

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



RoHS
COMPLIANT

PRODUCT SUMMARY

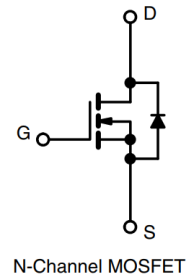
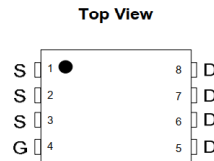
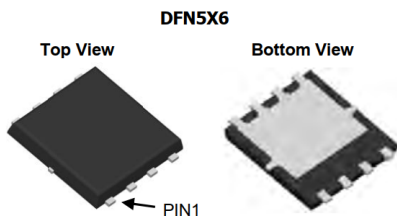
V _{DS} (V)	R _{DS(on)} (mΩ)(Typ.)	I _D (A) ^{a, d}	Q _g (Typ.)
100	10 at V _{GS} = 10 V	50	18nC

FEATURES

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

APPLICATIONS

- DC/DC converters
- Primary side switch



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)	I _D	T _C = 25 °C	50 ^a
		T _C = 70 °C	38 ^a
		T _A = 25 °C	9 ^{b, c}
		T _A = 70 °C	5.5 ^{b, c}
Pulsed drain current (t = 100 μs)	I _{DM}	180	A
Continuous source-drain diode current	I _S	T _C = 25 °C	50 ^a
		T _A = 25 °C	8.6 ^{b, c}
Single pulse avalanche current	I _{AS}	48	
Single pulse avalanche energy	E _{AS}	93	mJ
Maximum power dissipation	P _D	T _C = 25 °C	65
		T _C = 70 °C	50
		T _A = 25 °C	2.25 ^{b, c}
		T _A = 70 °C	1.8 ^{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	
Maximum junction-to-case	R _{thJC}	1.2	2	°C/W

Notes:

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

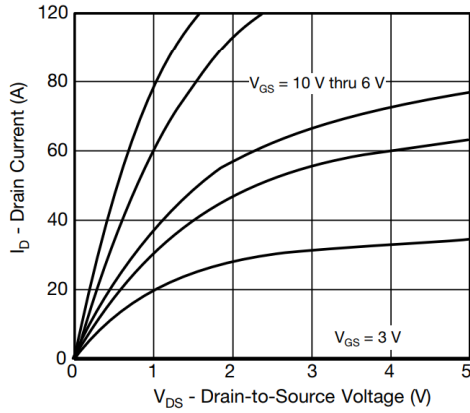
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	100	-	-	V
V_{DS} temperature coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$	-	56	-	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}	$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 80\text{ V}, V_{GS} = 0\text{ V}, T_J = 75\text{ }^\circ\text{C}$	-	-	10	
On-state drain current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	50	-	-	A
Drain-source on-state resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	10	13	m Ω
Forward transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 20\text{ A}$	-	25	-	S
Dynamic ^b						
Input capacitance	C_{iss}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$	-	1185	-	pF
Output capacitance	C_{oss}		-	660	-	
Reverse transfer capacitance	C_{rss}		-	15	-	
Total gate charge	Q_g	$V_{DS} = 50\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	18	-	nC
Gate-source charge	Q_{gs}		-	5	-	
Gate-drain charge	Q_{gd}		-	3.6	-	
Output charge	Q_{oss}	$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}$	-	49	-	
Gate resistance	R_g	$f = 1\text{ MHz}$	-	0.8	-	Ω
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 50\text{ V}, R_L = 2.5\text{ }\Omega, I_D \cong 20\text{ A},$ $V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$	-	13	-	ns
Rise time	t_r		-	14	-	
Turn-off delay time	$t_{d(off)}$		-	35	-	
Fall time	t_f		-	9	-	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	50	A
Pulse diode forward current ($t_p = 100\text{ }\mu\text{s}$)	I_{SM}		-	-	180	
Body diode voltage	V_{SD}	$I_S = 5\text{ A}, V_{GS} = 0\text{ V}$	-	0.7	1.2	V
Body diode reverse recovery time	t_{rr}	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$	-	54	-	ns
Body diode reverse recovery charge	Q_{rr}		-	76	-	nC
Reverse recovery fall time	t_a		-	27	-	ns
Reverse recovery rise time	t_b		-	27	-	

