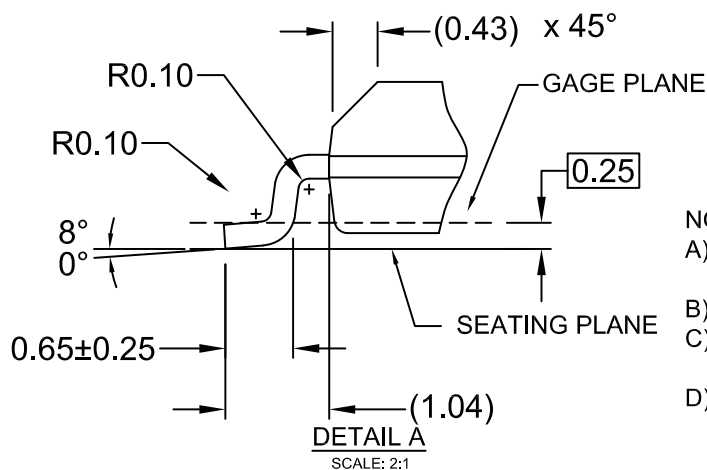
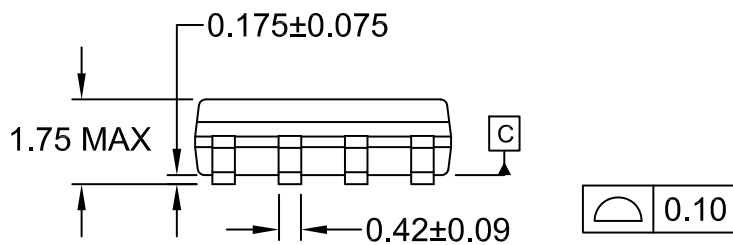


Figure 12. Single Pulse Maximum Power Dissipation

**SOIC8**  
**CASE 751EB**  
**ISSUE A**

DATE 24 AUG 2017



**NOTES:**

- A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA.
- B) ALL DIMENSIONS ARE IN MILLIMETERS.
- C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
- D) LANDPATTERN STANDARD: SOIC127P600X175-8M

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