

N-Channel 40 V (D-S) Super Junction MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (mΩ) (Typ.)	I _D (A) ^a	Q _g (Typ.)
40	0.38 at V _{GS} = 10 V	456	126 nC
	0.54 at V _{GS} = 4.5 V		

FEATURES

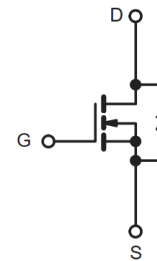
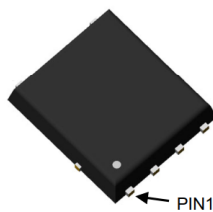
- DT-SJ Power MOSFET
- 100 % R_g and UIS tested
- Extremely Low R_{DS(ON)}



APPLICATIONS

- Synchronous Rectification
- Motor Drives and Uninterruptible Power Supplies

DFNW5(SO-8FL)



N-Channel MOSFET

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

PARAMETER	SYMBOL	LIMIT	UNIT
Drain-Source Voltage	V _{DS}	40	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 175 °C)	I _D	T _C = 25 °C	456
		T _C = 100 °C	325
Pulsed Drain Current (t = 100 μs)	I _{DM}	1415	A
Single Avalanche Energy ^a	E _{AS}	L = 0.5 mH	1330
Maximum Power Dissipation	P _D	T _C = 25 °C	195 ^{b,c}
		T _C = 100 °C	98 ^{b,c}
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +175	°C
Soldering Recommendations (Peak Temperature)		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Junction-to-Ambient (PCB Mount) ^{b,d}	R _{thJA}	38	°C/W
Junction-to-Case (Drain)	R _{thJC}	0.77	

Notes:

- T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 40 °C/W.

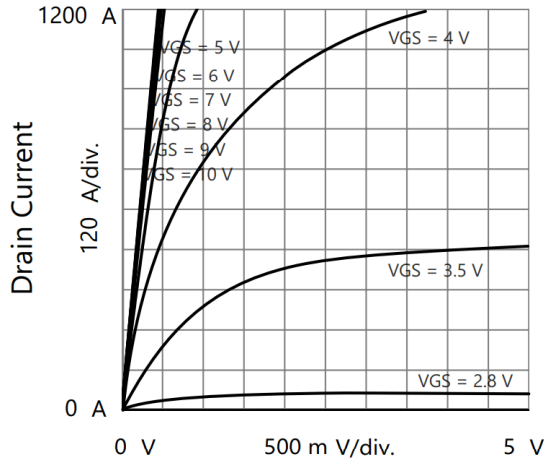
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.3	-	2.2	
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	μA
		$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$	-	-	60	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = 10\text{ V}$	456	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 50\text{ A}$	-	0.38	0.49	m Ω
		$V_{GS} = 4.5\text{ V}, I_D = 50\text{ A}$	-	0.54	0.78	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 5\text{ V}, I_D = 50\text{ A}$	-	277	-	S
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 20\text{ V}, f = 1\text{ MHz}$	-	9503	-	pF
Output Capacitance	C_{oss}		-	2466	-	
Reverse Transfer Capacitance	C_{rss}		-	35	-	
Total Gate Charge ^c	Q_g	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 50\text{ A}$	-	126	-	nC
Gate-Source Charge ^c	Q_{gs}		-	25	-	
Gate-Drain Charge ^c	Q_{gd}		-	9	-	
Gate Resistance	R_g	$f = 1\text{ MHz}$	-	0.5	-	Ω
Turn-On Delay Time ^c	$t_{d(on)}$	$V_{DS} = 20\text{ V}, I_D = 50\text{ A}, R_g = 2.5\text{ }\Omega$ $V_{GS} = 10\text{ V}$	-	10	-	ns
Rise Time ^c	t_r		-	9	-	
Turn-Off Delay Time ^c	$t_{d(off)}$		-	52	-	
Fall Time ^c	t_f		-	27	-	
Drain-Source Body Diode Ratings and Characteristics ^b ($T_C = 25\text{ }^\circ\text{C}$)						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$	-	-	456	A
Pulsed Current ($t = 100\text{ }\mu\text{s}$)	I_{SM}		-	-	1415	A
Forward Voltage ^a	V_{SD}	$I_F = 50\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.2	V
Reverse Recovery Time	t_{rr}	$I_F = 50\text{ A}, di/dt = 300\text{ A}/\mu\text{s}$	-	39	-	ns
Reverse Recovery Charge	Q_{rr}		-	105	-	nC

Notes

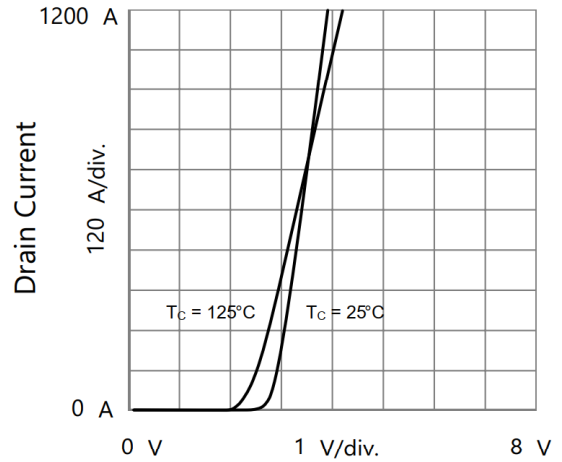
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.
 c. Independent of operating temperature.

