N-Channel 100 V (D-S) Power MOSFET

RoHS COMPLIANT

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a, d]	Q_g (Typ.)
100	12 at V_{GS} = 10 V	48	19 nC

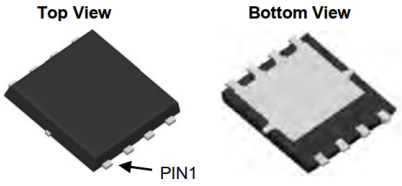
FEATURES

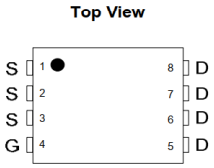
- DT-Trench Power MOSFET
- 100 % Rgand UIS Tested

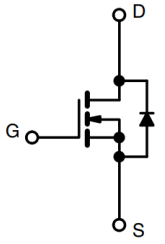
APPLICATIONS

- DC/DC converters
- Primary side switch

DFN5X6







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	LIMIT	UNIT
Drain-source voltage		V_{DS}	100	V
Gate-source voltage		V_{GS}	± 20	
Continuous drain current (T_J = 150 °C)	T_C = 25 °C	I_D	48 [a]	A
	T_C = 70 °C		35 [a]	
	T_A = 25 °C		8.8 [b, c]	
	T_A = 70 °C		5.2 [b, c]	
Pulsed drain current (t = 100 µs)		I_{DM}	165	
Continuous source-drain diode current	T_C = 25 °C	I_S	48 [a]	
	T_A = 25 °C		8.1 [b, c]	
Single pulse avalanche current	L = 0.1 mH	I_{AS}	45	
Single pulse avalanche energy		E_{AS}	90	mJ
Maximum power dissipation	T_C = 25 °C	P_D	60	W
	T_C = 70 °C		47	
	T_A = 25 °C		2.05 [b, c]	
	T_A = 70 °C		1.6 [b, c]	
Operating junction and storage temperature range		T_J, T_{stg}	-55 to +150	°C
Soldering recommendations (peak temperature) [c]			260	

THERMAL RESISTANCE RATINGS					
PARAMETER		SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient [b]	t ≤ 10 s	R_{thJA}	40	50	°C/W
Maximum junction-to-case	Steady state	R_{thJC}	1.2	2	

Notes:
a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 10 s.
d. Calculated based on maximum junction temperature.

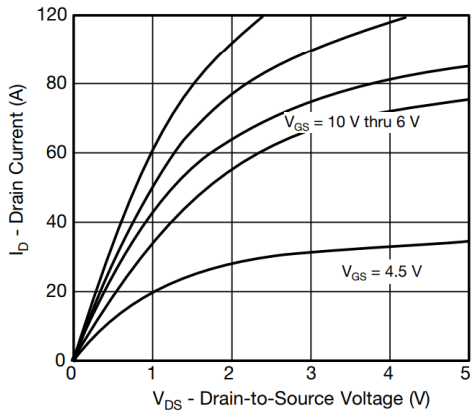
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Drain-source breakdown voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	100	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA	-	55	-	mV/°C
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$	I_D = 250 µA	-	-6	-	
Gate-source threshold voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1	-	3	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} = 100 V, V_{GS} = 0 V	-	-	1	µA
		V_{DS} = 80 V, V_{GS} = 0 V, T_J = 75 °C	-	-	10	
On-state drain current [a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} =10 V	48	-	-	A
Drain-source on-state resistance [a]	$R_{DS(on)}$	V_{GS} =10 V, I_D = 20 A	-	12	18	mΩ
Forward transconductance [a]	g_{fs}	V_{DS} = 5 V, I_D = 20 A	-	38	-	S
Dynamic [b]						
Input capacitance	C_{iss}	V_{DS} = 50 V, V_{GS} = 0 V, f = 1 MHz	-	780	-	pF
Output capacitance	C_{oss}		-	110	-	
Reverse transfer capacitance	C_{rss}		-	9	-	
Total gate charge	Q_g	V_{DS} = 50 V, V_{GS} = 10 V, I_D = 20 A	-	19	-	nC
Gate-source charge	Q_{gs}		-	5	-	
Gate-drain charge	Q_{gd}		-	3.3	-	
Gate resistance	R_g	f = 1 MHz	-	1.2	-	Ω
Turn-on delay time	$t_{d(on)}$	V_{DD} = 50 V, R_L = 2.5 Ω, I_D ≅ 20 A, V_{GEN} = 10 V, R_g = 1 Ω	-	7.5	-	ns
Rise time	t_r		-	4	-	
Turn-off delay time	$t_{d(off)}$		-	15	-	
Fall time	t_f		-	5	-	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	T_C = 25 °C	-	-	48	A
Pulse diode forward current (t_p = 100 µs)	I_{SM}		-	-	165	
Body diode voltage	V_{SD}	I_S = 5 A, V_{GS} = 0 V	-	0.7	1.2	V
Body diode reverse recovery time	t_{rr}	I_F = 20 A, di/dt = 100 A/µs, T_J = 25 °C	-	34	-	ns
Body diode reverse recovery charge	Q_{rr}		-	86	-	nC
Reverse recovery fall time	t_a		-	17	-	ns
Reverse recovery rise time	t_b		-	15	-	

