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FDS5690

60V N-Channel PowerTrench MOSFET

General Description

This N-Channel MOSFET is produced using $ON \bullet 7 A$, 60 V. $R_{DS(on)} = 0.028 \Omega @ V_{GS} = 10 V$ Semiconductor's advanced PowerTrench process that has been especially tailored to minimize on-state resistance and yet maintain superior switching performance. • Low gate charge (23nC typical).

These devices are well suited for low voltage and battery • Fast switching speed. powered applications where low in-line power loss and • High performance trench technology for extremely fast switching are required.

Applications

- DC/DC converter
- Motor drives





Features



 $R_{DS(on)} = 0.033 \ \Omega \ @ V_{GS} = 6 \ V.$

Absolute Maximum Ratings T_A = 25°C unless otherwise noted

Symbol	Parameter		Ratings	Units
V _{DSS}	Drain-Source Voltage		60	V
V _{GSS}	Gate-Source Voltage		<u>+</u> 20	V
ID	Drain Current - Continuous	(Note 1a)	7	A
	- Pulsed		50	
PD	Power Dissipation for Single Operation	(Note 1a)	2.5	W
		(Note 1b)	1.2	
		(Note 1c)	1	
T _J , T _{stg}	Operating and Storage Junction Temperatu	re Range	-55 to +150	°C

Thermal Characteristics

R _{ØJA}	Thermal Resistance, Junction-to-Ambient	(Note 1a)	50	°C/W
R _{θJC} -	Thermal Resistance, Junction-to-Case	(Note 1)	25	°C/W

Package Outlines and Ordering Information

Device Marking	Device	Reel Size	Tape Width	Quantity
FDS5690	FDS5690	13"	12mm	2500 units

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Publication Order Number: EDS5690/D

FDS5690

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
Off Char	acteristics					
BV _{DSS}	Drain-Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 250 \mu A$	60			V
<u>A</u> BVdss ATj	Breakdown Voltage Temperature Coefficient	I_D = 250 μ A, Referenced to 25°C		57		mV/°C
DSS	Zero Gate Voltage Drain Current	$V_{\text{DS}} = 48 \text{ V}, V_{\text{GS}} = 0 \text{ V}$			1	μA
GSSF	Gate-Body Leakage Current, Forward	$V_{GS}=20~V,~V_{DS}=0~V$			100	nA
GSSR	Gate-Body Leakage Current, Reverse	$V_{GS} = -20 \text{ V}, V_{DS} = 0 \text{ V}$			-100	nA
On Char	acteristics (Note 2)					
/ _{GS(th)}	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_{D} = 250 \ \mu A$	2	2.5	4	V
<u>A</u> VGS(th) ΔTJ	Gate Threshold Voltage Temperature Coefficient	$I_D = 250 \ \mu$ A, Referenced to 25° C		-5.9		mV/∘C
R _{DS(on)}	Static Drain-Source On-Resistance			0.022 0.037 0.025	0.028 0.050 0.033	Ω
D(on)	On-State Drain Current	V_{GS} = 10 V, V_{DS} = 5 V	25			Α
FS	Forward Transconductance	$V_{DS} = 10 \text{ V}, \text{ I}_{D} = 7 \text{ A}$		24		S
Dynamic	Characteristics					
Viss	Input Capacitance	$V_{DS} = 30 \text{ V}, V_{GS} = 0 \text{ V},$ f = 1.0 MHz		1107		pF
2055	Output Capacitance			149		pF
	Reverse Transfer Capacitance	-		72		pF
				l	l.	
Switchin	Turn-On Delay Time	$V_{pp} = 30 V I_p = 1 A$		10	18	ns
u(on)	Turn-On Rise Time	$V_{\text{GS}} = 10 \text{ V}, \text{ R}_{\text{GEN}} = 6 \Omega$		9	18	ns
-1(-11)	Turn-Off Delay Time	-		24		ns
	Turn-Off Fall Time			10	18	ns
)_	Total Gate Charge	$V_{DS} = 30 \text{ V}, \text{ I}_{D} = 7 \text{ A},$ $V_{GS} = 10 \text{ V},$		23	32	nC
-g)	Gate-Source Charge			4	02	nC
×gs Σ _{ad}	Gate-Drain Charge	-		6.8		nC
~gu				0.0		
Drain-Sc	Maximum Continuous Drain Source Did	d Maximum Ratings			2.1	۸
s /	Drain-Source Diode Forward Voltage	$V_{res} = 0 V_{res} = 2.1 A_{res}$ (Note 2)		0.75	2.1	A V
SD	Drain-Source Diode i ofward Voltage	$V_{GS} = 0 V, I_{S} = 2.1 A (NOLE 2)$		0.75	1.2	v
 R_{θJA} is the drain pins. 	sum of the junction-to-case and case-to-ambient res $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determine a) 50° C/W when mounted on a 0.5 in ² pad of 2 oz. copper.	b) 105° C/W when a 0.02 in ²	defined as	the solder	mounting 25° C/W w ounted on ad of 2 oz.	surface of hen a 0.003 i copper.

FDS5690

2. Pulse Test: Pulse Width $\leq 300~\mu\text{s},$ Duty Cycle $\leq 2.0\%$



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