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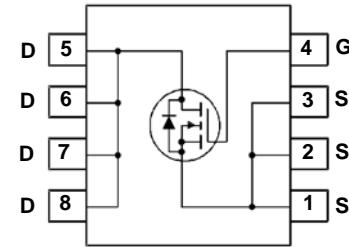
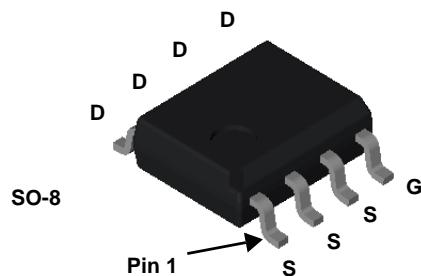
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FDS86106

N-Channel Power Trench® MOSFET 100 V, 3.4 A, 105 mΩ

Features

- Max $r_{DS(on)}$ = 105 mΩ at $V_{GS} = 10$ V, $I_D = 3.4$ A
- Max $r_{DS(on)}$ = 171 mΩ at $V_{GS} = 6$ V, $I_D = 2.7$ A
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability in a widely used surface mount package
- 100% UIL Tested
- RoHS Compliant



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	Drain Current -Continuous	3.4	A
	-Pulsed	15	
E_{AS}	Single Pulse Avalanche Energy	(Note 3)	mJ
P_D	Power Dissipation $T_A = 25$ °C	5.0	W
	Power Dissipation $T_A = 25$ °C	2.5	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	°C

Thermal Characteristics

$R_{θJC}$	Thermal Resistance, Junction to Case	(Note 1)	2.5	°C/W
$R_{θJA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	50	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDS86106	FDS86106	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
Off Characteristics						
BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250 \mu\text{A}, V_{GS} = 0 \text{ V}$	100			V
$\frac{\Delta \text{BV}_{\text{DSS}}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$, referenced to 25°C		67		$\text{mV/}^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 80 \text{ V}, V_{GS} = 0 \text{ V}$			1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 20 \text{ V}, V_{DS} = 0 \text{ V}$			± 100	nA

On Characteristics

$V_{GS(\text{th})}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250 \mu\text{A}$	2	2.9	4	V
$\frac{\Delta V_{GS(\text{th})}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250 \mu\text{A}$, referenced to 25°C		-9		$\text{mV/}^\circ\text{C}$
$r_{DS(\text{on})}$	Static Drain to Source On Resistance	$V_{GS} = 10 \text{ V}, I_D = 3.4 \text{ A}$		83	105	$\text{m}\Omega$
		$V_{GS} = 6 \text{ V}, I_D = 2.7 \text{ A}$		115	171	
		$V_{GS} = 10 \text{ V}, I_D = 3.4 \text{ A}, T_J = 125^\circ\text{C}$		143	177	
g_{FS}	Forward Transconductance	$V_{DS} = 10 \text{ V}, I_D = 3.4 \text{ A}$		6		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 50 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$		156	208	pF
C_{oss}	Output Capacitance			47	62	pF
C_{rss}	Reverse Transfer Capacitance			2	3	pF
R_g	Gate Resistance			0.9		Ω

Switching Characteristics

$t_{\text{d(on)}}$	Turn-On Delay Time	$V_{DD} = 50 \text{ V}, I_D = 3.4 \text{ A}, V_{GS} = 10 \text{ V}, R_{\text{GEN}} = 6 \Omega$		5	10	ns
t_r	Rise Time			2	10	ns
$t_{\text{d(off)}}$	Turn-Off Delay Time			8	15	ns
t_f	Fall Time			2	10	ns
$Q_{\text{g(TOT)}}$	Total Gate Charge	$V_{GS} = 0 \text{ V} \text{ to } 10 \text{ V}$		3	4	nC
	Total Gate Charge	$V_{GS} = 0 \text{ V} \text{ to } 5 \text{ V}$	$V_{DD} = 50 \text{ V}$ $I_D = 3.4 \text{ A}$	1.6	2.3	nC
Q_{gs}	Total Gate Charge			0.8		nC
Q_{gd}	Gate to Drain "Miller" Charge			0.8		nC