Notes

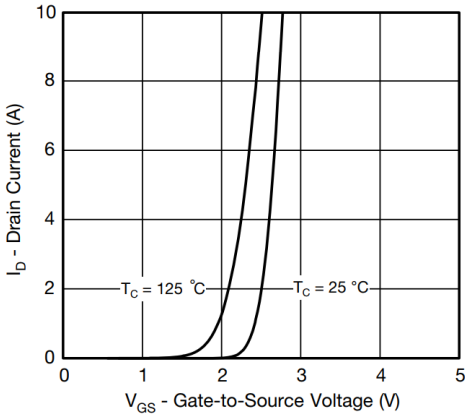
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %
b. Guaranteed by design, not subject to production testing

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.

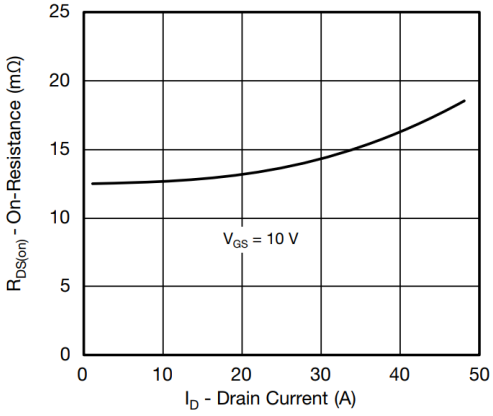
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



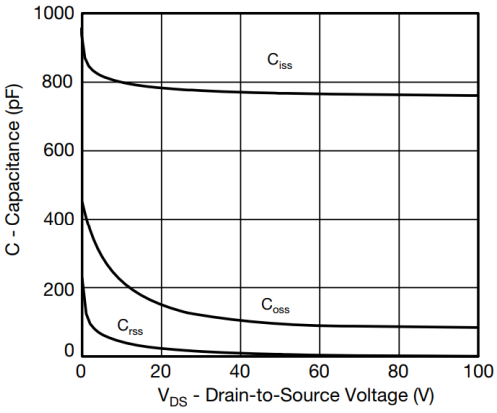
Output Characteristics



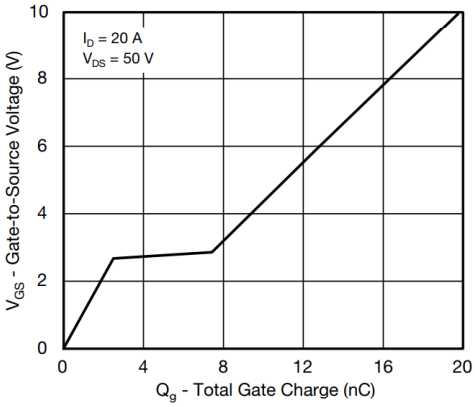
Transfer Characteristics



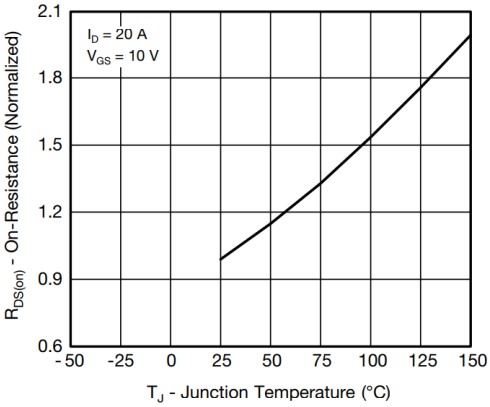
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

