

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

PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ)(Typ.)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
40	3.7 at V <sub>GS</sub> = 10 V	85	17 nC
	5 at V <sub>GS</sub> = 4.5 V		

### FEATURES

- DT-SJ Power MOSFET
- 100 % R<sub>g</sub> and UIS tested
- Extremely Low R<sub>DS(ON)</sub>

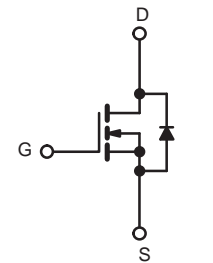
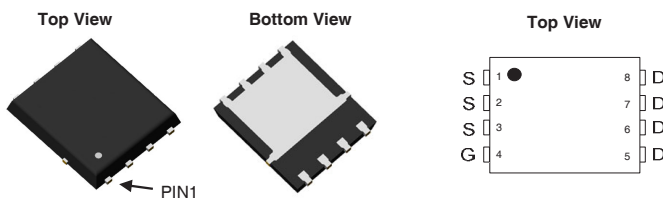


**RoHS**  
COMPLIANT

### APPLICATIONS

- Synchronous Rectification
- Motor Drives and Uninterruptible Power Supplies

DFN5X6-8L Pin Configuration



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T <sub>C</sub> = 25 °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-Source Voltage	V <sub>DS</sub>	40	V	
Gate-Source Voltage	V <sub>GS</sub>	± 20		
Continuous Drain Current (T <sub>J</sub> = 175 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	85	A
		T <sub>C</sub> = 100 °C	57	
Pulsed Drain Current	I <sub>DM</sub>	340		
Single Avalanche Energy <sup>a</sup>	E <sub>AS</sub>	L = 0.5 mH	288	mJ
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	65 <sup>b,c</sup>	W
		T <sub>C</sub> = 100 °C	32.6 <sup>b,c</sup>	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +175	°C	
Soldering Recommendations (Peak Temperature)		260		

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	LIMIT	UNIT	
Junction-to-Ambient (PCB Mount) <sup>b,d</sup>	R <sub>thJA</sub>	23	°C/W	
Junction-to-Case (Drain)	R <sub>thJC</sub>	2.3		

Notes:

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

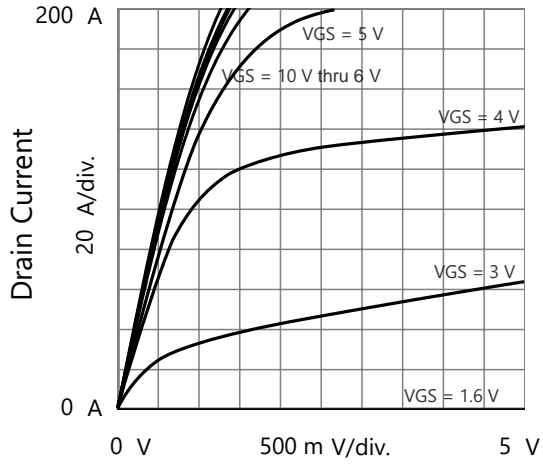
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$	40			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 32\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	85			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		3.7	4.5	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		5	6.3	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 4.5\text{ V}, I_D = 20\text{ A}$		79		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 20\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		1050		pF
Output Capacitance	$C_{oss}$			592		
Reverse Transfer Capacitance	$C_{rss}$			22		
Total Gate Charge	$Q_g$	$V_{DS} = 20\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		17		nC
Gate-Source Charge	$Q_{gs}$			2		
Gate-Drain Charge	$Q_{gd}$			2.9		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		2.5		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 20\text{ V}, R_L = 0.75\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 3\text{ }\Omega$		18		ns
Rise Time	$t_r$			13		
Turn-Off Delay Time	$t_{d(off)}$			40		
Fall Time	$t_f$			14		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			85	A
Pulse Diode Forward Current (100 $\mu\text{s}$ )	$I_{SM}$				340	
Body Diode Voltage	$V_{SD}$	$I_S = 1\text{ A}$			1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		23		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$				60	

**Notes:**

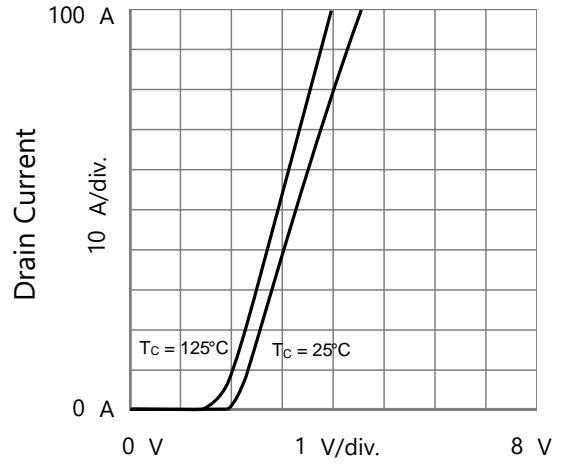
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.

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.

