

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



RoHS
COMPLIANT

PRODUCT SUMMARY

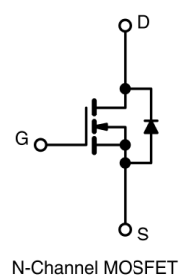
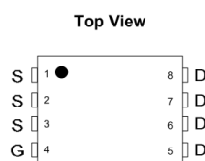
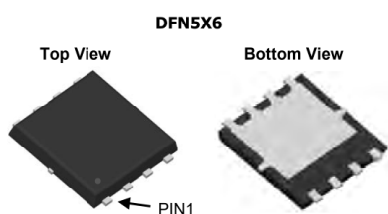
V_{DS} (V)	$R_{DS(on)}$ (m Ω)(Typ.)	I_D (A) ^{a, d}	Q_g (Typ.)
100	10 at $V_{GS} = 10$ V	50	18nC

FEATURES

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

APPLICATIONS

- DC/DC converters
- Primary side switch



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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-source voltage	V_{DS}	100	V
Gate-source voltage	V_{GS}	± 20	
Continuous drain current ($T_J = 150^\circ\text{C}$)	I_D	$T_C = 25^\circ\text{C}$	50 ^a
		$T_C = 70^\circ\text{C}$	38 ^a
		$T_A = 25^\circ\text{C}$	9 ^{b, c}
		$T_A = 70^\circ\text{C}$	5.5 ^{b, c}
Pulsed drain current ($t = 100 \mu\text{s}$)	I_{DM}	180	A
Continuous source-drain diode current	I_S	$T_C = 25^\circ\text{C}$	50 ^a
		$T_A = 25^\circ\text{C}$	8.6 ^{b, c}
Single pulse avalanche current	I_{AS}	48	
Single pulse avalanche energy	E_{AS}	93	mJ
Maximum power dissipation	P_D	$T_C = 25^\circ\text{C}$	65
		$T_C = 70^\circ\text{C}$	50
		$T_A = 25^\circ\text{C}$	2.25 ^{b, c}
		$T_A = 70^\circ\text{C}$	1.8 ^{b, c}
Operating junction and storage temperature range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Soldering recommendations (peak temperature) ^c		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum junction-to-ambient ^b	R_{thJA}	40	50	$^\circ\text{C/W}$
Maximum junction-to-case	R_{thJC}	1.2	2	

Notes:

a. Based on $T_C = 25^\circ\text{C}$.

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

c. $t = 10$ s.

d. Calculated based on maximum junction temperature.

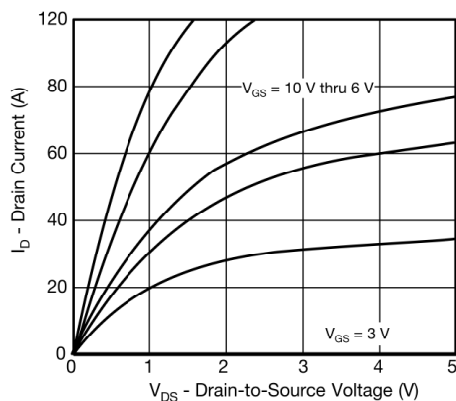
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	100	-	-	V
V _{DS} temperature coefficient	ΔV _{DS} /T _J	I _D = 250 μA	-	56	-	mV/°C
V _{GS(th)} temperature coefficient	ΔV _{GS(th)} /T _J	I _D = 250 μA	-	-6	-	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	2	-	4	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	50	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A	-	10	13	mΩ
Forward transconductance ^a	g _{fs}	V _{DS} = 5 V, I _D = 20 A	-	25	-	S
Dynamic ^b						
Input capacitance	C _{iss}	V _{DS} = 50 V, V _{GS} = 0 V, f = 1 MHz	-	1185	-	pF
Output capacitance	C _{oss}		-	660	-	
Reverse transfer capacitance	C _{rss}		-	15	-	
Total gate charge	Q _g	V _{DS} = 50 V, V _{GS} = 10 V, I _D = 20 A	-	18	-	nC
Gate-source charge	Q _{gs}		-	5	-	
Gate-drain charge	Q _{gd}		-	3.6	-	
Output charge	Q _{oss}	V _{DS} = 50 V, V _{GS} = 0 V	-	49	-	
Gate resistance	R _g	f = 1 MHz	-	0.8	-	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	-	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 °C	-	-	50	A
Pulse diode forward current (t _p = 100 μs)	I _{SM}		-	-	180	
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	-	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

