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FDS86267P

P-Channel Shielded Gate PowerTrench[®] MOSFET

-150 V, -2.2 A, 255 mΩ

Features

- Shielded Gate MOSFET Technology
- Max $r_{DS(on)}$ = 255 mΩ at $V_{GS} = -10$ V, $I_D = -2.2$ A
- Max $r_{DS(on)}$ = 290 mΩ at $V_{GS} = -6$ V, $I_D = -2$ A
- Very Low $r_{DS(on)}$ Mid Voltage P-channel Silicon Technology Optimised for Low Qg
- This Product is Optimised for Fast Switching Applications as well as Load Switch Applications
- 100% UIL Tested
- RoHS Compliant

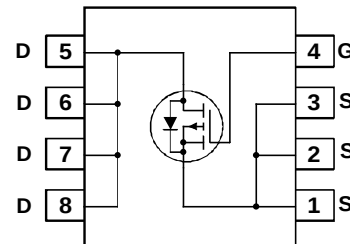
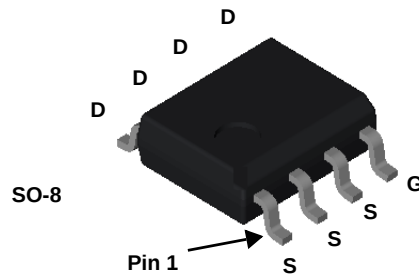


General Description

This P-Channel MOSFET is produced using Fairchild Semiconductor'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.

Applications

- Active Clamp Switch
- Load Switch



MOSFET Maximum Ratings $T_A = 25$ °C unless otherwise noted.

Symbol	Parameter	Ratings	Units
V_{DS}	Drain to Source Voltage	-150	V
V_{GS}	Gate to Source Voltage	±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 $T_A = 25$ °C (Note 1a)	2.5	W
	Power Dissipation $T_A = 25$ °C (Note 1b)	1.0	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	125	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDS86267P	FDS86267P	SO-8	13 "	12 mm	2500 units

Electrical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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°C		-121		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -120\ \text{V}$, $V_{GS} = 0\ \text{V}$			-1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 25\ \text{V}$, $V_{DS} = 0\ \text{V}$			± 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°C		5		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	m Ω
		$V_{GS} = -6\ \text{V}$, $I_D = -2\ \text{A}$		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	Ω

Switching Characteristics

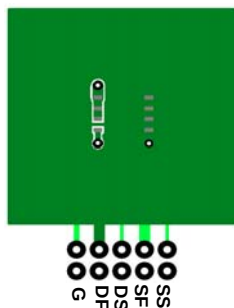
$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = -75\ \text{V}$, $I_D = -2.2\ \text{A}$, $V_{GS} = -10\ \text{V}$, $R_{GEN} = 6\ \Omega$		9.7	20	ns
t_r	Rise Time			2.5	10	ns
$t_{d(off)}$	Turn-Off Delay Time			17	30	ns
t_f	Fall Time			5.7	12	ns
Q_g	Total Gate Charge	$V_{GS} = 0\ \text{V}$ to $-10\ \text{V}$	$V_{DD} = -75\ \text{V}$, $I_D = -2.2\ \text{A}$	11	16	nC
Q_g	Total Gate Charge	$V_{GS} = 0\ \text{V}$ to $-6\ \text{V}$		7	10	nC
Q_{gs}	Gate to Source Charge			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

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in² pad 2 oz copper pad on a 1.5 x 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 in² pad of 2 oz copper.



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

2. Pulse Test: Pulse Width < 300 μs , Duty cycle < 2.0%.

3. 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 $L = 0.3\ \text{mH}$, $I_{AS} = -13\ \text{A}$.