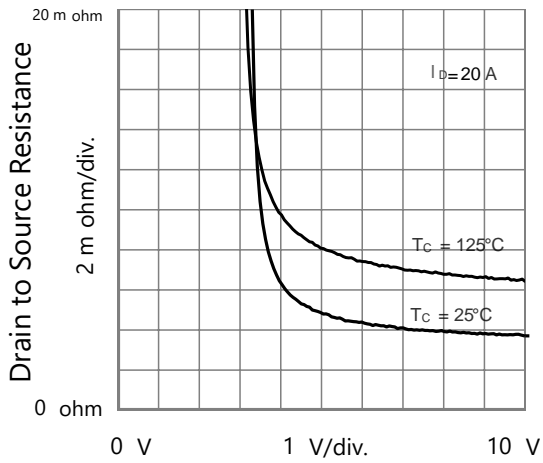
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



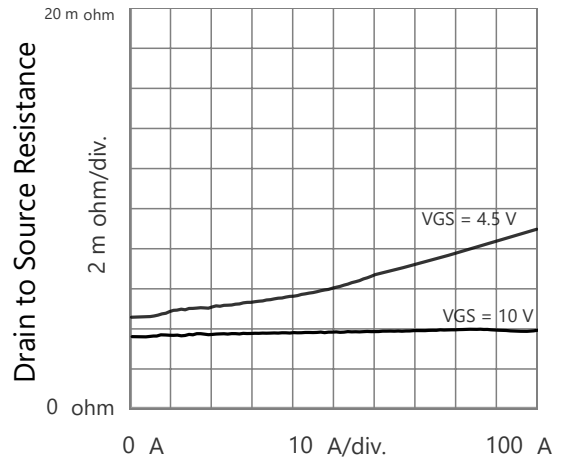
Drain to Source Voltage  
Output Characteristics



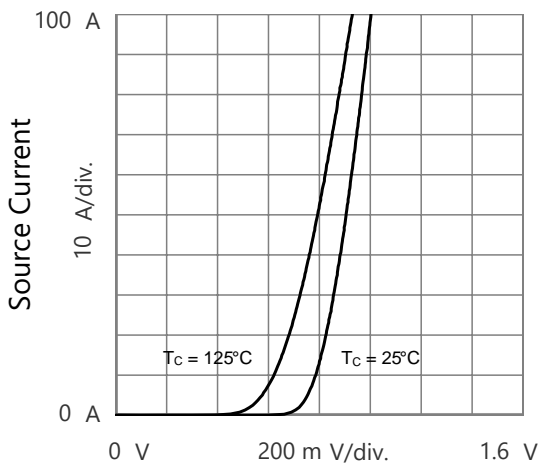
Gate to Source Voltage  
Transfer Characteristics



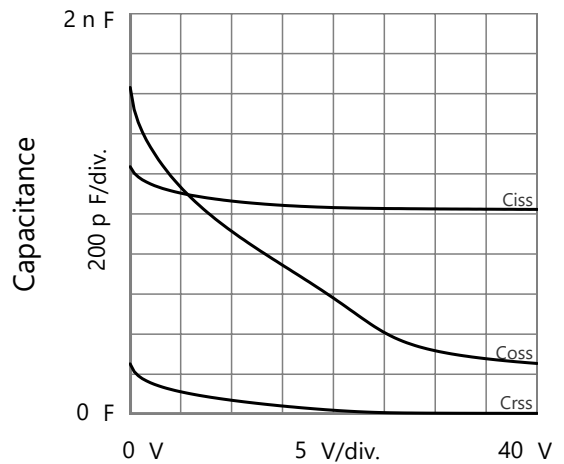
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

