

Dual N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY

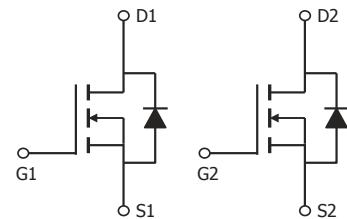
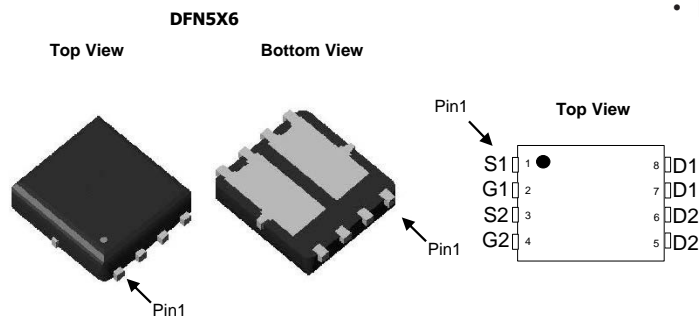
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^d	Q _g (Typ.)
60	0.019 at V _{GS} = 10 V	28	23 nC
	0.022 at V _{GS} = 4.5 V	20	

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

APPLICATIONS

- Notebook System Power
- Synchronous Buck Converter
- Notebook Vcore


RoHS
 COMPLIANT


N-Channel MOSFET N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V _{DS}	60	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C)	I _D	28 ^a	A
		22	
		16 ^{b, c}	
		9 ^{b, c}	
Pulsed Drain Current	I _{DM}	112	A
Continuous Source-Drain Diode Current	I _S	20	
		15 ^{b, c}	
Avalanche Current	I _{AS}	22	mJ
Single-Pulse Avalanche Energy	E _{AS}	41	
Maximum Power Dissipation	P _D	35	W
		26	
		15 ^{b, c}	
		10 ^{b, c}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	R _{thJA}	45	55	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	8	10	

Notes:

- Package limited.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under Steady State conditions is 85 °C/W.

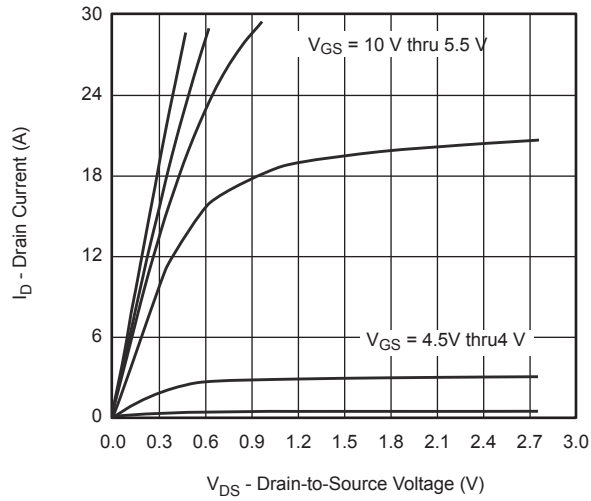
SPECIFICATIONS T _J = 25 °C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	60			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		55		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 6.3		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		4	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 48V, V _{GS} = 0 V			1	μA
		V _{DS} = 48 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	28			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 6A		0.019	0.025	Ω
		V _{GS} = 4.5 V, I _D = 6A		0.022	0.030	Ω
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 6A		40		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 48 V, V _{GS} = 0 V, f = 1 MHz		1950		pF
Output Capacitance	C _{oss}			930		
Reverse Transfer Capacitance	C _{rss}			510		
Total Gate Charge	Q _g	V _{DS} = 48 V, V _{GS} = 10V, I _D = 6 A		35		nC
Gate-Source Charge	Q _{gs}			6.3		
Gate-Drain Charge	Q _{gd}			11		
Gate Resistance	R _g	f = 1 MHz		4.9	6.2	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 48 V, R _L = 5.4 Ω I _D ≅ 6 A, V _{GEN} = 4.5 V, R _g = 1 Ω		16	19	ns
Rise Time	t _r			35	66	
Turn-Off DelayTime	t _{d(off)}			30	39	
Fall Time	t _f			26	31	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 48 V, R _L = 5.4 Ω I _D ≅ 6A, V _{GEN} = 10 V, R _g = 1 Ω		9	18	
Rise Time	t _r			15	15	
Turn-Off DelayTime	t _{d(off)}			19	28	
Fall Time	t _f			20	35	
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I _S	T _C = 25 °C			28	A
Pulse Diode Forward Current ^a	I _{SM}				112	
Body Diode Voltage	V _{SD}	I _S = 2 A		0.7	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 5.5 A, dI/dt = 100 A/μs, T _J = 25 °C		26	55	ns
Body Diode Reverse Recovery Charge	Q _{rr}			26	55	nC
Reverse Recovery Fall Time	t _a			20		ns
Reverse Recovery Rise Time	t _b			7		

