FDN8601

100 V, 2.7 A, 109 mΩ

Features

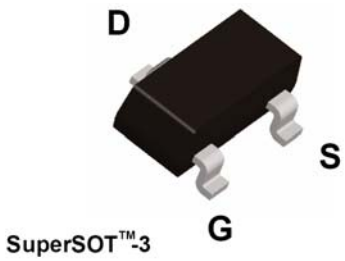
- Max $r_{DS(on)}$ = 109 mΩ at V_{GS} = 10 V, I_D = 1.5 A
- Max $r_{DS(on)}$ = 175 mΩ at V_{GS} = 6 V, I_D = 1.2 A
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability in a widely used surface mount package
- Fast switching speed
- 100% UIL tested
- RoHS Compliant

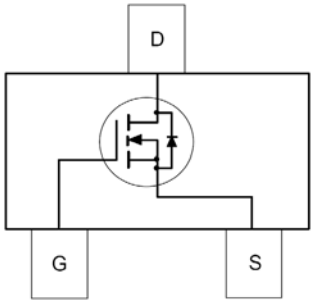
General Description

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.

Applications

- Primary DC-DC Switch
- Load Switch





MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted

Symbol	Parameter		Ratings	Units
V_{DS}	Drain to Source Voltage		100	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	-Continuous	(Note 1a)	2.7	A
	-Pulsed		12	
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
8601	FDN8601	SSOT-3	7 ”	8 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	100			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		68		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 80 V, V_{GS} = 0 V			1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
On Characteristics (Note 2)						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	2.0	3.0	4.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-8		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 1.5 A		85.4	109	mΩ
		V_{GS} = 6 V, I_D = 1.2 A		117	175	
		V_{GS} = 10 V, I_D = 1.5 A, T_J = 125 °C		143	183	
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 1.5 A		8		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz		156	210	pF
C_{oss}	Output Capacitance			47	65	pF
C_{rss}	Reverse Transfer Capacitance			2.7	5	pF
R_g	Gate Resistance			1.0		Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 50 V, I_D = 1.5 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		4.3	10	ns
t_r	Rise Time			1.3	10	ns
$t_{d(off)}$	Turn-Off Delay Time			7.8	16	ns
t_f	Fall Time			3.4	10	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to 10 V; V_{DD} = 50 V, I_D = 1.5 A		3	5	nC
Q_g	Total Gate Charge	V_{GS} = 0 V to 5 V; V_{DD} = 50 V, I_D = 1.5 A		1.8	3	nC
Q_{gs}	Gate to Source Gate Charge	V_{DD} = 50 V, I_D = 1.5 A		0.9		nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = 50 V, I_D = 1.5 A		0.8		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 1.5 A (Note 2)		0.81	1.3	V
t_{rr}	Reverse Recovery Time	I_F = 1.5 A, di/dt = 100 A/μs		29	46	ns
Q_{rr}	Reverse Recovery Charge			15	27	nC

Notes:

1. $R_{\theta JA}$ 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 °C/W when mounted on a 1 in^2 pad of 2 oz copper

b) 180 °C/W when mounted on a minimum pad.

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

3. Starting T_J = 25 °C; N-ch: L = 3 mH, I_{AS} = 3 A, V_{DD} = 100 V, V_{GS} = 10 V.