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0 \text{ V}, I_S = 3.4 \text{ A}$ (Note 2)		0.86	1.3	V
		$V_{GS} = 0 \text{ V}, I_S = 2.1 \text{ A}$ (Note 2)		0.83	1.2	
t_{rr}	Reverse Recovery Time	$I_F = 3.4 \text{ A}, \text{di/dt} = 100 \text{ A}/\mu\text{s}$		34	54	ns
				22	35	

NOTES:

1. R_{QJA} is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a $1.5 \times 1.5 \text{ in.}$ board of FR-4 material. R_{QJC} is guaranteed by design while R_{QCA} is determined by the user's board design.



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



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

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

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

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

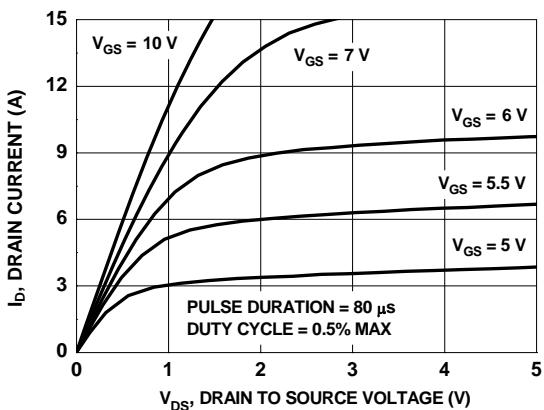


Figure 1. On-Region Characteristics

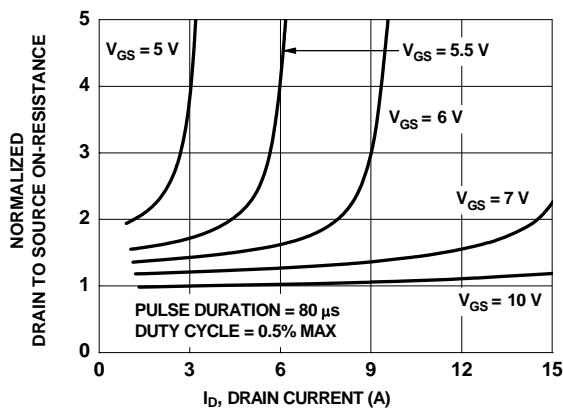


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

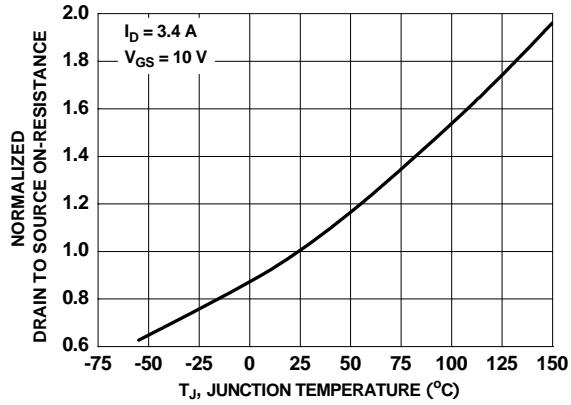


Figure 3. Normalized On-Resistance vs Junction Temperature

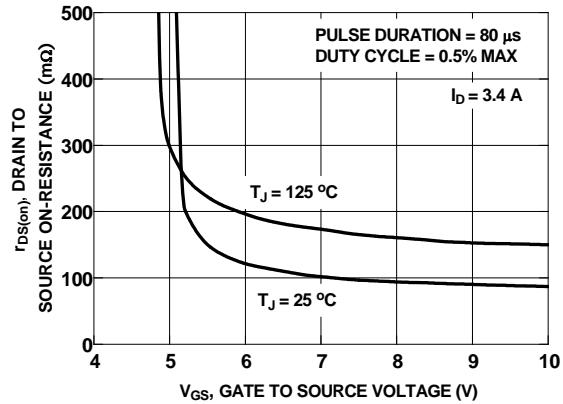


Figure 4. On-Resistance vs Gate to Source Voltage

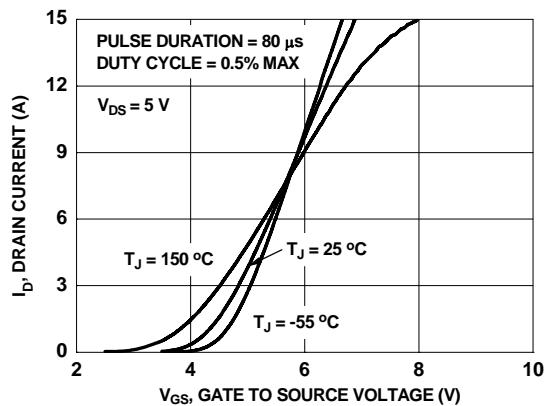


Figure 5. Transfer Characteristics

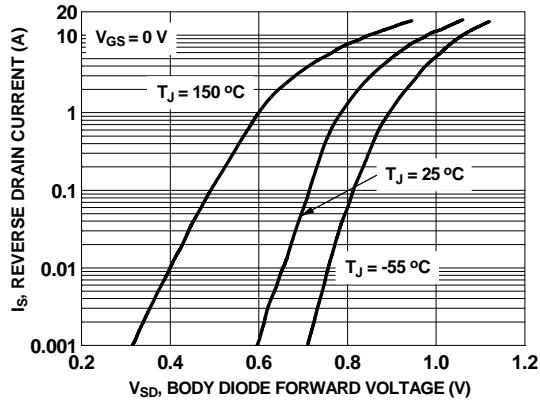


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

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

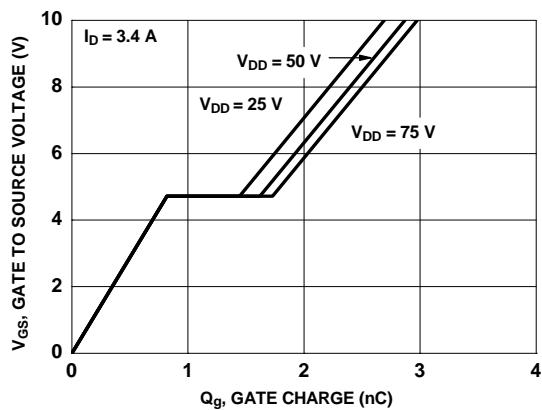