Notes

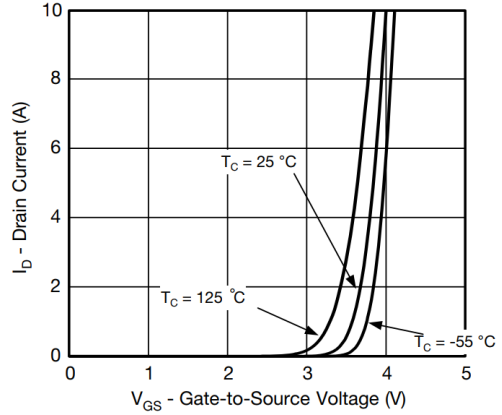
- a.P ulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 b. Guaranteed by design, not subject to production testing

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.

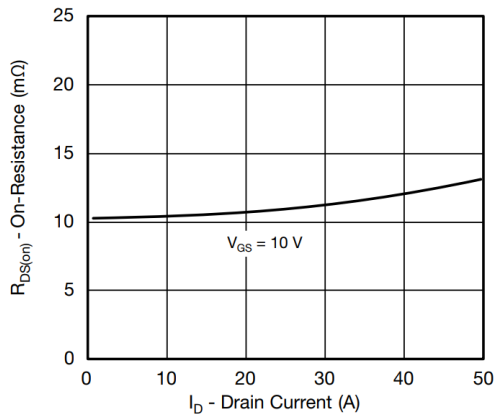
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



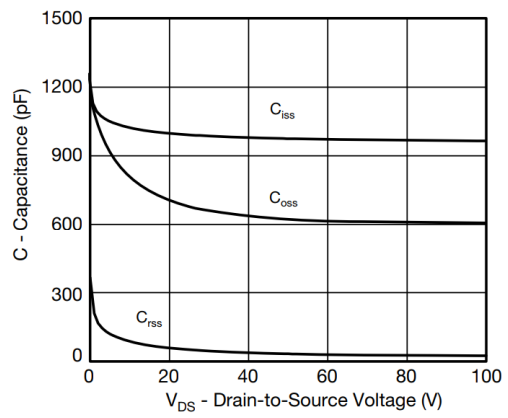
Output Characteristics



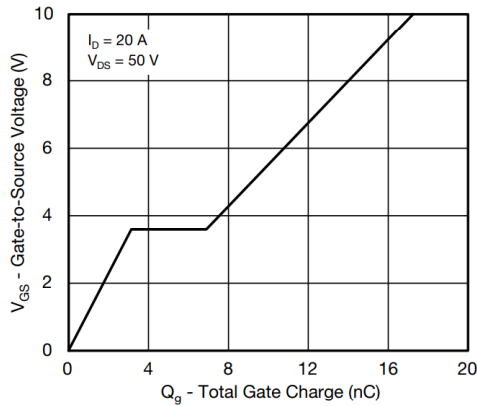
Transfer Characteristics



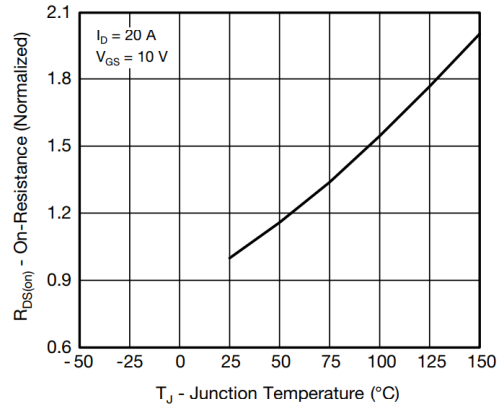
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

