

N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.028 at $V_{GS} = 10$ V	8.5
	0.031 at $V_{GS} = 4.5$ V	7.9

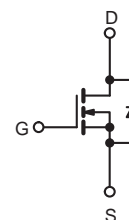
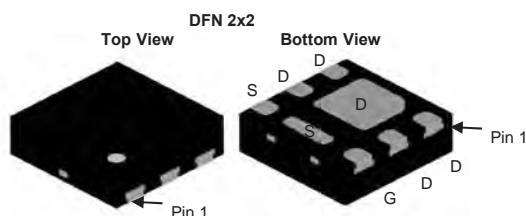
FEATURES

- DT-Trench Power MOSFET
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC


RoHS
 COMPLIANT

APPLICATIONS

- Primary Side Switch
- Synchronous Rectification



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ\text{C}$, unless otherwise noted

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	60		V
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	T _A = 25 °C	I _D	8.5	6.0	A
	T _A = 70 °C		7.6	4.8	
Pulsed Drain Current		I _{DM}	40		
Continuous Source Current (Diode Conduction) ^a		I _S	3.2	1.3	
Single Avalanche Current	L = 0.1 mH	I _{AS}	22		
Single Avalanche Energy		E _{AS}	24		
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	3.8	1.5	W
	T _A = 70 °C		2.4	1.0	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 150		°C
Soldering Recommendations (Peak Temperature) ^{b, c}			260		

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	26	33	$^\circ\text{C/W}$
		65	81	
Maximum Junction-to-Case (Drain)	R_{thJC}	1.9	2.4	

Notes:

- Surface mounted on 1" x 1" FR4 board.
- The DFN2X2 is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.

SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\text{ }\mu\text{A}$	1.5	2.5	3.0	V
Gate Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 55\text{ }^{\circ}\text{C}$			5	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}$, $V_{GS} = 10\text{ V}$	30			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 8.5\text{ A}$		0.028	0.031	Ω
		$V_{GS} = 4.5\text{ V}$, $I_D = 6.9\text{ A}$		0.031	0.034	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}$, $I_D = 8.5\text{ A}$		35		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 3.2\text{ A}$, $V_{GS} = 0\text{ V}$		0.78	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 10\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 8.5\text{ A}$		30	45	nC
Gate-Source Charge	Q_{gs}			6.9		
Gate-Drain Charge	Q_{gd}			5.8		
Gate Resistance	R_g		0.65	1.3	1.95	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}$, $R_L = 30\text{ }\Omega$ $I_D \cong 1\text{ A}$, $V_{GEN} = 10\text{ V}$, $R_g = 6\text{ }\Omega$		14	25	ns
Rise Time	t_r			12	20	
Turn-Off Delay Time	$t_{d(off)}$			50	80	
Fall Time	t_f			12	20	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 3.2\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$		60	100	

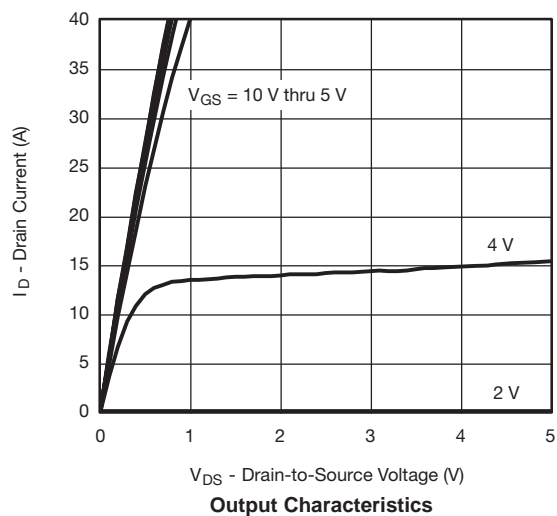
Notes:

 a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

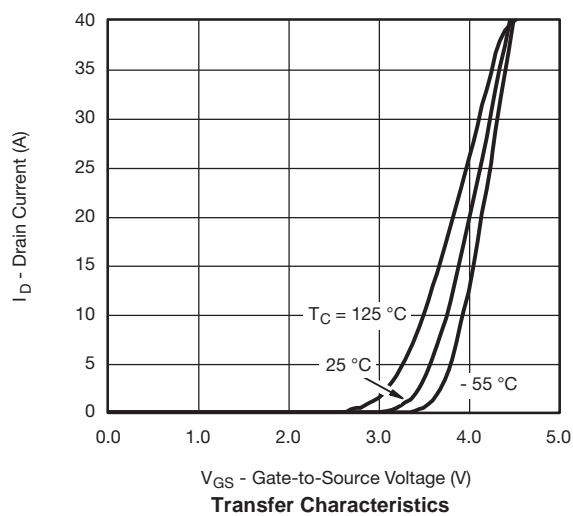
b. Guaranteed by design, not subject to production testing.