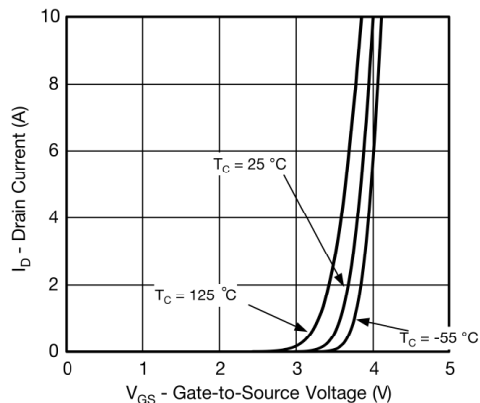
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 b. Guaranteed by design, not subject to production testing

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.

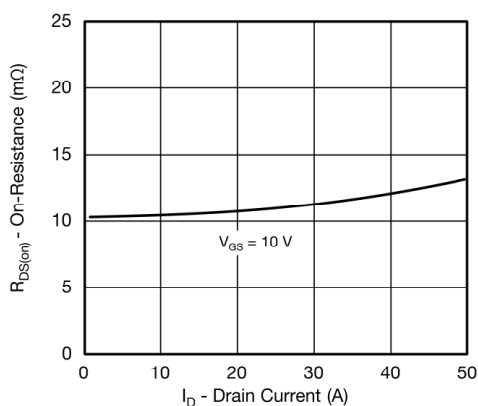
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



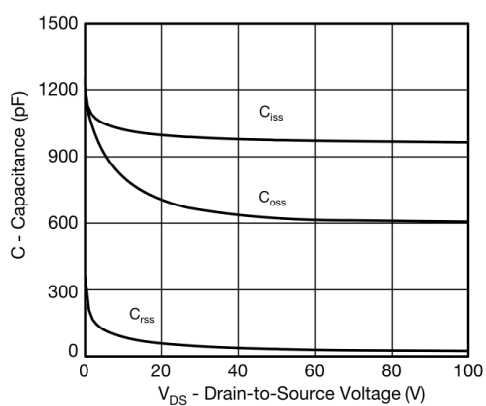
Output Characteristics



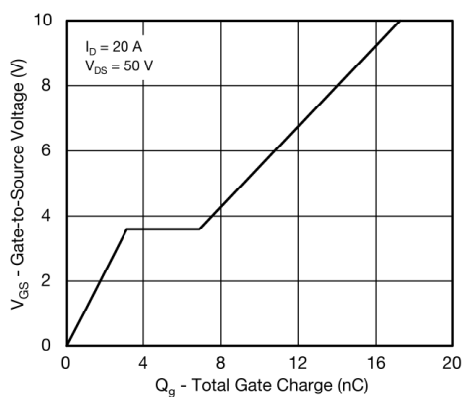
Transfer Characteristics



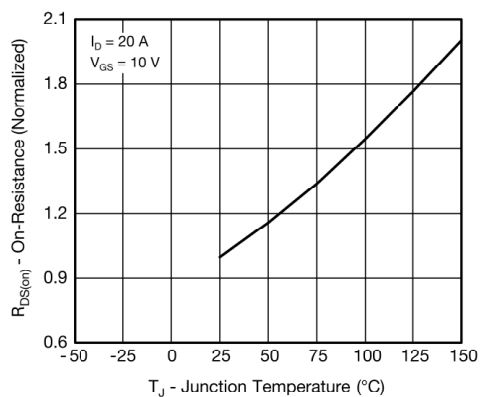
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