Figure 7. Gate Charge Characteristics

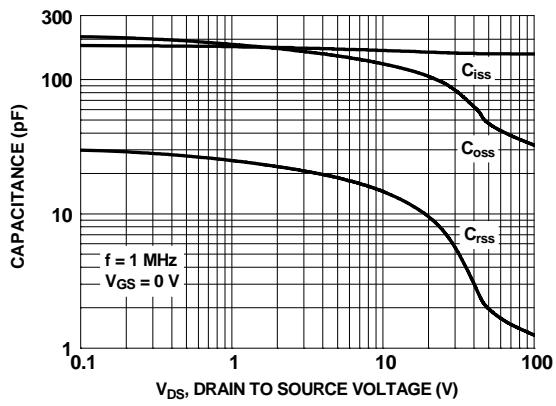


Figure 8. Capacitance vs Drain to Source Voltage

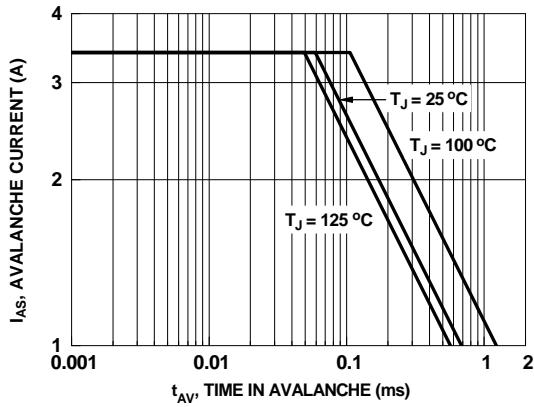


Figure 9. Unclamped Inductive Switching Capability

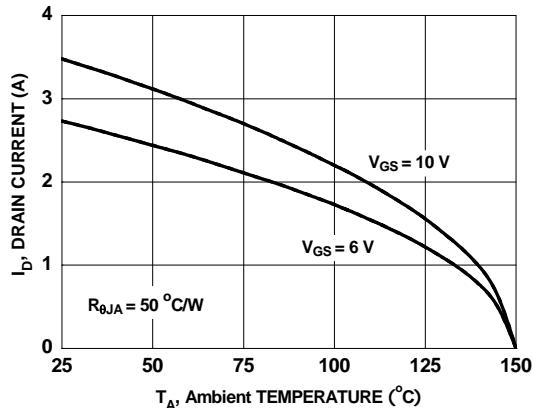


Figure 10. Maximum Continuous Drain Current vs Ambient Temperature

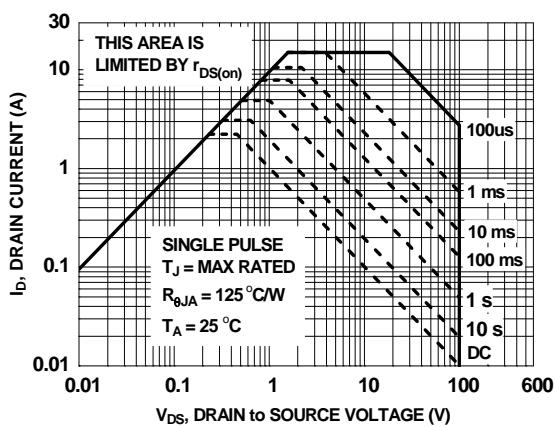


Figure 11. Forward Bias Safe Operating Area

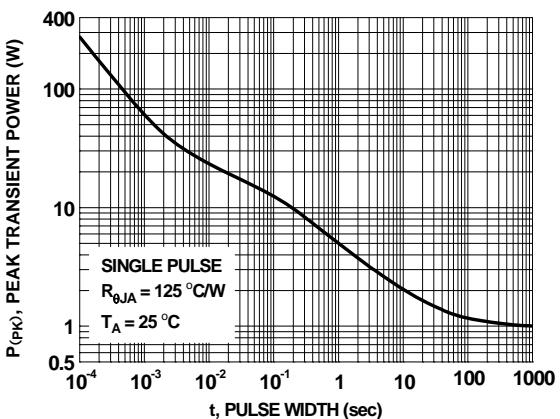


Figure 12. Single Pulse Maximum Power Dissipation

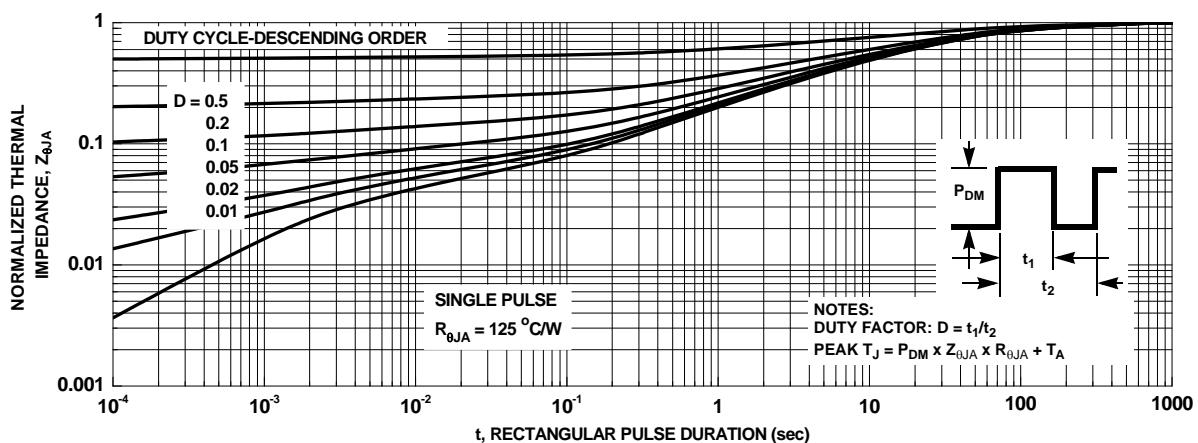
Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

Figure 13. Junction-to-Ambient Transient Thermal Response Curve



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