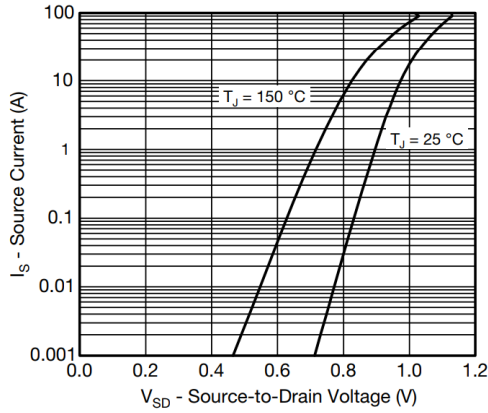


Gate Charge

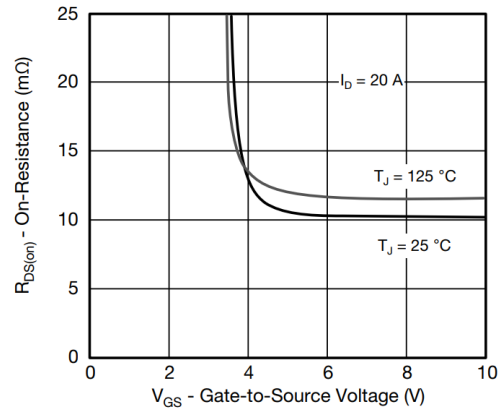


On-Resistance vs. Junction Temperature

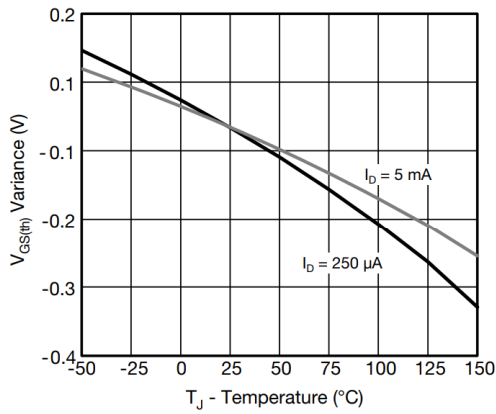
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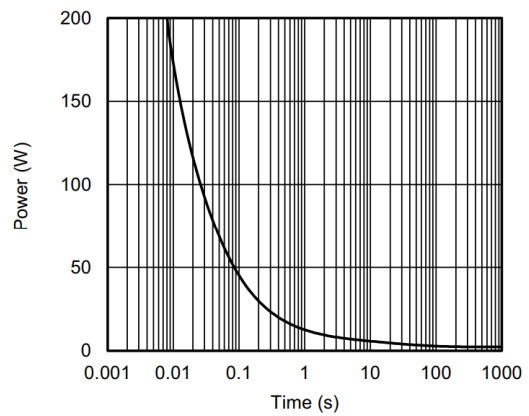
Source-Drain Diode Forward Voltage



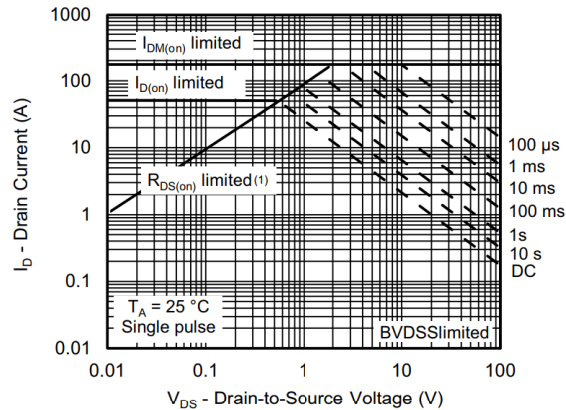
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