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.

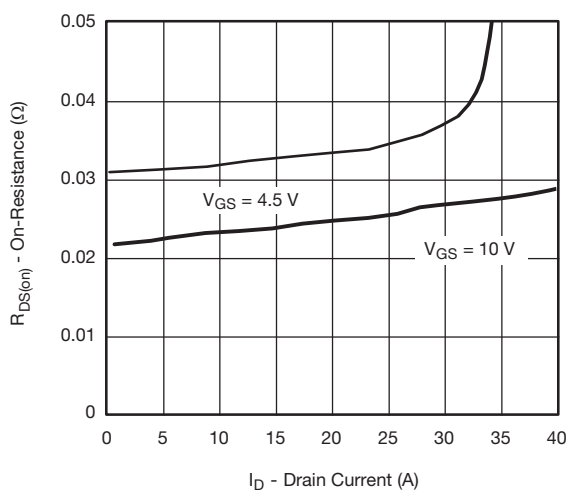
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



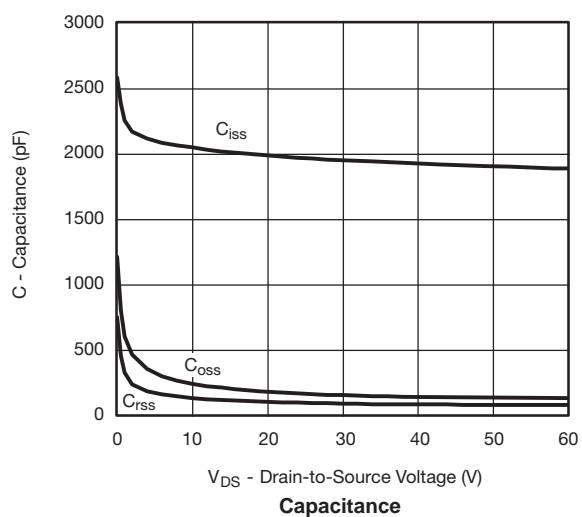
Output Characteristics



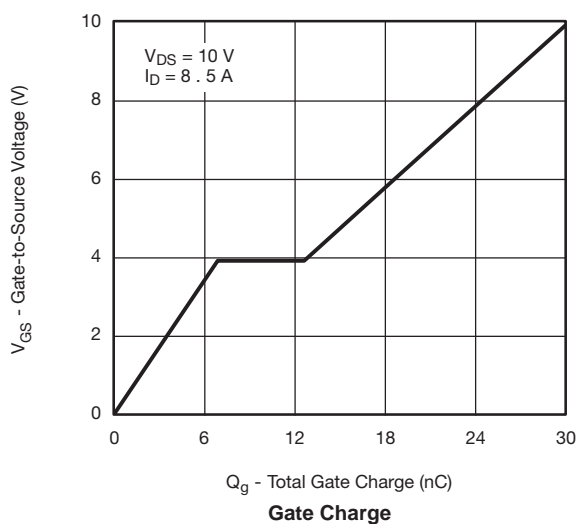
Transfer Characteristics