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.

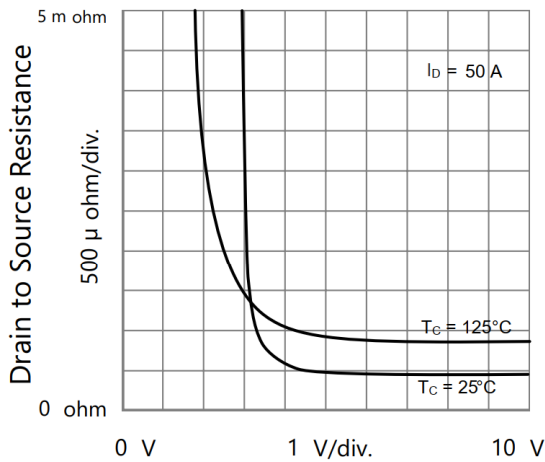
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



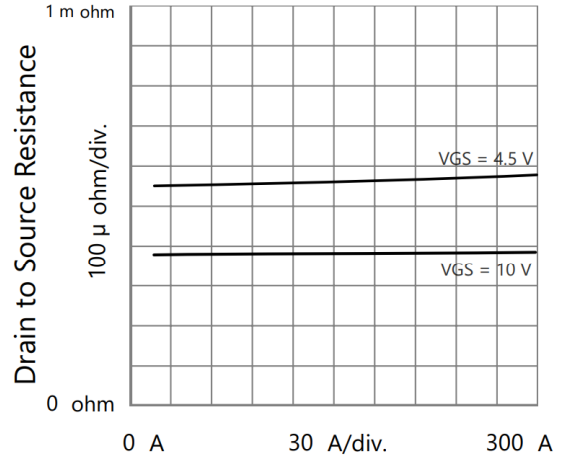
Drain to Source Voltage
Output Characteristics



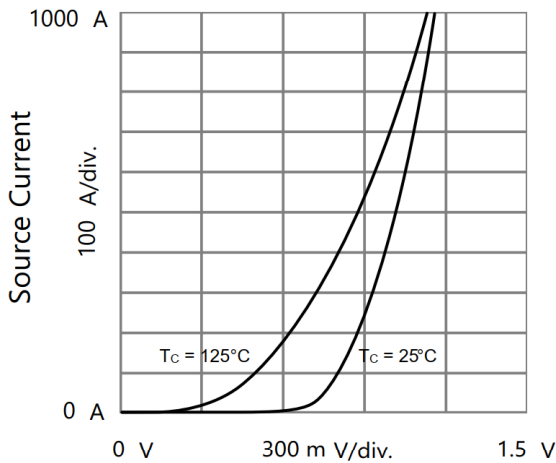
Gate to Source Voltage
Transfer Characteristics



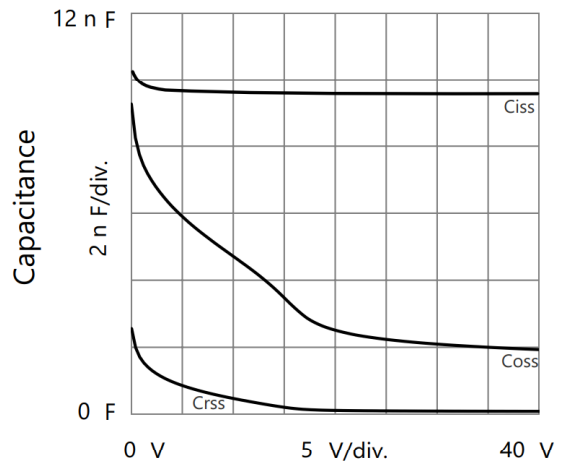
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

