FAIRCHILD SEMICONDUCTOR®

October 2008

FDC5661N_F085

N-Channel Logic Level PowerTrench® MOSFET

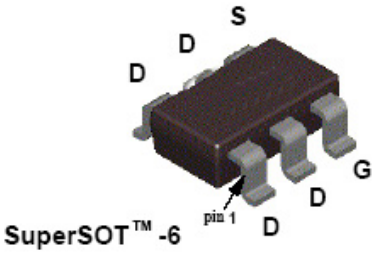
60V, 4A, 60mΩ

Features

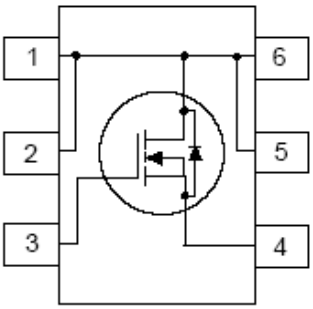
- $R_{DS(on)}$ = 47mΩ at V_{GS} = 10V, I_D = 4.3A
- $R_{DS(on)}$ = 60mΩ at V_{GS} = 4.5V, I_D = 4A
- Typ $Q_{g(TOT)}$ = 14.5nC at V_{GS} = 10V
- Low Miller Charge
- Qualified to AEC Q101
- RoHS Compliant

Applications

- DC/DC converter
- Motor Drives



SuperSOT™-6



MOSFET Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DSS}	Drain to Source Voltage	60	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current Continuous (V_{GS} = 10V)	4.3	A
	Pulsed	20	
P_D	Power Dissipation	1.6	W
T_J, T_{STG}	Operating and Storage Temperature	-55 to +150	°C

Thermal Characteristics

$R_{\theta JC}$	Thermal Resistance Junction to Case	30	°C/W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient TO-263, 1in^2 copper pad area	78	°C/W

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
.661N	FDC5661N_F085	SSOT-6	7”	8mm	3000 units

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
B_{VDSS}	Drain to Source Breakdown Voltage	I_D = 250μA, V_{GS} = 0V	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48V, V_{GS} = 0V	-	-	1	μA
		V_{DS} = 48V, V_{GS} = 0V, T_A = 150°C	-	-	250	
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20V	-	-	±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	1	2.0	3	V
$r_{DS(on)}$	Drain to Source On Resistance	I_D = 4.3A, V_{GS}= 10V	-	38	47	mΩ
		I_D = 4A, V_{GS}= 4.5V	-	46	60	
		I_D = 4.3A, V_{GS}= 10V, T_J = 150°C	-	69	86	
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1MHz	-	763	-	pF
C_{oss}	Output Capacitance		-	68	-	pF
C_{rss}	Reverse Transfer Capacitance		-	36	-	pF
R_G	Gate Resistance	f = 1MHz	-	2.6	-	Ω
$Q_{g(TOT)}$	Total Gate Charge at 10V	V_{GS} = 0 to 10V, V_{DD} = 30V, I_D = 4.3A	-	14.5	19	nC
Q_{gs}	Gate to Source Gate Charge		-	2.4	-	nC
Q_{gd}	Gate to Drain “Miller“ Charge		-	2.9	-	nC

Electrical Characteristics T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Switching Characteristics						
t_{on}	Turn-On Time	V_{DD} = 30V, I_D = 4.3A V_{GS} = 10V, R_{GS} = 6Ω	-	-	17.6	ns
$t_{d(on)}$	Turn-On Delay Time		-	7.2	-	ns
t_r	Rise Time		-	1.6	-	ns
$t_{d(off)}$	Turn-Off Delay Time		-	19.3	-	ns
t_f	Fall Time		-	3.1	-	ns
t_{off}	Turn-Off Time		-	-	36	ns
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Voltage	I_{SD} = 4.3A	-	0.8	1.25	V
		I_{SD} = 2.1A	-	0.8	1.0	
t_{rr}	Reverse Recovery Time	I_{SD} = 4.3A, dI_{SD}/dt = 100A/μs	-	18.4	24	ns
Q_{rr}	Reverse Recovery Charge		-	10.0	13	nC

This product has been designed to meet the extreme test conditions and environment demanded by the automotive industry. For a copy of the requirements, see AEC Q101 at: http://www.aecouncil.com/
All Fairchild Semiconductor products are manufactured, assembled and tested under ISO9000 and QS9000 quality systems certification.