4. Pulsed I_d please refer to Fig 11 SOA graph for more details.

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

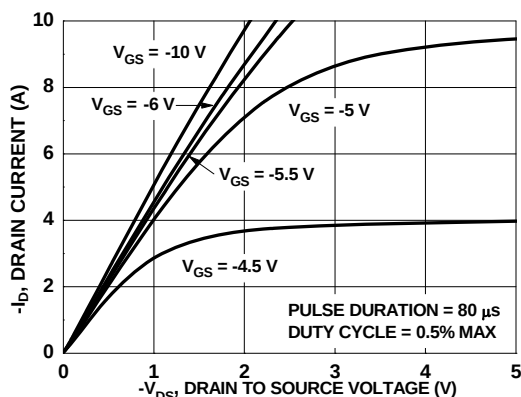


Figure 1. On Region Characteristics

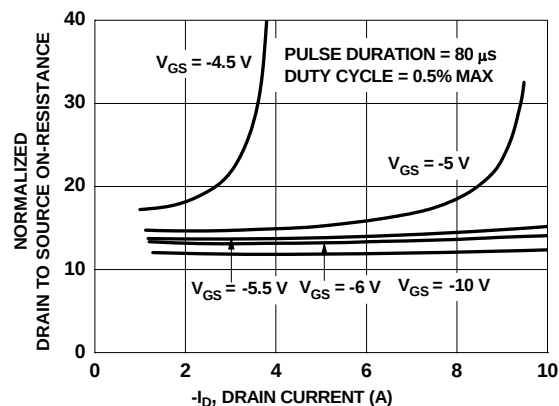


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

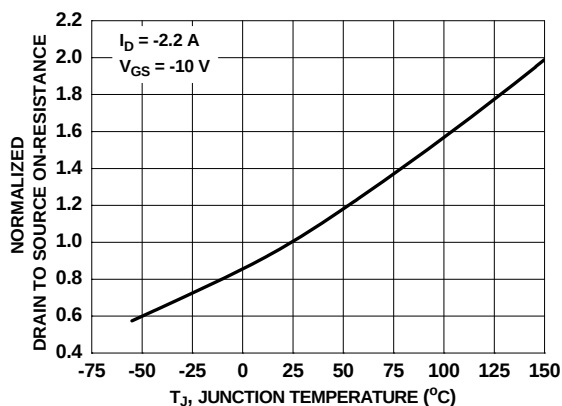


Figure 3. Normalized On Resistance vs Junction Temperature

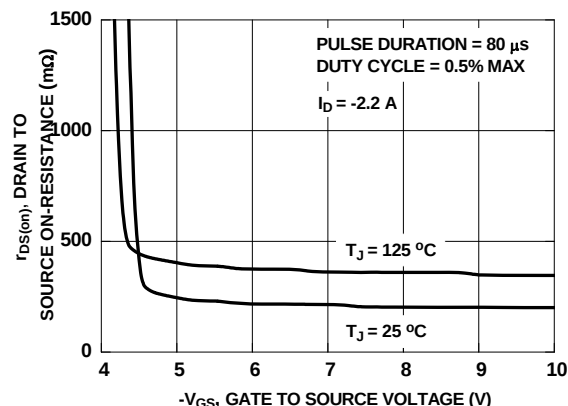


Figure 4. On-Resistance vs Gate to Source Voltage

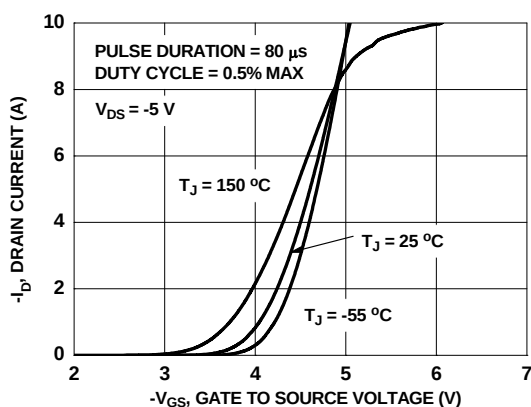


Figure 5. Transfer Characteristics

