

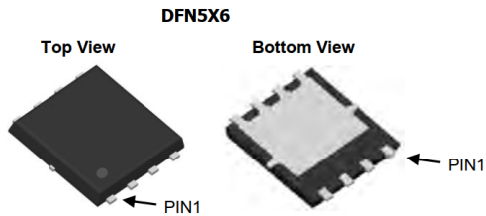
N-Channel 250 V (D-S) Power MOSFET



RoHS
COMPLIANT

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A) ^{a, d}	Q_g (Typ.)
250	34 at $V_{GS} = 10$ V	36	15 nC

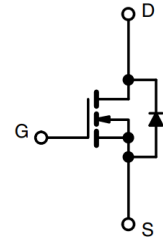


FEATURES

- TrenchFET II Power MOSFET
- 100 % Rgand UIS Tested

APPLICATIONS

- Synchronous rectification
- Primary side switch
- DC/DC converters
- OR-ing
- Power supplies
- Motor drive control
- Battery and load switch



N-Channel MOSFET

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	250	V
Gate-source voltage	V_{GS}	± 20	V
Continuous drain current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	36 ^a
		$T_C = 70$ °C	29
		$T_A = 25$ °C	15.3 ^{b, c}
		$T_A = 70$ °C	10 ^{b, c}
Pulsed drain current ($t = 100$ μ s)	I_{DM}	145	A
Continuous source-drain diode current	I_S	$T_C = 25$ °C	36 ^a
		$T_A = 25$ °C	15.1 ^{b, c}
Single pulse avalanche current	I_{AS}	33	
Single pulse avalanche energy	E_{AS}	163	mJ
Maximum power dissipation	P_D	$T_C = 25$ °C	203
		$T_C = 70$ °C	165
		$T_A = 25$ °C	6.2 ^{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) ^c		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^b	R_{thJA}	40	50	°C/W
Maximum junction-to-case (drain)	R_{thJC}	0.5	0.8	
Maximum junction-to-case (source)	R_{thJC}	0.6	1	

Notes:

- Based on $T_C = 25$ °C.
- Surface mounted on 1" x 1" FR4 board.
- $t = 10$ s.
- Calculated based on maximum junction temperature.

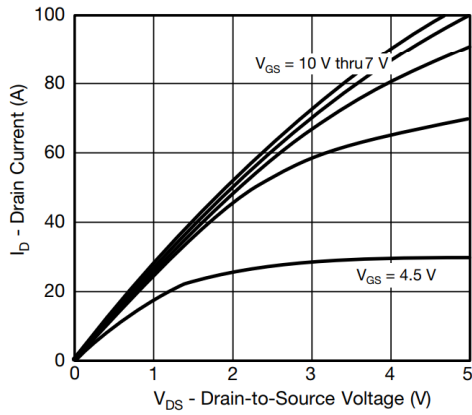
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	250	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	58	-	mV/ $^\circ\text{C}$
$V_{GS(th)}$ temperature coefficient	$\Delta V_{GS(th)}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	-6	-	
Gate-source threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2	-	4	V
Gate-source leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	100	nA
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 250\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 200\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^\circ\text{C}$	-	-	10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	36	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	34	45	m Ω
Forward transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 20\text{ A}$	-	70	-	S
Dynamic ^b						
Input capacitance	C_{ISS}	$V_{DS} = 125\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	-	2805	-	pF
Output capacitance	C_{OSS}		-	176	-	
Reverse transfer capacitance	C_{RSS}		-	11	-	
Total gate charge	Q_g	$V_{DS} = 125\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	15	-	nC
Gate-source charge	Q_{gs}		-	5	-	
Gate-drain charge	Q_{gd}		-	9	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	-	3.5	-	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 125\text{ V}, R_L = 2.5\text{ }\Omega, I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$	-	10	-	ns
Rise time	t_r		-	8	-	
Turn-off delay time	$t_{d(off)}$		-	39	-	
Fall time	t_f		-	10	-	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	36	A
Pulse diode forward current ($t_p = 100\text{ }\mu\text{s}$)	I_{SM}		-	-	145	
Body diode voltage	V_{SD}	$I_S = 20\text{ A}, V_{GS} = 0\text{ V}$	-	0.7	1.2	V
Body diode reverse recovery time	t_{rr}	$I_F = 10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	-	98	-	ns
Body diode reverse recovery charge	Q_{rr}		-	251	-	nC
Reverse recovery fall time	t_a		-	26	-	ns
Reverse recovery rise time	t_b		-	21	-	

