Dual N-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ.)
30	0.009 at V_{GS} = 10 V	45	8.1 nC
	0.012at V_{GS} = 4.5 V	32	

FEATURES

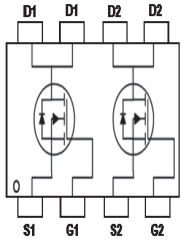
- DT-Trench Power MOSFET
- 100 % UIS Tested
- 100 % R_g Tested

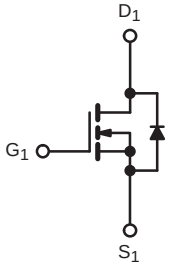
RoHS COMPLIANT

APPLICATIONS

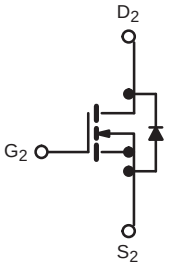
- Synchronous buck
- DC/DC conversion
- Half bridge
- POL

PDFN 3.3x3.3





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}	30	V
Gate-source voltage		V_{GS}	+20	
Continuous drain current (T_J = 150 °C)	T_C = 25 °C	I_D	45	A
	T_C = 70 °C		26.7	
	T_A = 25 °C		15.7 [b, c]	
	T_A = 70 °C		12.5 [b, c]	
Pulsed drain current (t = 100 µs)		I_{DM}	180	
Continuous source current (MOSFET diode conduction)	T_C = 25 °C	I_S	45	
	T_A = 25 °C		3.9 [b, c]	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	10	
Single pulse avalanche energy		E_{AS}	19	mJ
Maximum power dissipation	T_C = 25 °C	P_D	22	W
	T_C = 70 °C		12.7	
	T_A = 25 °C		6.7 [b, c]	
	T_A = 70 °C		4.1 [b, c]	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature)			260	

Notes

a. T_C = 25 °C

b. Surface mounted on 1" x 1" FR4 board

c. t = 10 s

THERMAL RESISTANCE RATINGS		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient [a, b]	t ≤ 10 s	R_{thJA}	27	34	°C/W
Maximum junction-to-case (drain)	Steady state	R_{thJC}	6	7.5	

Notes

a. Surface mounted on 1" x 1" FR4 board

b. Maximum under steady state conditions is 69 °C/W

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**CHANNEL-1 AND CHANNEL-2**					
	SYMBOL	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	30	-	-	V
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1	-	2.4	
Gate-source leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = +20 V / -16 V	-	-	± 100	nA
Zero gate voltage drain current	I_{DSS}	V_{DS} = 24 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 24 V, V_{GS} = 0 V, T_J = 55 °C	-	-	5	
On-state drain current [a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	45	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A	-	0.0090	0.012	Ω
		V_{GS} = 4.5 V, I_D = 7 A	-	0.0120	0.018	
Forward transconductance [a]	g_{fs}	V_{DS} = 10 V, I_D = 10 A	-	57	-	S
Dynamic [b]						
Input capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	-	880	-	pF
Output capacitance	C_{oss}		-	250	-	
Reverse transfer capacitance	C_{rss}		-	30	-	
C_{rss}/C_{iss} ratio			-	0.052	0.103	
Total gate charge	Q_g	V_{DS} = 15 V, V_{GS} = 10 V, I_D = 10 A	-	8.1	12.2	nC
		V_{DS} = 15 V, V_{GS} = 4.5 V, I_D = 7 A	-	3.7	4.5	
Gate-source charge	Q_{gs}		-	2.4	-	
Gate-drain charge	Q_{gd}		-	0.67	-	
Gate resistance	R_g	f = 1 MHz	0.24	1.2	2.4	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 1.2 Ω, I_D ≅ 10 A, V_{GEN} = 10 V, R_g = 1 Ω	-	10	20	ns
Rise time	t_r		-	6	12	
Turn-off delay time	$t_{d(off)}$		-	18	36	
Fall time	t_f		-	8	16	
Turn-on delay time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 1.2 Ω, I_D ≅ 7 A, V_{GEN} = 4.5 V, R_g = 1 Ω	-	15	30	
Rise time	t_r		-	180	360	
Turn-off delay time	$t_{d(off)}$		-	20	40	
Fall time	t_f		-	15	30	

