

FDN86246

150 V, 1.6 A, 261 mΩ

Features

- Max $r_{DS(on)}$ = 261 mΩ at $V_{GS} = 10\text{ V}$, $I_D = 1.6\text{ A}$
- Max $r_{DS(on)}$ = 359 mΩ at $V_{GS} = 6\text{ V}$, $I_D = 1.4\text{ A}$
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability in a widely used surface mount package
- Fast switching speed
- 100% UIL tested
- RoHS Compliant

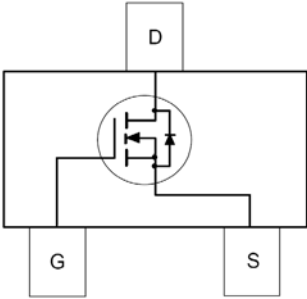
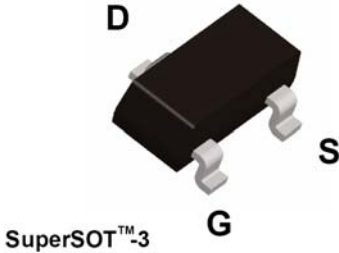


General Description

This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced Power Trench[®] process that has been optimized for $r_{DS(on)}$, switching performance and ruggedness.

Application

- PD Switch



MOSFET Maximum Ratings $T_A = 25\text{ °C}$ unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DS}	Drain to Source Voltage	150	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	-Continuous (Note 1a)	1.6	A
	-Pulsed	6	
E_{AS}	Single Pulse Avalanche Energy (Note 3)	13	mJ
P_D	Power Dissipation (Note 1a)	1.5	W
	Power Dissipation (Note 1b)	0.6	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	75	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	80	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
246	FDN86246	SSOT-3	7"	8 mm	3000 units

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}, V_{GS} = 0\text{ V}$	150			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^\circ\text{C}$		106		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	$V_{GS} = \pm 20\text{ V}, V_{DS} = 0\text{ V}$			± 100	nA

On Characteristics (Note 2)

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\text{ }\mu\text{A}$	2	3.4	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^\circ\text{C}$		-9		mV/ $^\circ\text{C}$
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{ V}, I_D = 1.6\text{ A}$		195	261	m Ω
		$V_{GS} = 6\text{ V}, I_D = 1.4\text{ A}$		242	359	
		$V_{GS} = 10\text{ V}, I_D = 1.6\text{ A}, T_J = 125\text{ }^\circ\text{C}$		359	481	
g_{FS}	Forward Transconductance	$V_{DS} = 10\text{ V}, I_D = 1.6\text{ A}$		4		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 75\text{ V}, V_{GS} = 0\text{ V},$ $f = 1\text{ MHz}$		168	225	pF
C_{oss}	Output Capacitance			21	30	pF
C_{rss}	Reverse Transfer Capacitance			1.6	5	pF
R_g	Gate Resistance			0.9		Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay Time	$V_{DD} = 75\text{ V}, I_D = 1.6\text{ A},$ $V_{GS} = 10\text{ V}, R_{GEN} = 6\text{ }\Omega$		4.5	10	ns	
t_r	Rise Time			1.1	10	ns	
$t_{d(off)}$	Turn-Off Delay Time			8	16	ns	
t_f	Fall Time			2.9	10	ns	
Q_g	Total Gate Charge		$V_{GS} = 0\text{ V to } 10\text{ V}$		2.9	5	nC
Q_g	Total Gate Charge	$V_{GS} = 0\text{ V to } 5\text{ V}$	$V_{DD} = 75\text{ V},$ $I_D = 1.6\text{ A}$		1.6	3	nC
Q_{gs}	Gate to Source Gate Charge				0.9		nC
Q_{gd}	Gate to Drain "Miller" Charge				0.8		nC

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}, I_S = 1.6\text{ A}$ (Note 2)		0.83	1.3	V
t_{rr}	Reverse Recovery Time	$I_F = 1.6\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		44	70	ns
Q_{rr}	Reverse Recovery Charge			29	47	nC

Notes:

- $R_{\theta JA}$ 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) $80\text{ }^\circ\text{C/W}$ when mounted on a 1 in^2 pad of 2 oz copper



b) $180\text{ }^\circ\text{C/W}$ when mounted on a minimum pad.

2. Pulse Test: Pulse Width < $300\text{ }\mu\text{s}$, Duty cycle < 2.0%.

3. Starting $T_J = 25\text{ }^\circ\text{C}$; N-ch: $L = 3\text{ mH}, I_{AS} = 3\text{ A}, V_{DD} = 150\text{ V}, V_{GS} = 10\text{ V}$.