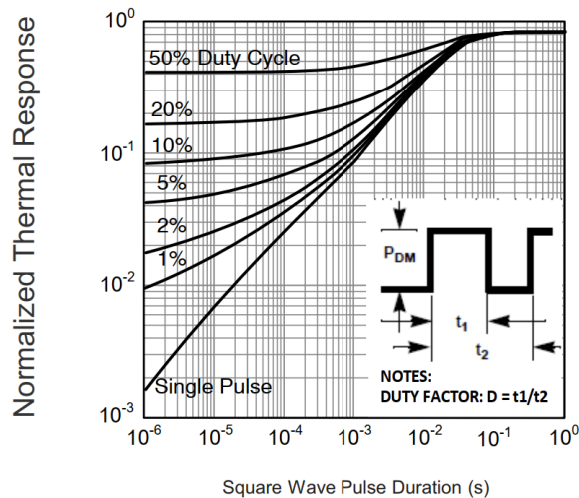
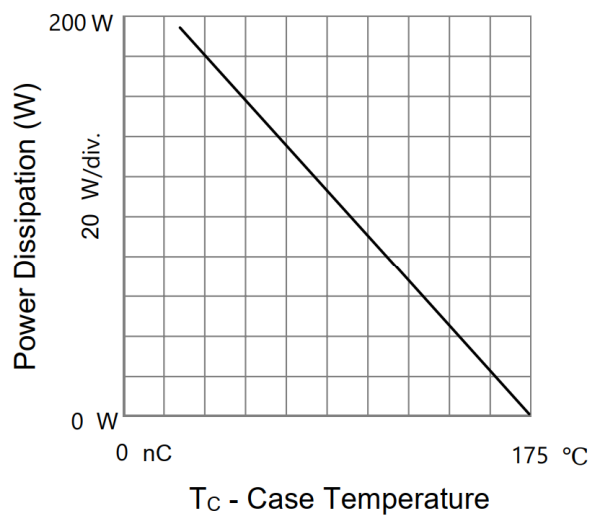
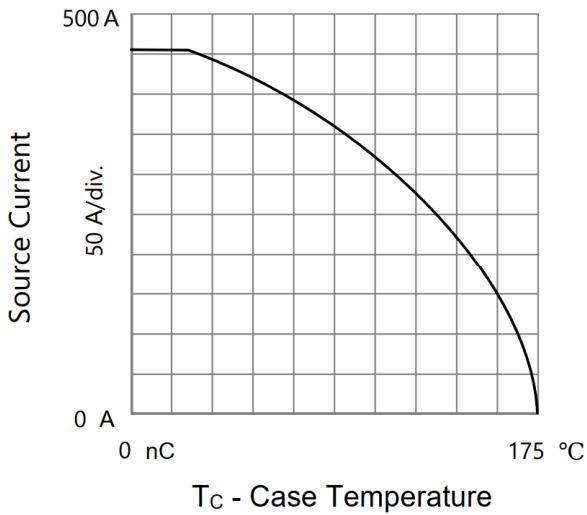
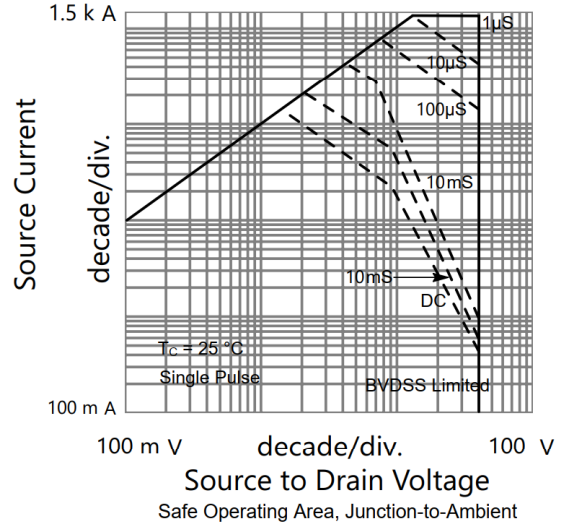
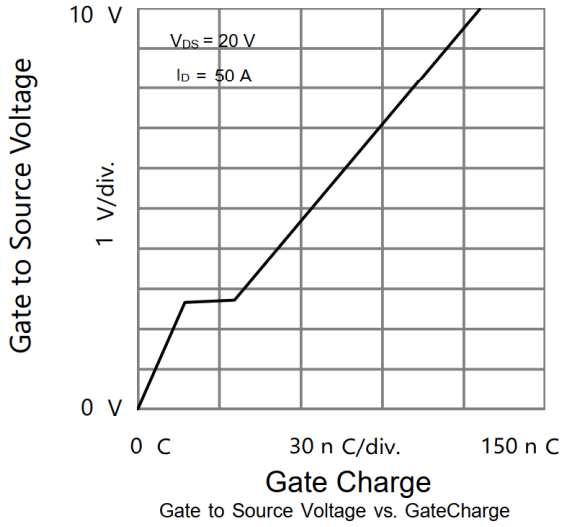


Source to Drain Voltage
Body Diode Forward Characteristics



Drain to Source Voltage
Capacitances

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance

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