Notes:

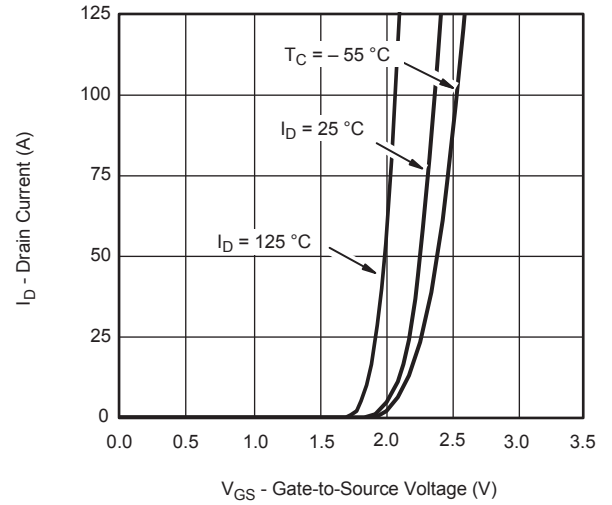
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

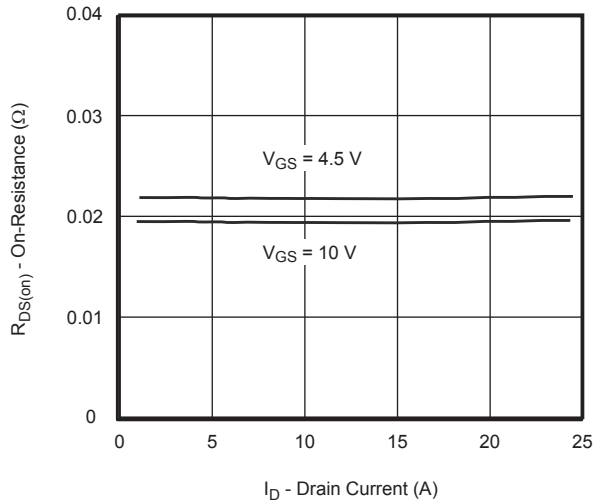
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