Notes

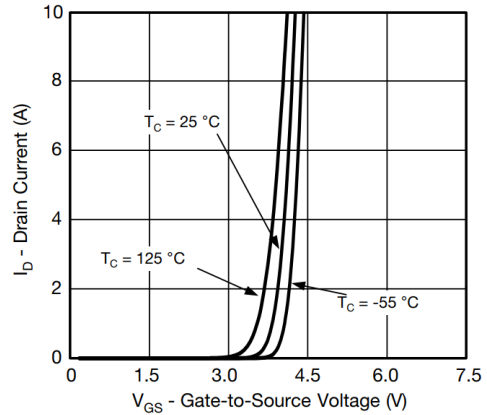
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 b. Guaranteed by design, not subject to production testing

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.

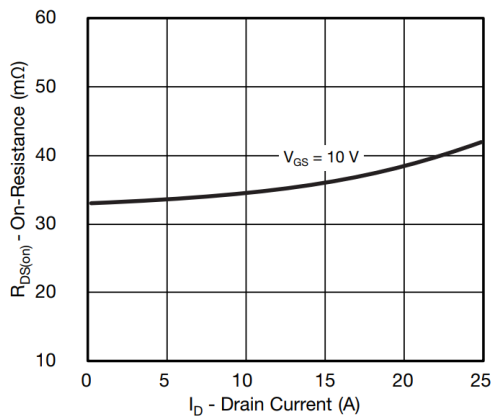
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



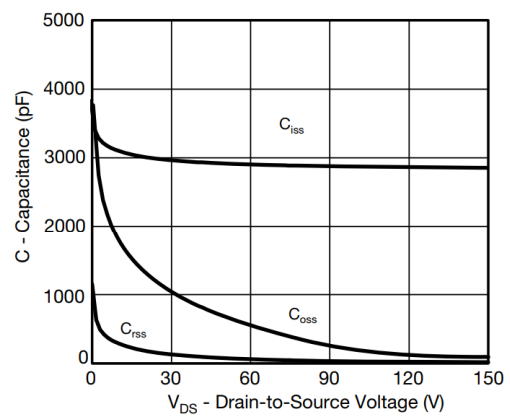
Output Characteristics



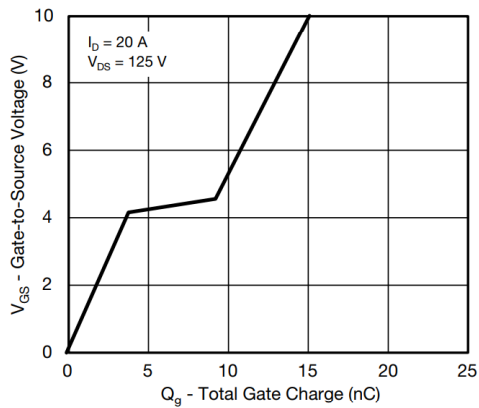
Transfer Characteristics



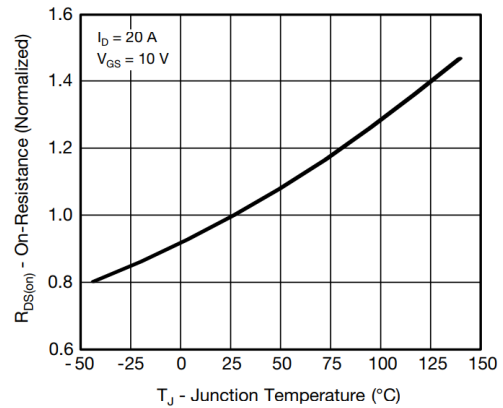
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