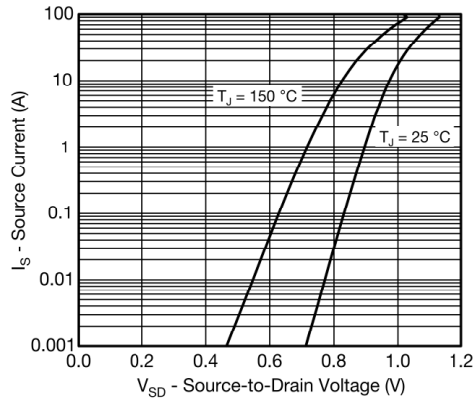


Gate Charge

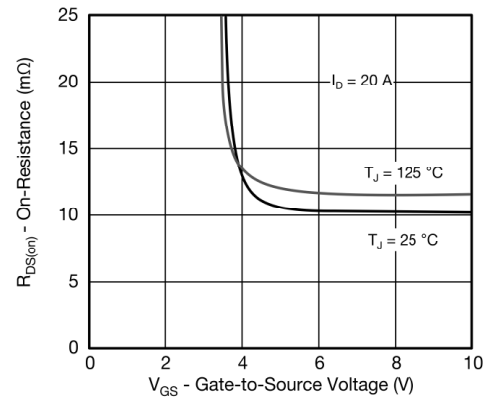


On-Resistance vs. Junction Temperature

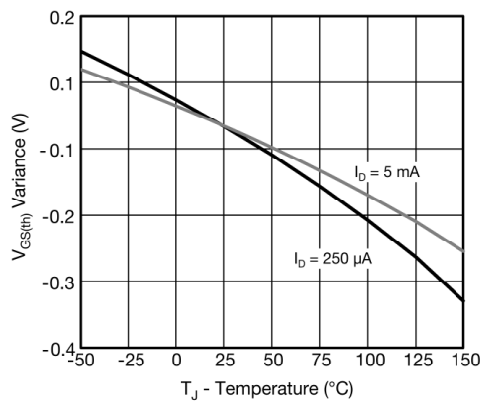
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



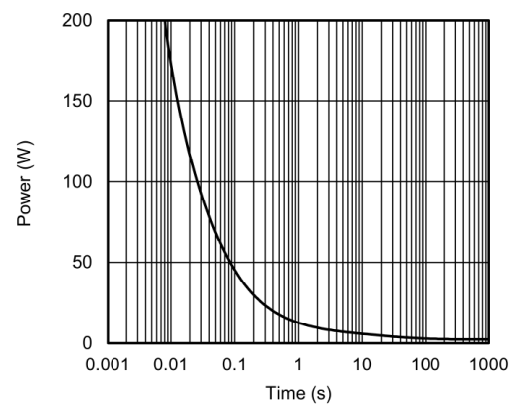
Source-Drain Diode Forward Voltage



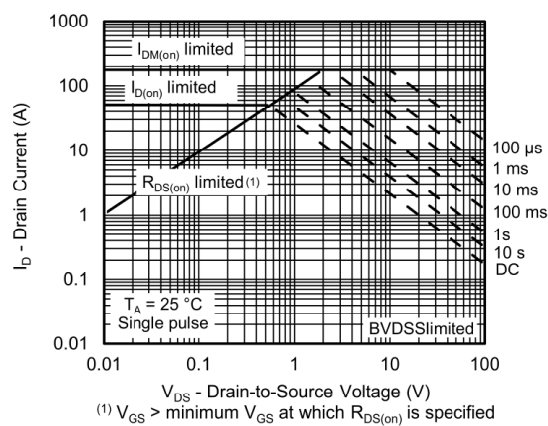
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage

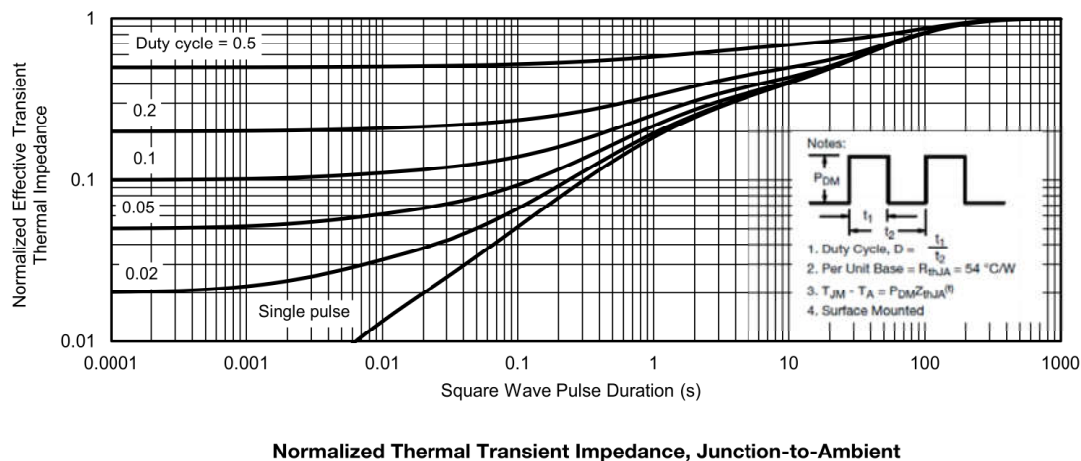


Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



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