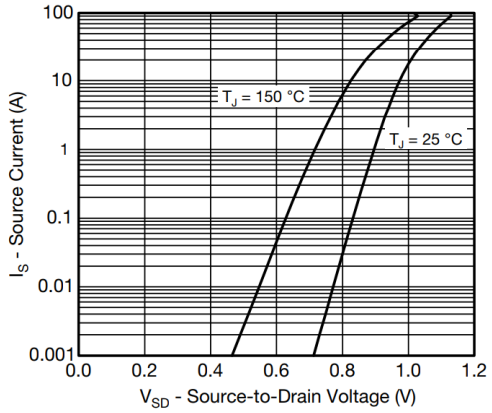


Gate Charge

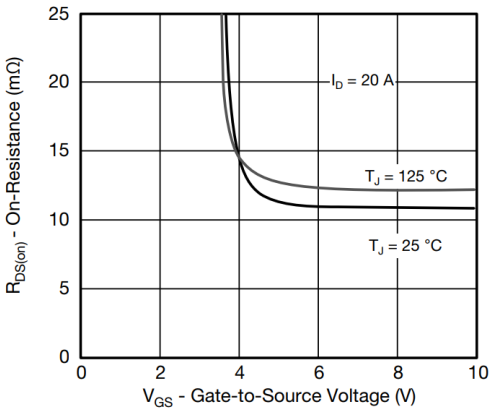


On-Resistance vs. Junction Temperature

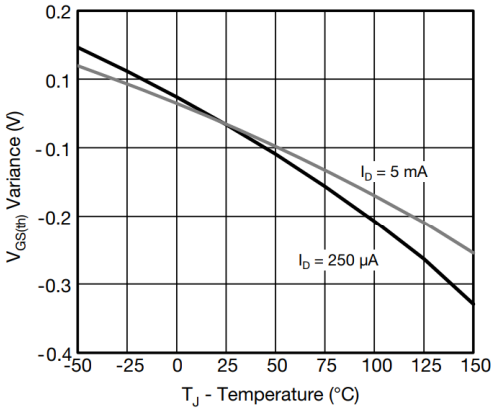
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



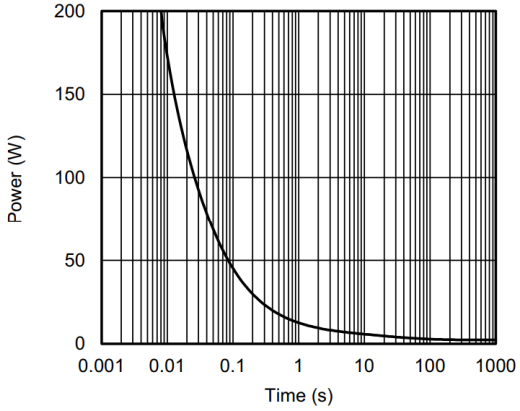
Source-Drain Diode Forward Voltage



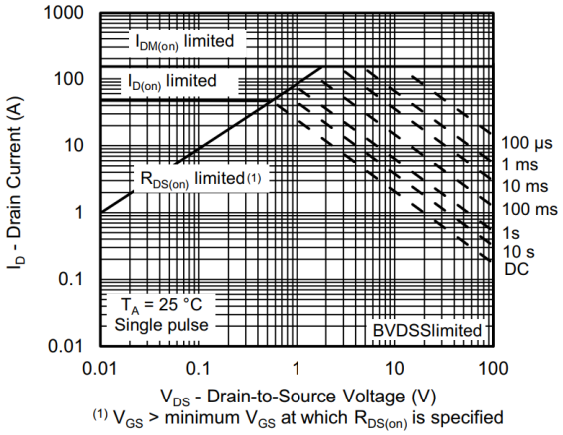
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