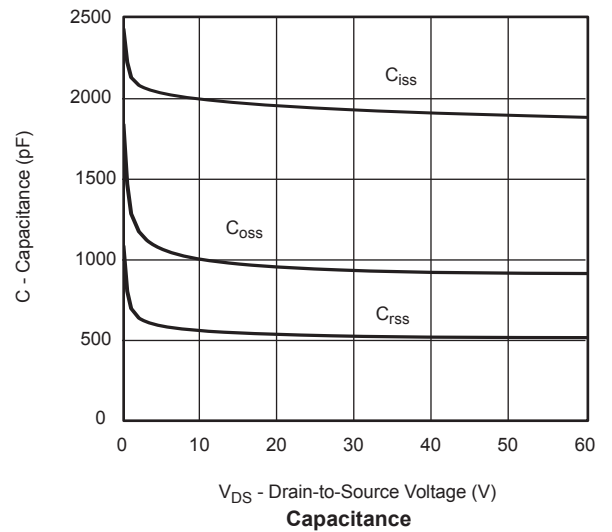
Output Characteristics



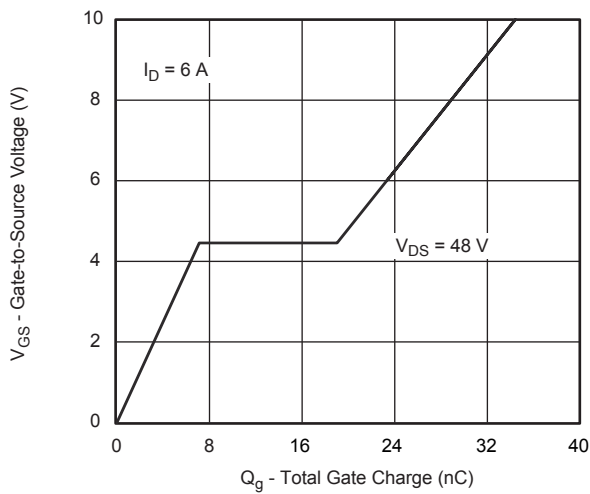
Transfer Characteristics



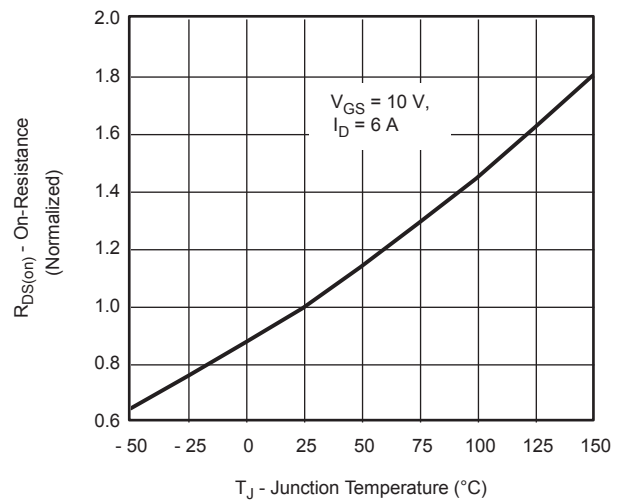
On-Resistance vs. Drain Current



Capacitance

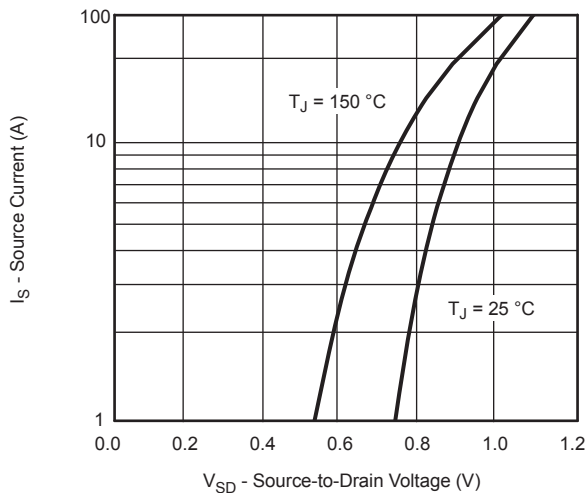


Gate Charge

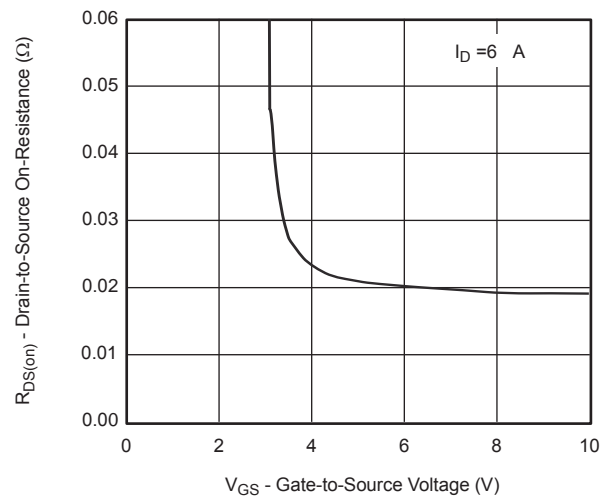


On-Resistance vs. Junction Temperature

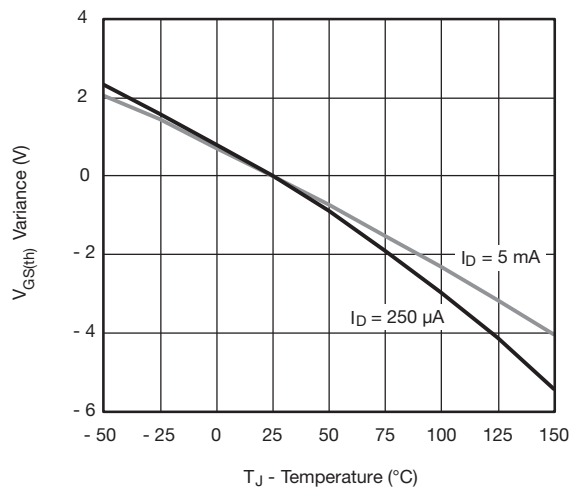