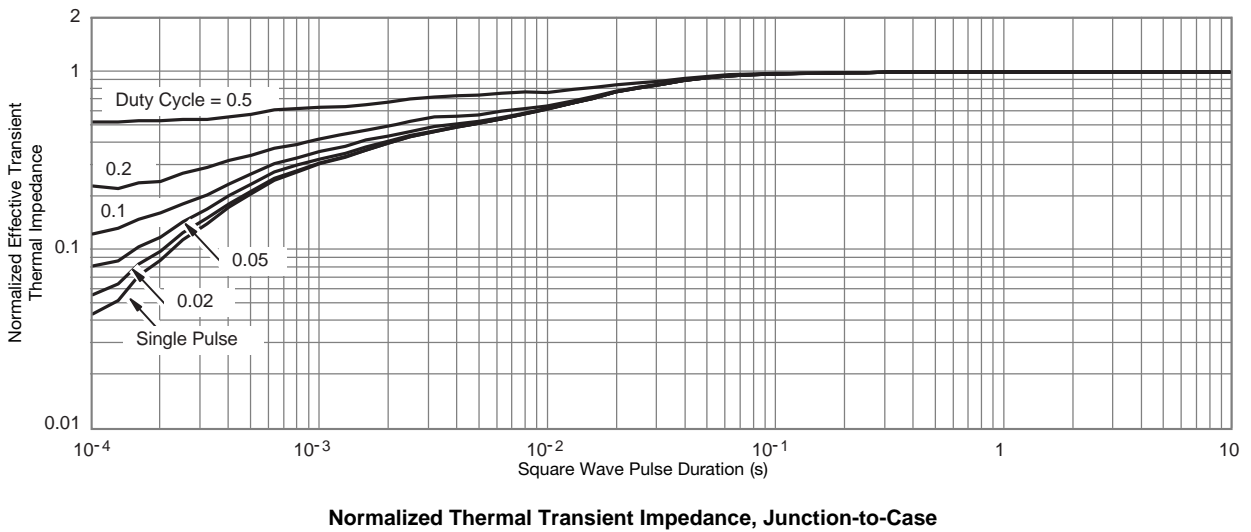
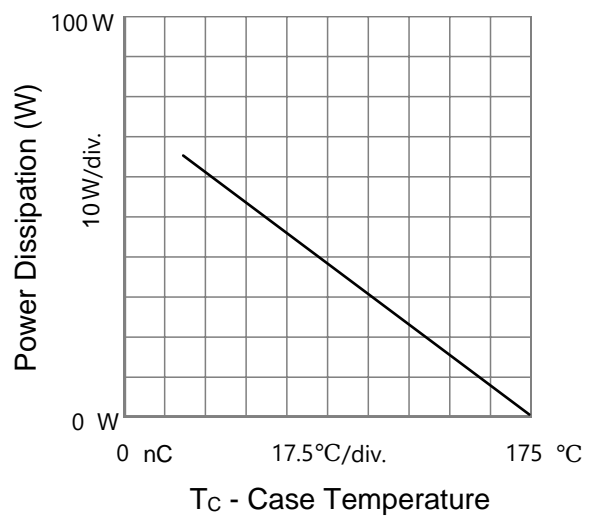
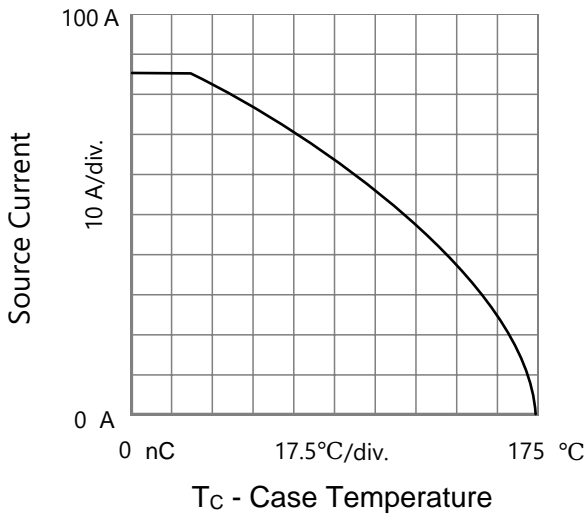
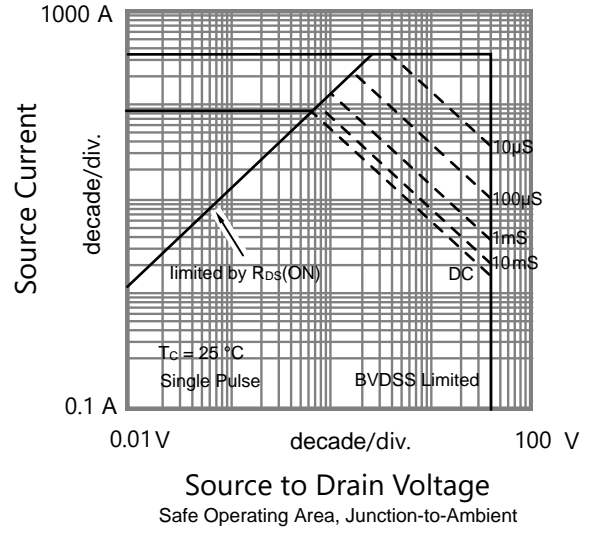
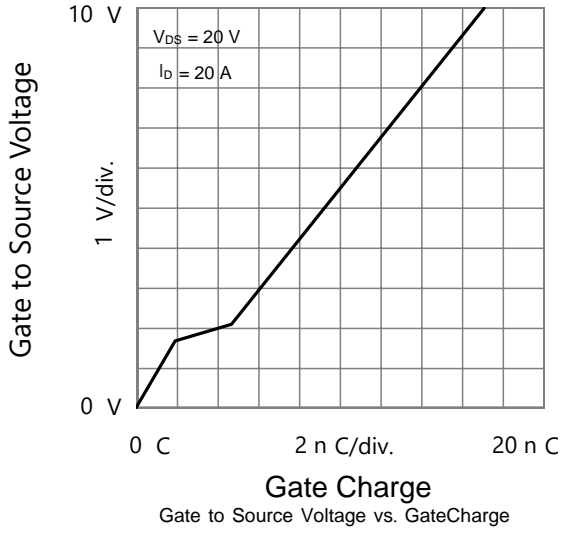


Source to Drain Voltage  
Body Diode Forward Characteristics



Drain to Source Voltage  
Capacitances

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



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