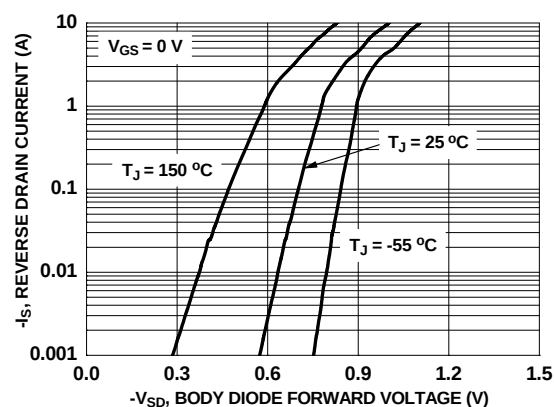


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

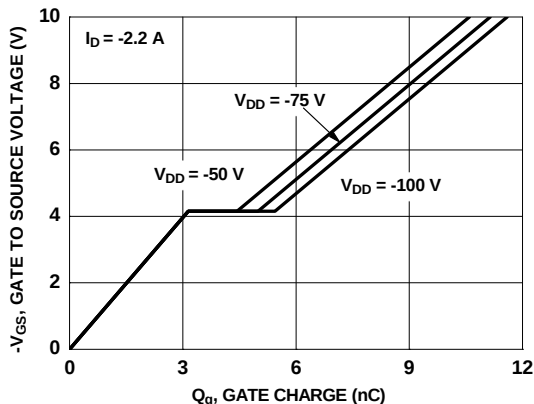


Figure 7. Gate Charge Characteristics

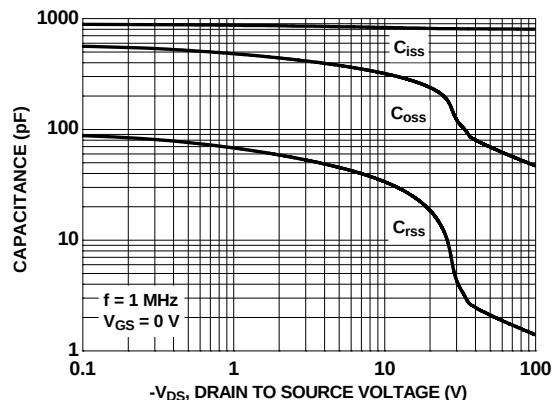


Figure 8. Capacitance vs Drain to Source Voltage

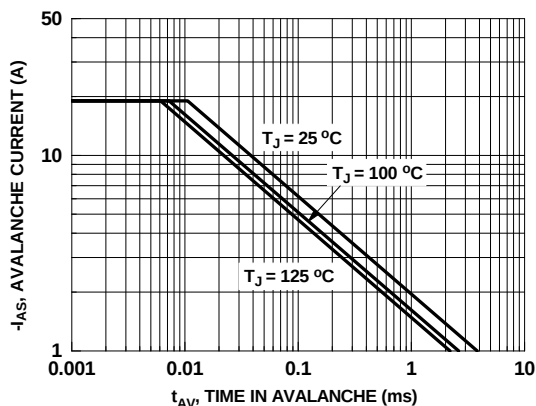


Figure 9. Unclamped Inductive Switching Capability

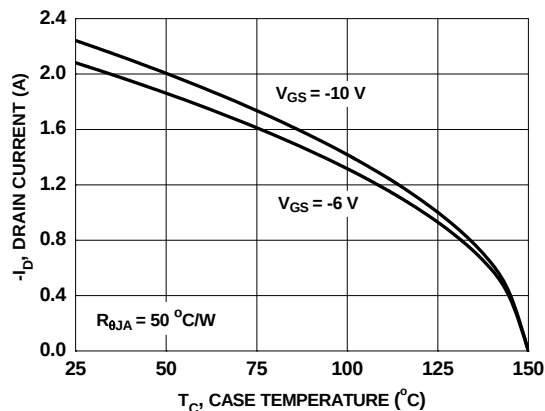


Figure 10. Maximum Continuous Drain Current vs Ambient Temperature

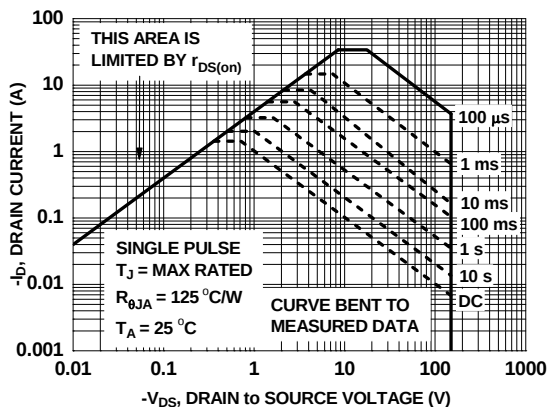