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Drain-source Body Diode Characteristics						
Continuous source-drain diode current	I_S	T_C = 25°C	-	-	45	A
Pulse diode forward current	I_{SM}		-	-	180	
Body diode voltage	V_{SD}	I_S = 12.5 A, V_{GS} = 0 V	-	0.7	1.2	V
Body diode reverse recovery time	t_{rr}	I_F = 12.5 A, di/dt = 100 A/µs, T_J = 25 °C	-	15	30	ns
Body diode reverse recovery charge	Q_{rr}		-	4.3	8.6	nC
Reverse recovery fall time	t_a		-	8	-	ns
Reverse recovery rise time	t_b		-	7	-	

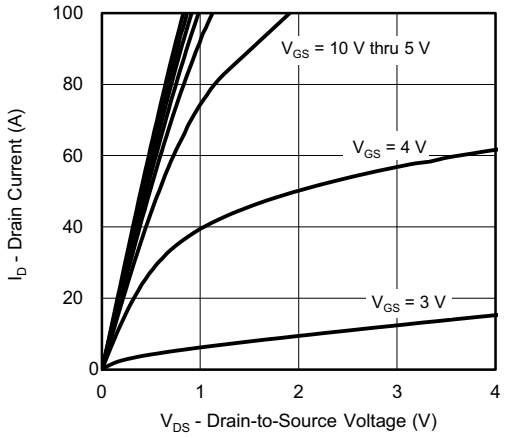
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %

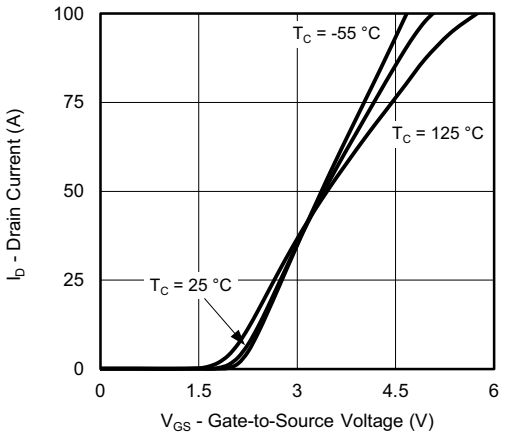
b. Guaranteed by design, not subject to production testing

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.

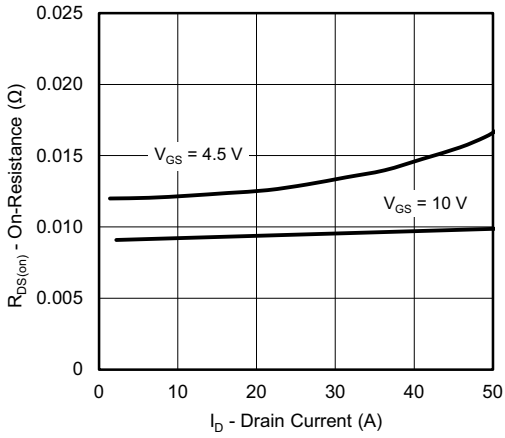
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