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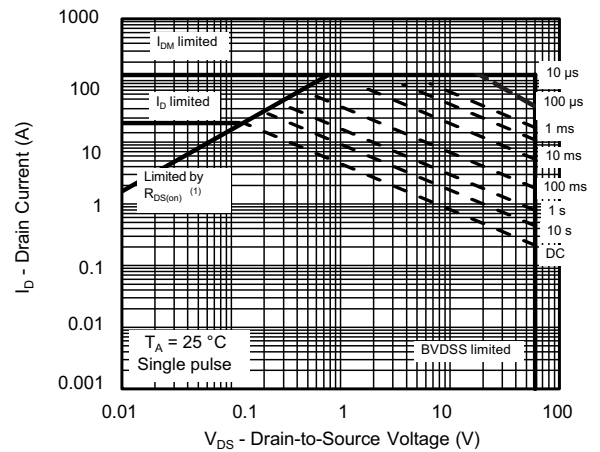
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

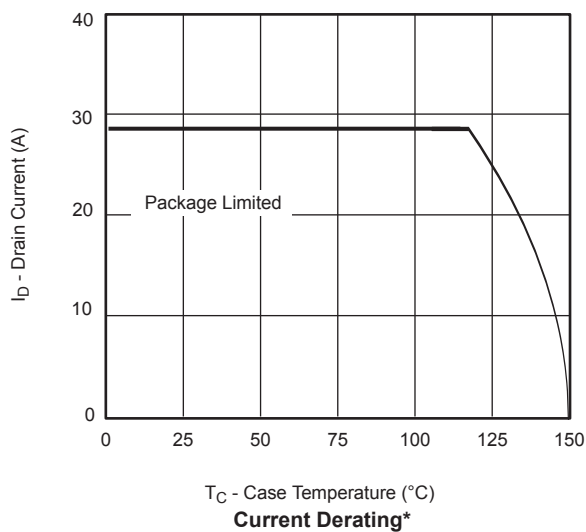


Threshold Voltage

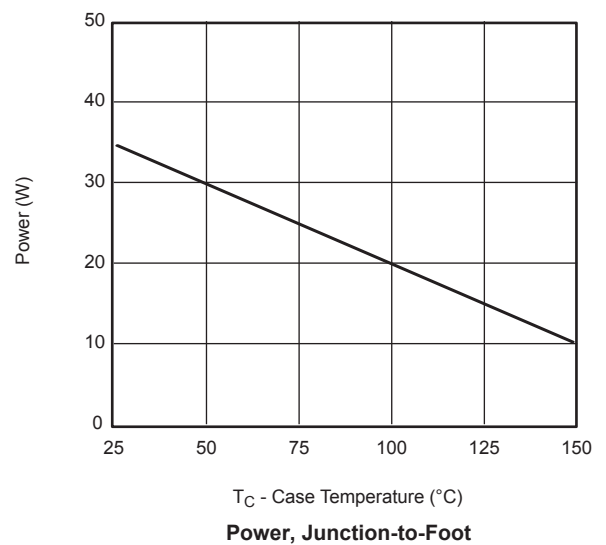


⁽¹⁾ $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient



Current Derating*



Power, Junction-to-Foot

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