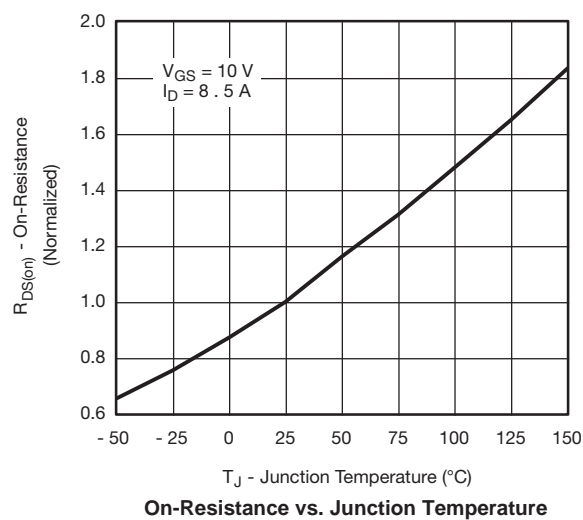
On-Resistance vs. Drain Current



Capacitance

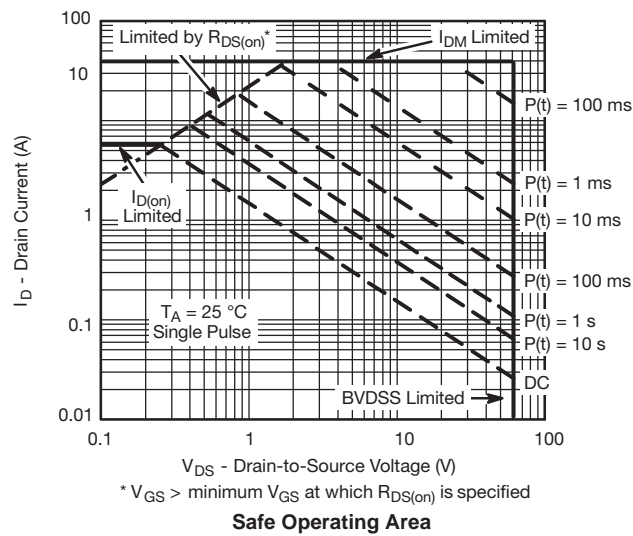
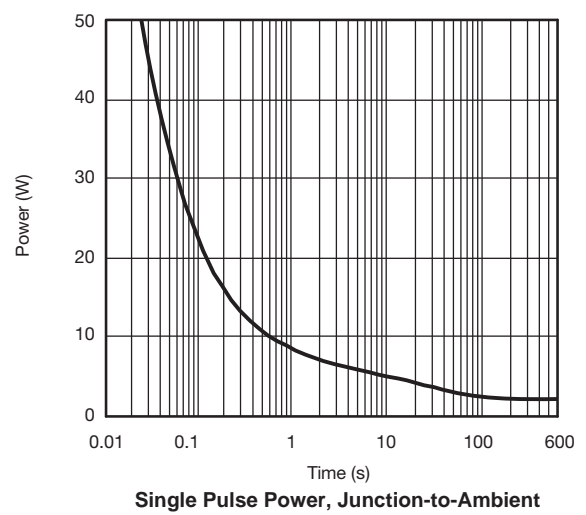
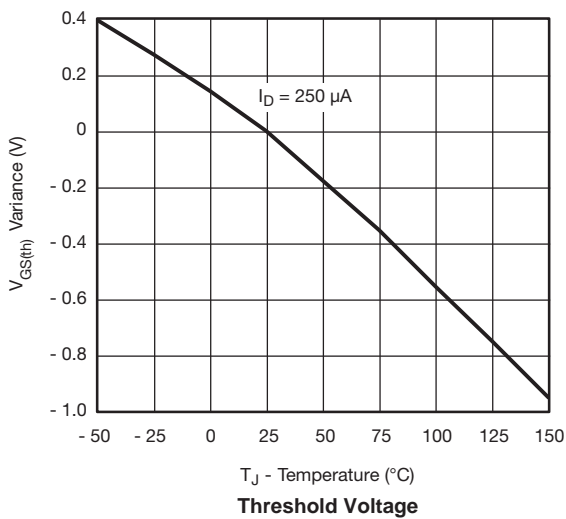
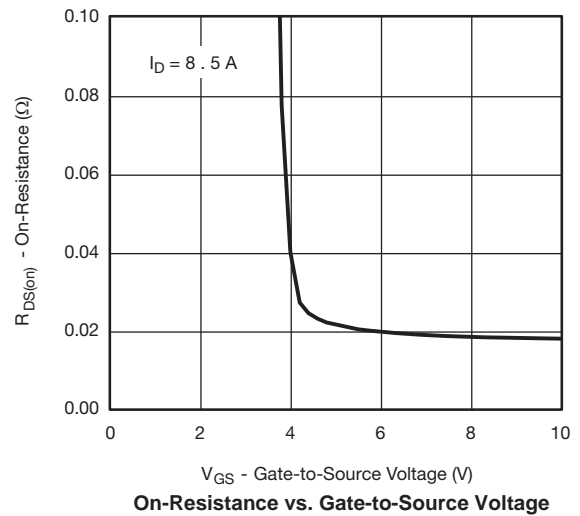
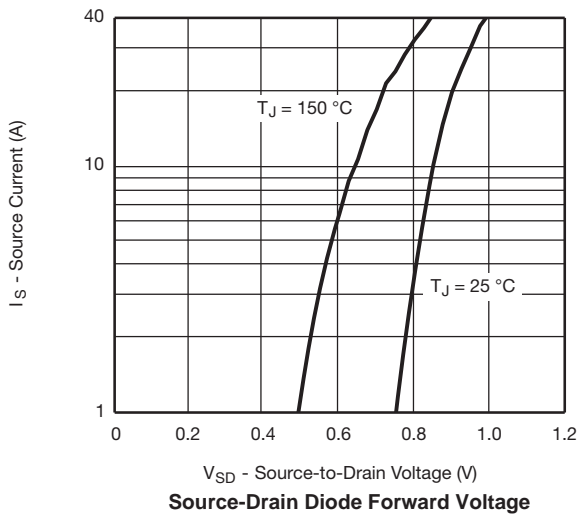