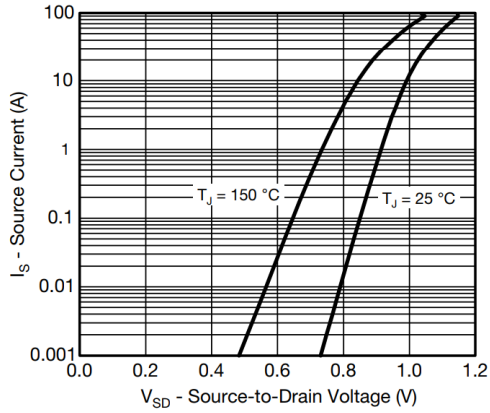


Gate Charge

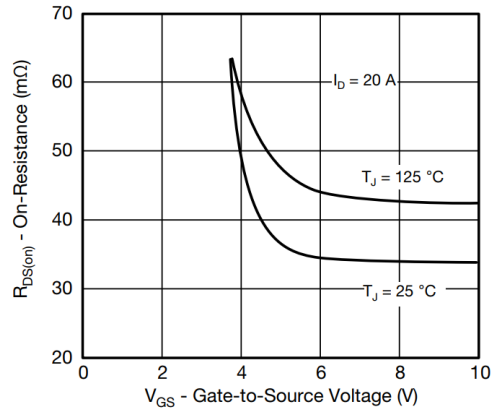


On-Resistance vs. Junction Temperature

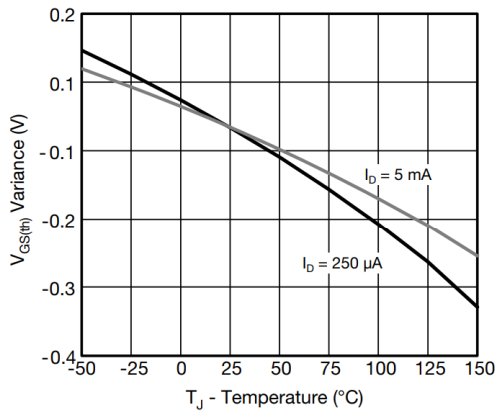
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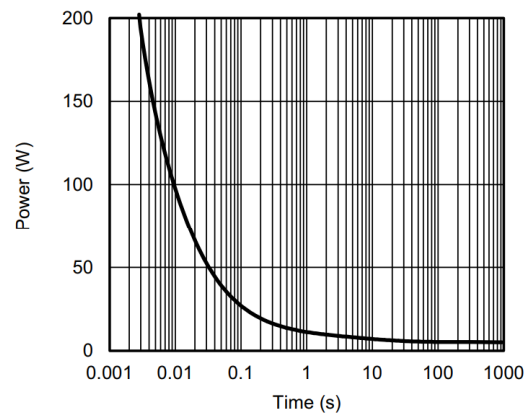
Source-Drain Diode Forward Voltage



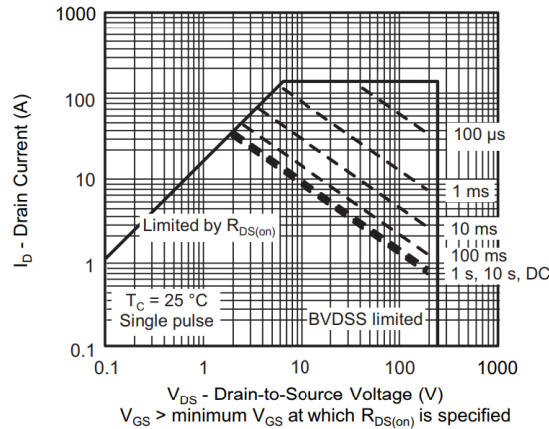
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