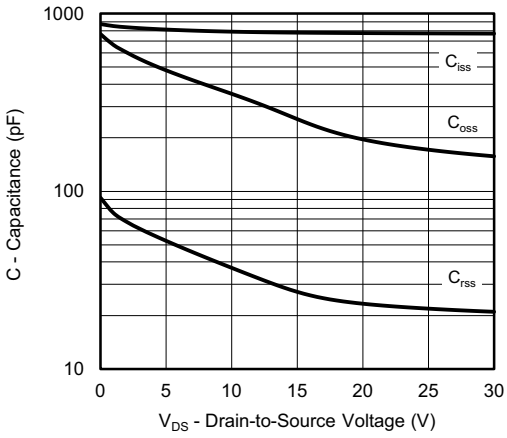
Output Characteristics



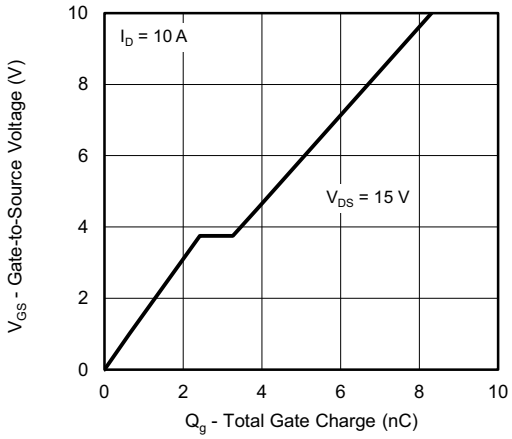
Transfer Characteristics



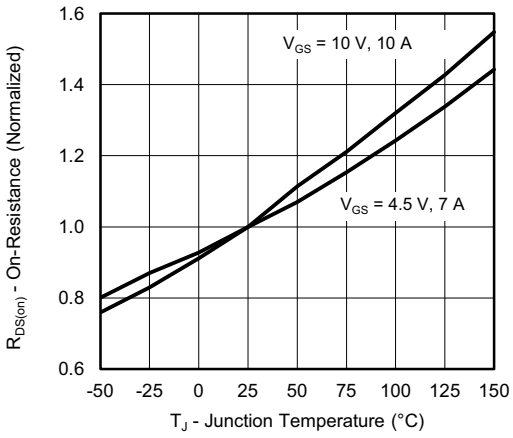
On-Resistance vs. Drain Current and Gate



Capacitance

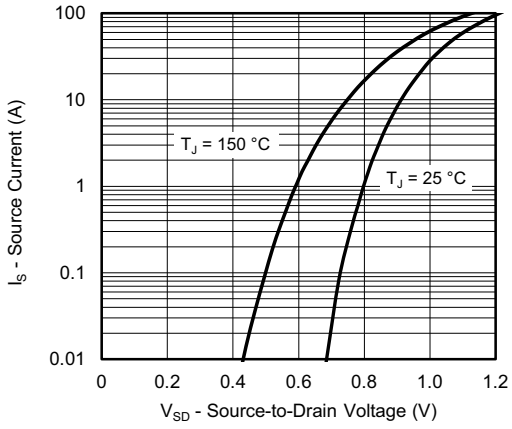


Gate Charge

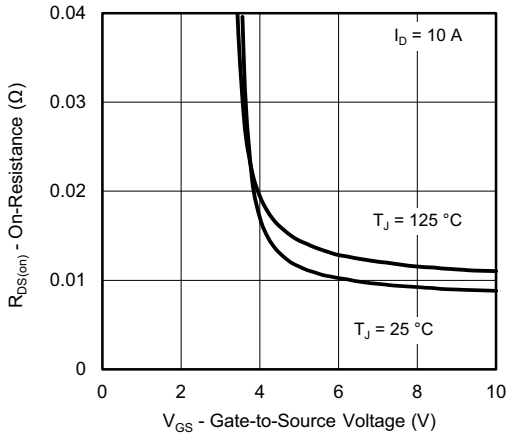


On-Resistance vs. Junction Temperature

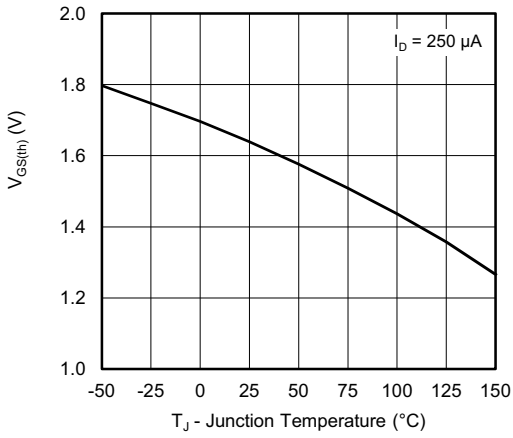
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