Gate Charge



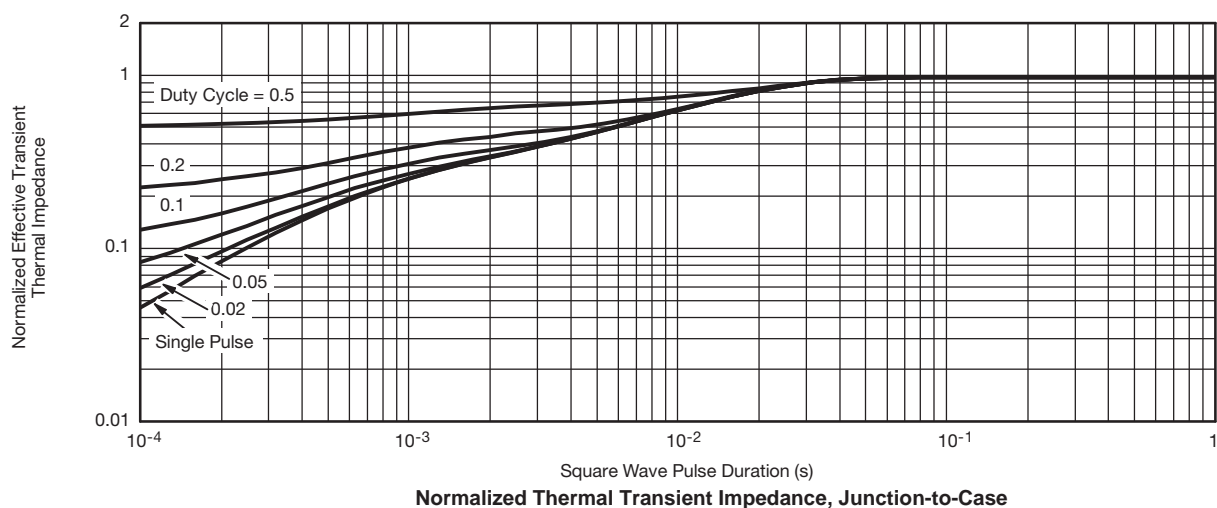
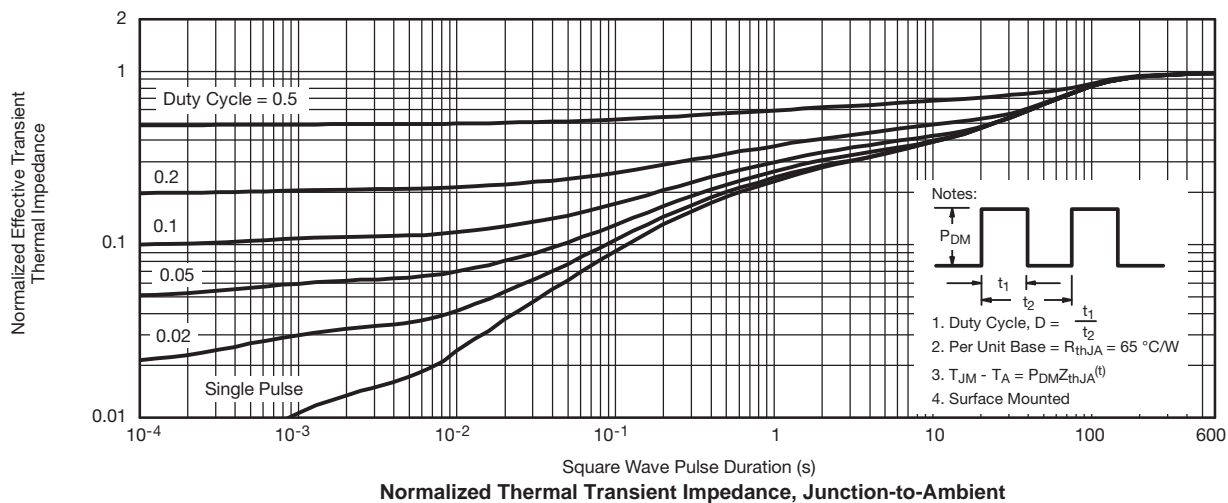
On-Resistance vs. Junction Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



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