Typical Characteristics

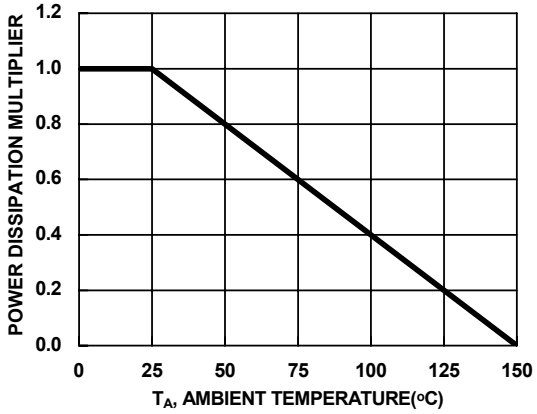


Figure 1. Normalized Power Dissipation vs Ambient Temperature

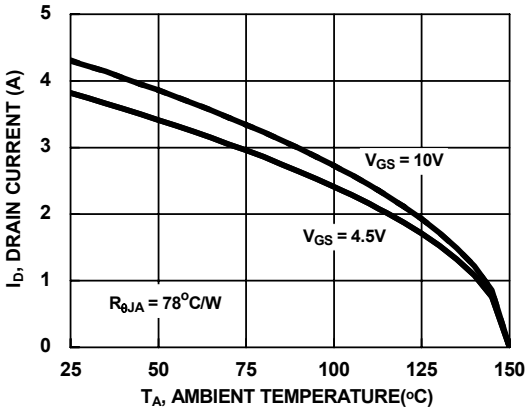


Figure 2. Maximum Continuous Drain Current vs Ambient Temperature

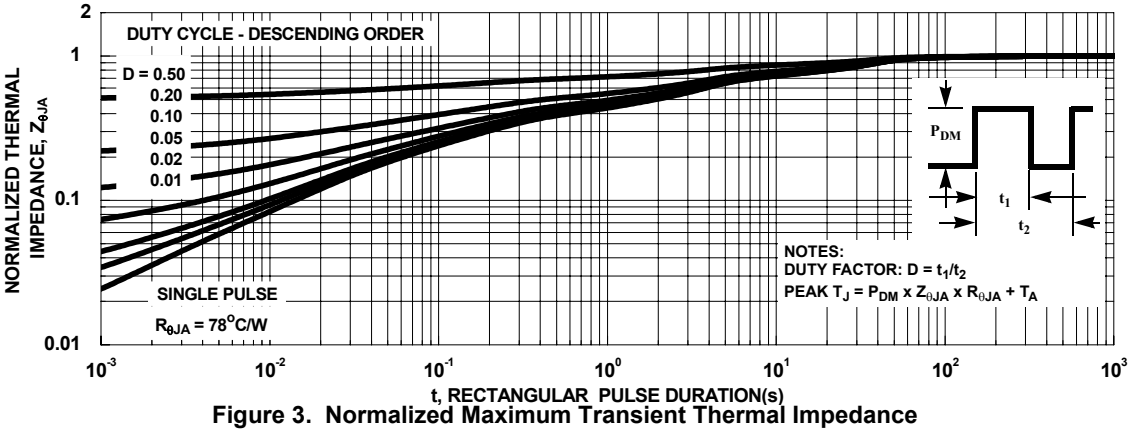


Figure 3. Normalized Maximum Transient Thermal Impedance

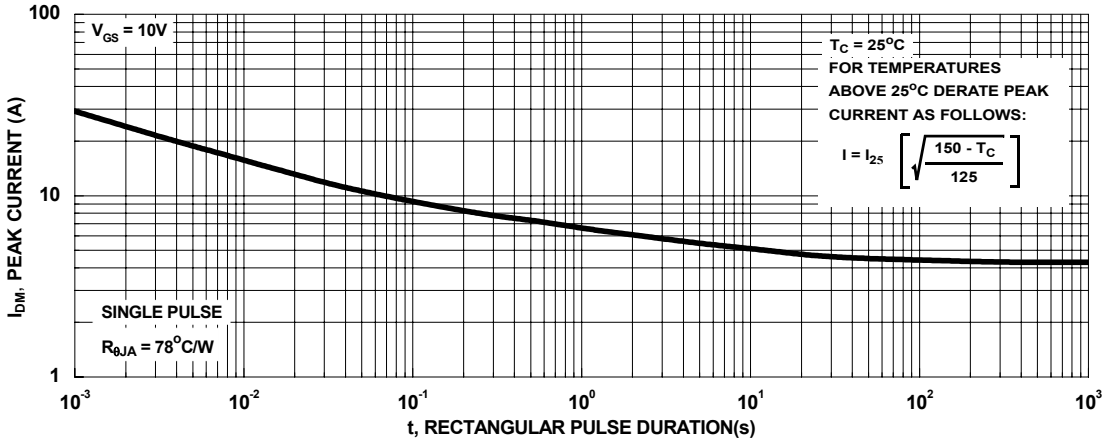


Figure 4. Peak Current Capability

Typical Characteristics

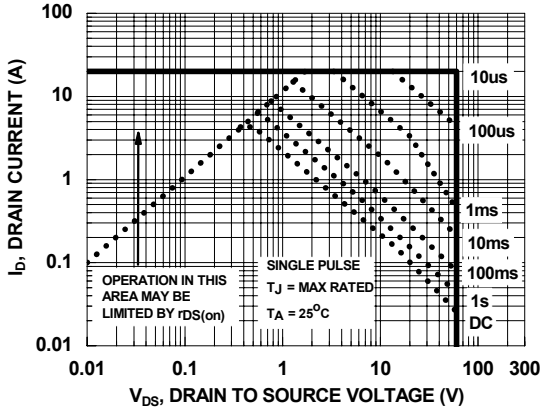


Figure 5. Forward Bias Safe Operating Area

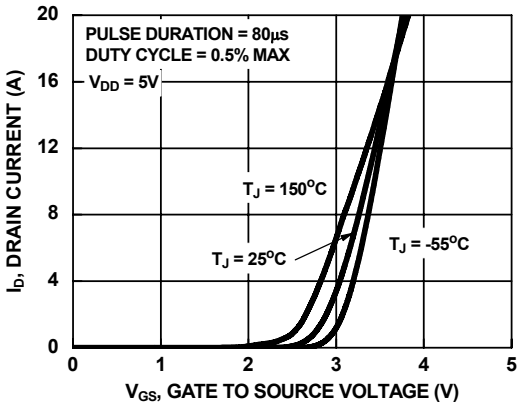