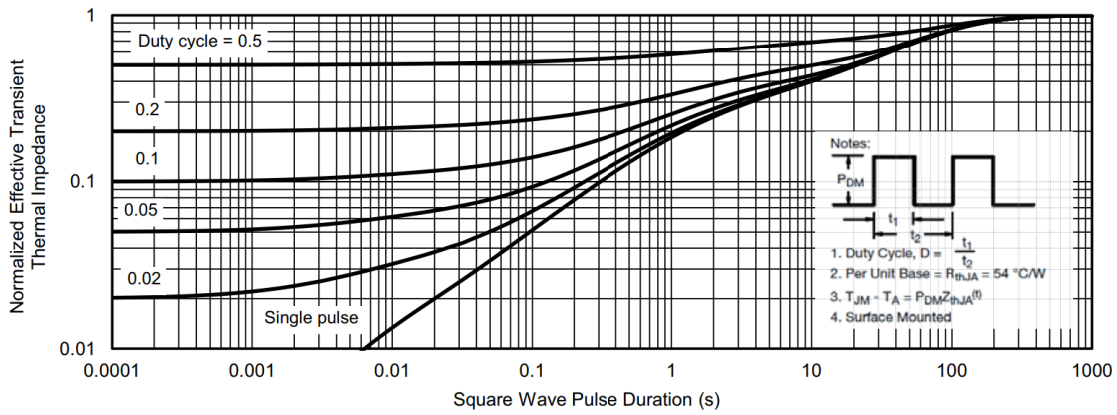
Single Pulse Power, Junction-to-Ambient



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

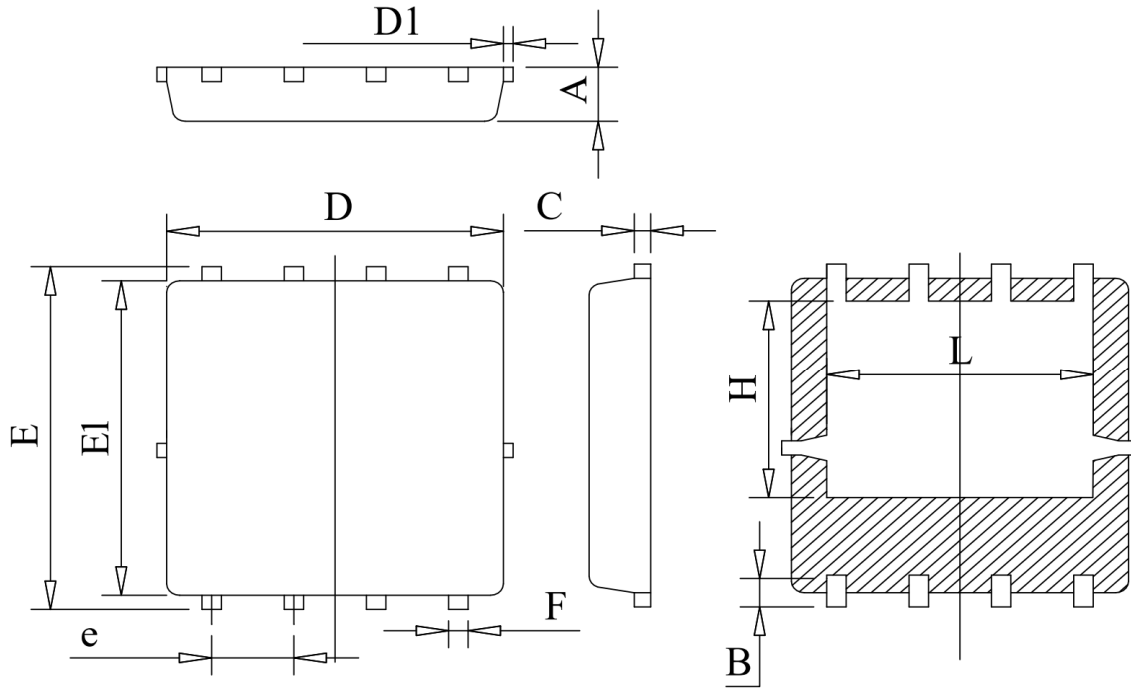
Safe Operating Area, Junction-to-Ambient

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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