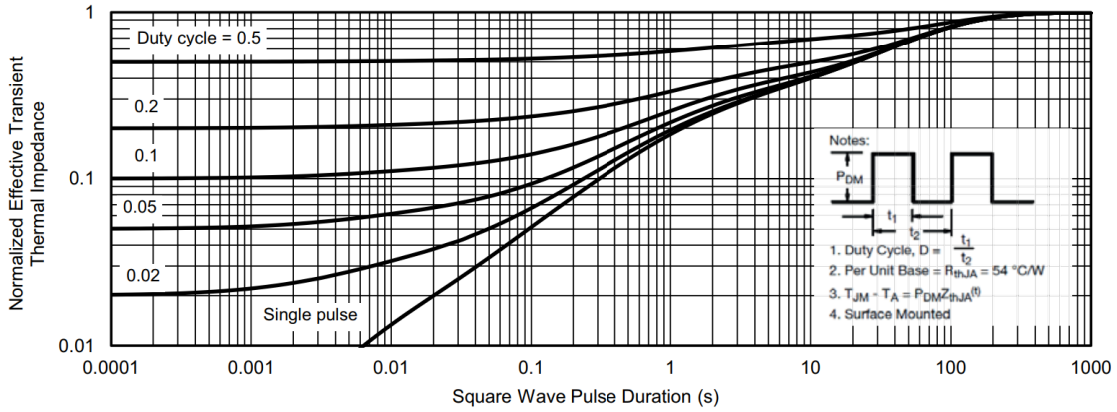


Single Pulse Power, Junction-to-Ambient



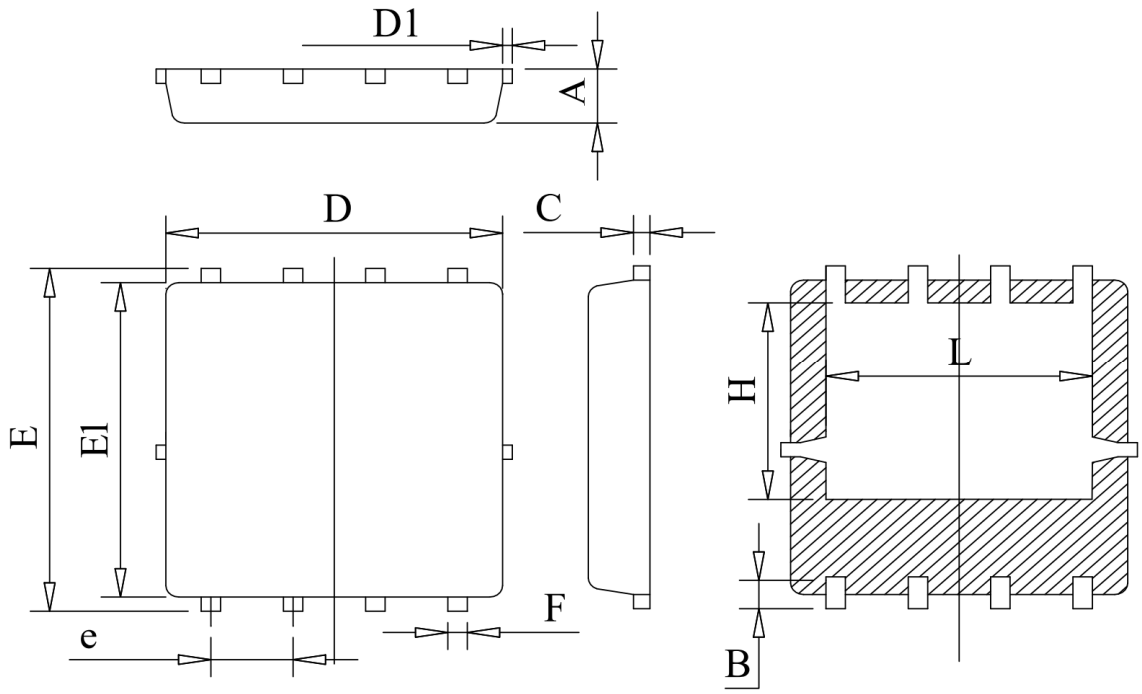
Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient

DFN5X6-8L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

Unit : mm

Symbol	Min	Typ	Max
A	0.78	0.95	1.12
B	0.45	0.58	0.78
C	0.18	0.254	0.36
D	4.70	5.20	5.45
D1			0.18
E	5.85	6.05	6.25
E1	5.38	5.55	5.98
e	1.15	1.27	1.40
F	0.18	0.30	0.52
H	3.25	3.47	3.70
L	3.75	4.00	4.25

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