Figure 6. Transfer Characteristics

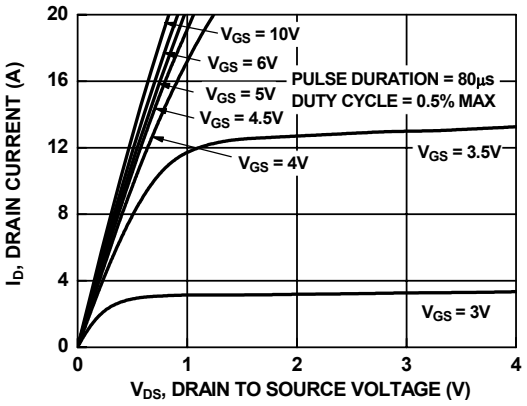


Figure 7. Saturation Characteristics

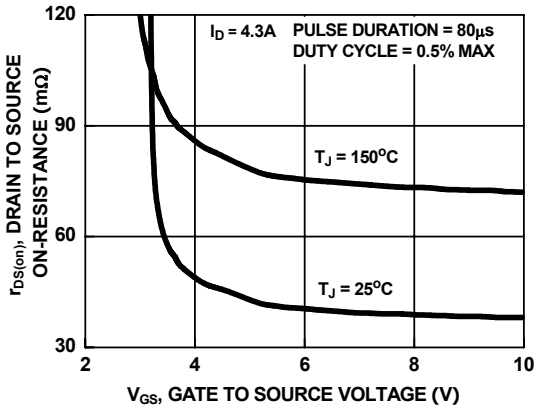


Figure 8. Drain to Source On-Resistance Variation vs Gate to Source Voltage

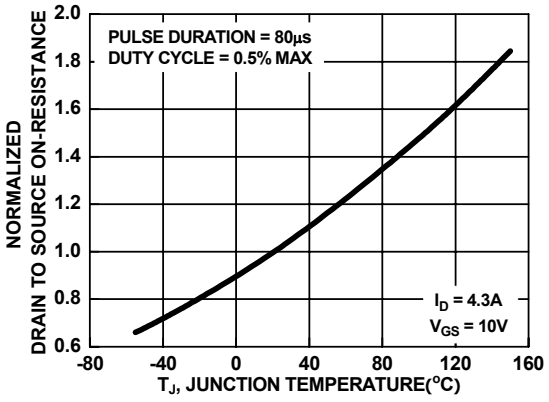


Figure 9. Normalized Drain to Source On Resistance vs Junction Temperature

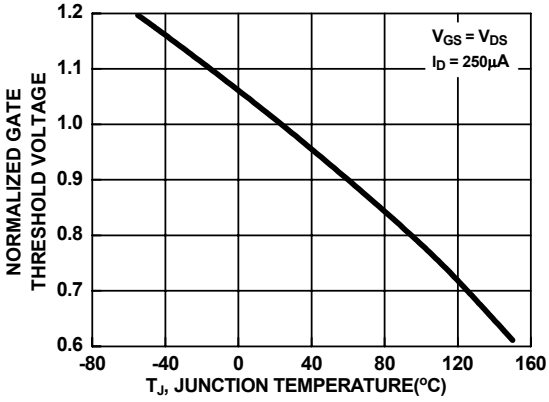


Figure 10. Normalized Gate Threshold Voltage vs Junction Temperature

Typical Characteristics

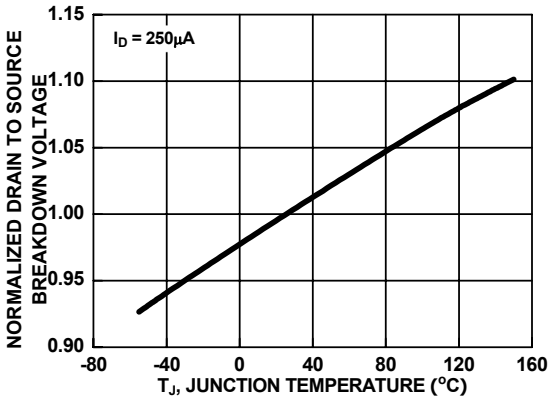