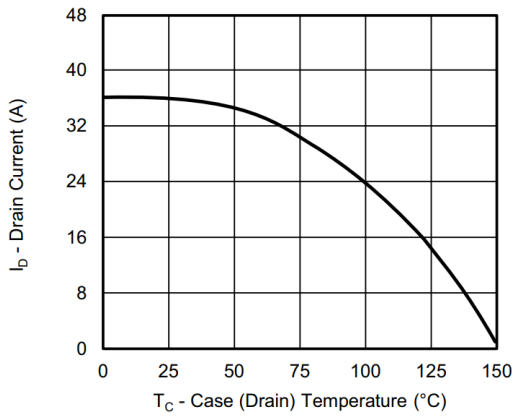


Single Pulse Power, Junction-to-Ambient

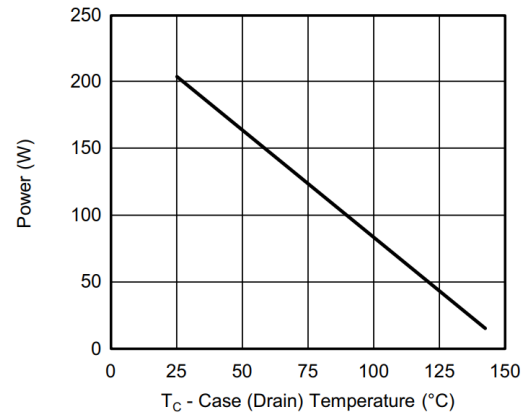


Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a

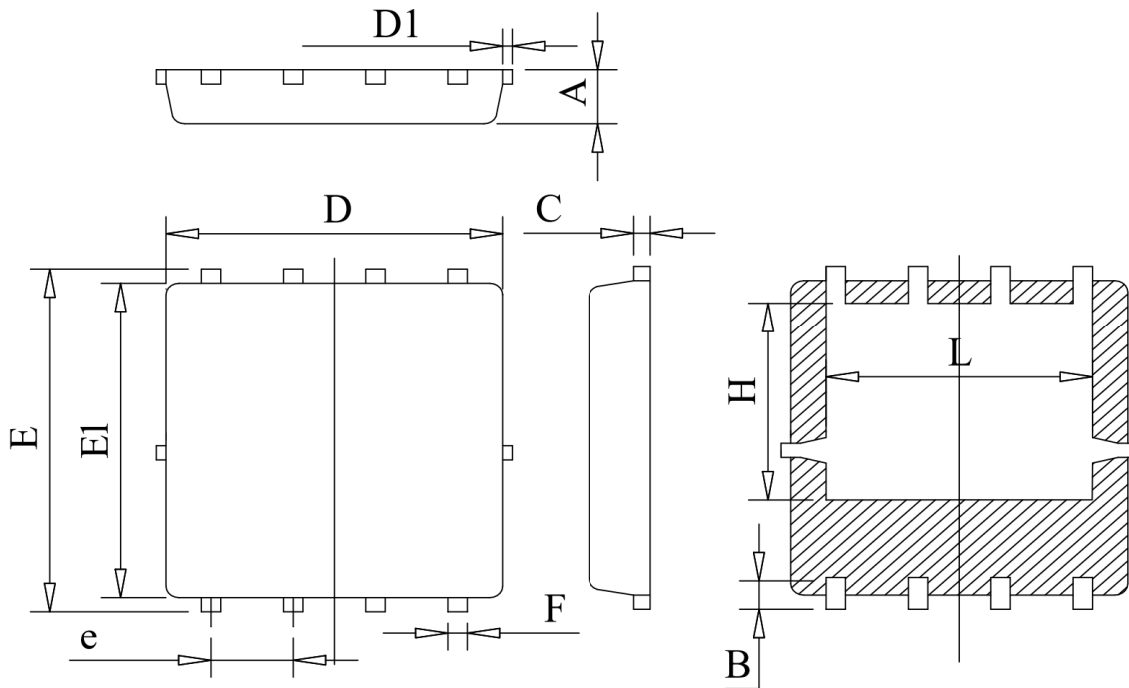


Power, Junction-to-Case

Note

- a. The power dissipation P_D is based on T_J max. = 150 °C, using junction-to-case 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

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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