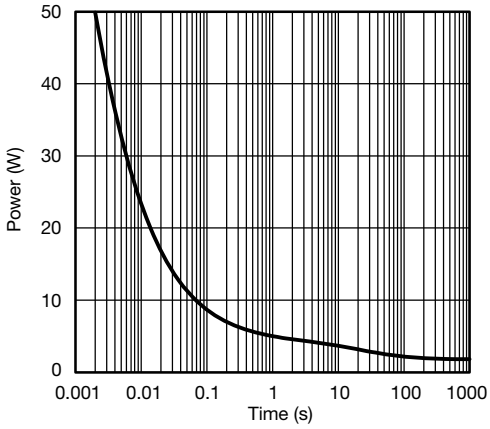
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

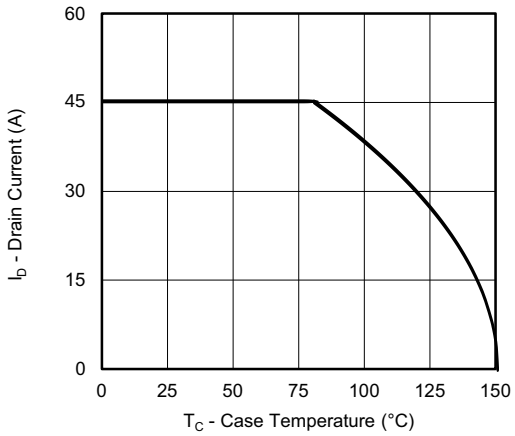


Threshold Voltage

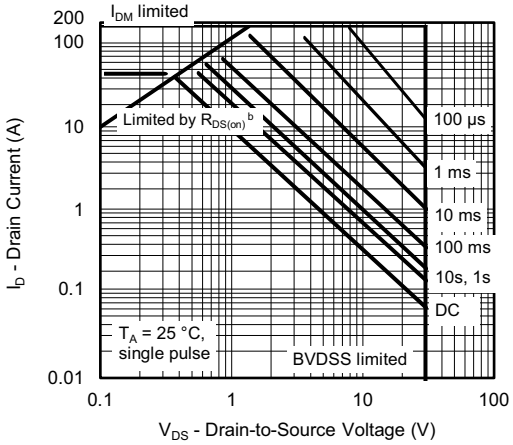


Single Pulse Power

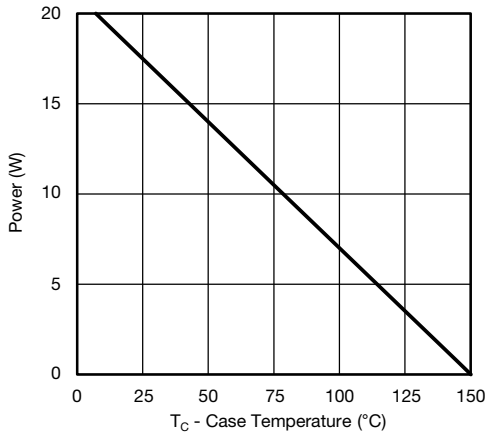
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



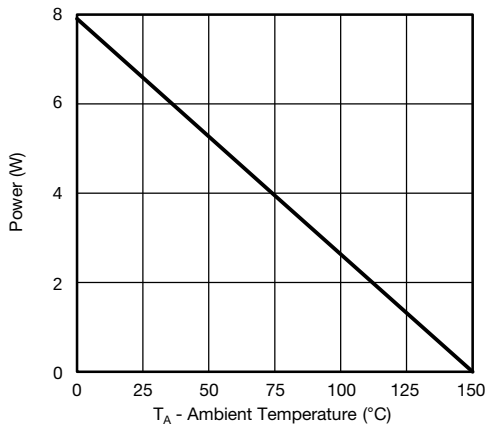
Current Derating [a]



Safe Operating Area, Junction-to-Ambient



Power, Junction-to-Case



Power, Junction-to-Ambient

Notes

a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-ambient thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit

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

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