Figure 11. Normalized Drain to Source Breakdown Voltage vs Junction Temperature

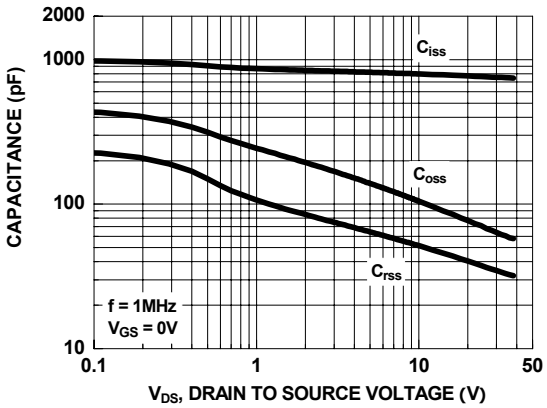


Figure 12. Capacitance vs Drain to Source Voltage

Figure 14.

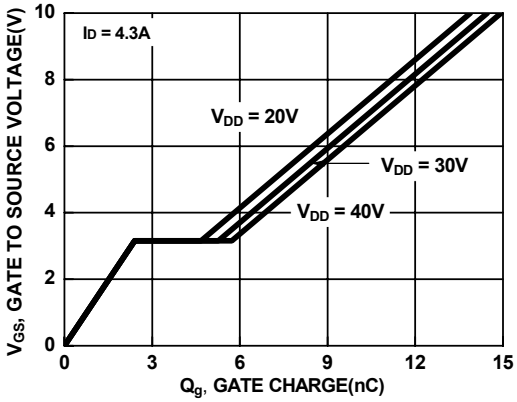


Figure 13. Gate Charge vs Gate to Source Voltage

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Preliminary	First Production	Datasheet contains preliminary data; supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve design.
No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

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