Figure 11. Forward Bias Safe Operating Area

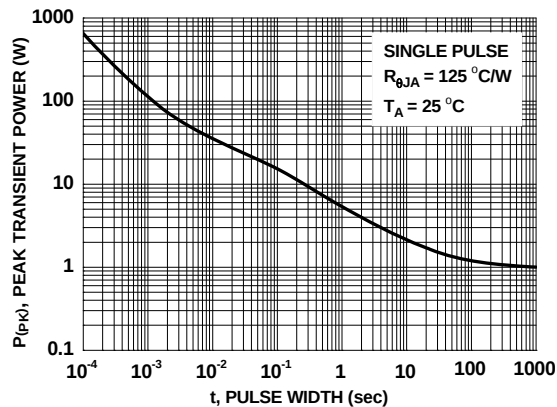
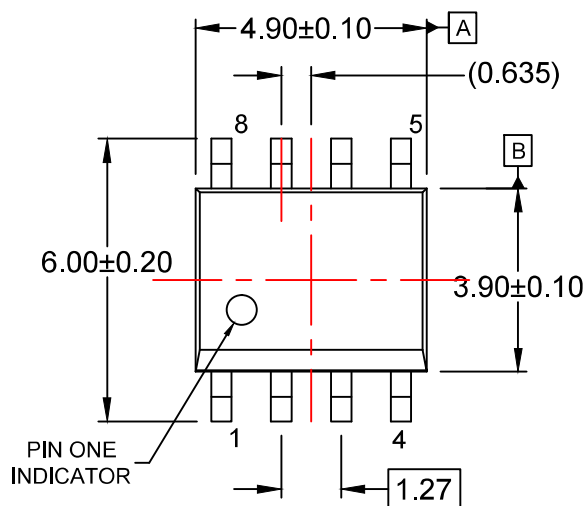
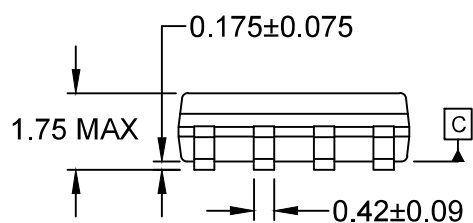
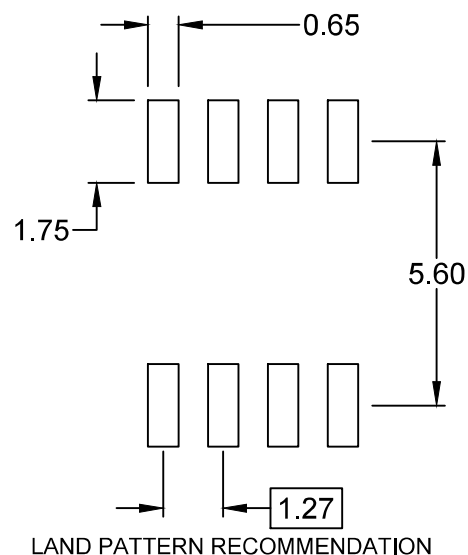


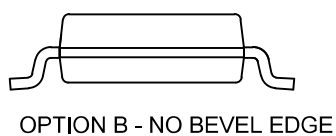
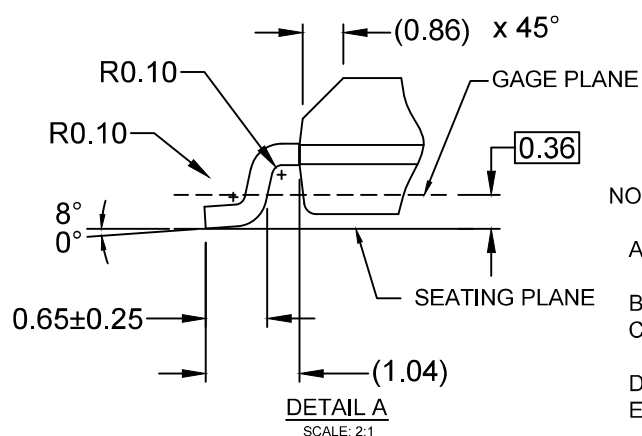
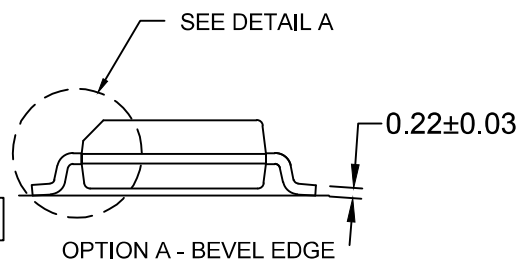
Figure 12. Single Pulse Maximum Power Dissipation



$\oplus 0.25(M) C B A$



$\frac{1}{2}$ 0.10



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
- E) DRAWING FILENAME: M08Arev16



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