

## N-Channel 30 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.)
30	0.88 at V <sub>GS</sub> = 10 V	210	52 nC
	1.9 at V <sub>GS</sub> = 4.5 V		

### FEATURES

- DT-SJ Power MOSFET
- 100 % R<sub>g</sub> and UIS Tested

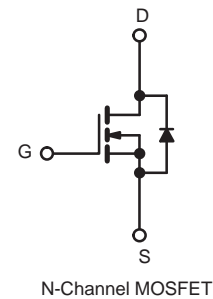
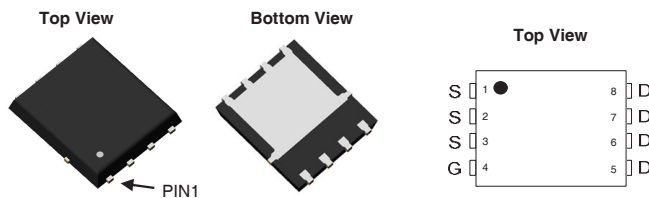


RoHS  
COMPLIANT

### APPLICATIONS

- Li- Battery Protection
- Motor Drive
- Power Management for High Performance Application

DFN5X6-8L Pin Configuration



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>C</sub> = 25 °C	210	A
	T <sub>C</sub> = 100 °C	127	
Pulsed Drain Current	I <sub>DM</sub>	840	
Single-Pulse Avalanche Energy	E <sub>AS</sub>	387	mJ
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	188	W
	T <sub>C</sub> = 100 °C	120	
	T <sub>A</sub> = 25 °C	5.8 <sup>b,c</sup>	
	T <sub>A</sub> = 100 °C	3.7 <sup>b,c</sup>	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	- 55 to 150	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	R <sub>thJA</sub>	15	22	°C/W
Maximum Junction-to-Case	R <sub>thJC</sub>	0.5	0.66	

Notes:

- a. Based on T<sub>C</sub> = 25 °C.  
 b. Surface mounted on 1" x 1" FR4 board.  
 c. t = 10 s.

<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	$V_{DS}$	$V_{GS} = 0, I_D = 250\text{ }\mu\text{A}$	30			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	$I_{DSS}$	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	$\mu\text{A}$
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 125\text{ }^\circ\text{C}$			100	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	210			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		0.88	1.05	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 20\text{ A}$		1.9	2.6	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 5\text{ V}, I_D = 20\text{ A}$		90		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		2993		pF
Output Capacitance	$C_{oss}$			2038		
Reverse Transfer Capacitance	$C_{rss}$			75		
Total Gate Charge	$Q_g$	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$		52		nC
Gate-Source Charge	$Q_{gs}$			7.2		
Gate-Drain Charge	$Q_{gd}$			11		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		1.8		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 0.5\text{ }\Omega$ $I_D \cong 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 3\text{ }\Omega$		7		ns
Rise Time	$t_r$			29		
Turn-Off Delay Time	$t_{d(off)}$			35		
Fall Time	$t_f$			22		
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			210	A
Pulse Diode Forward Current (100 $\mu\text{s}$ )	$I_{SM}$				840	
Body Diode Voltage	$V_{SD}$	$I_S = 1\text{ A}$			1.2	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		47		ns
Body Diode Reverse Recovery Charge	$Q_{rr}$				55	

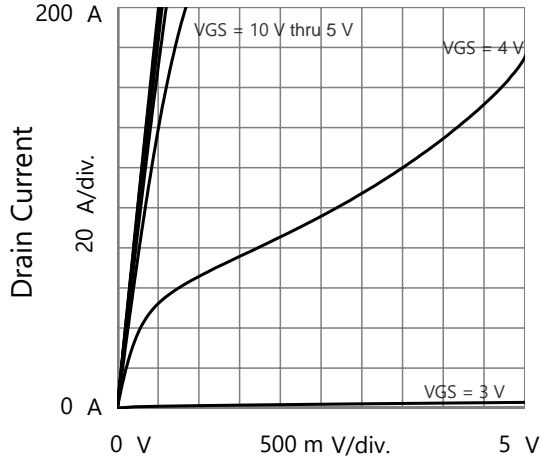
Notes:

a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .

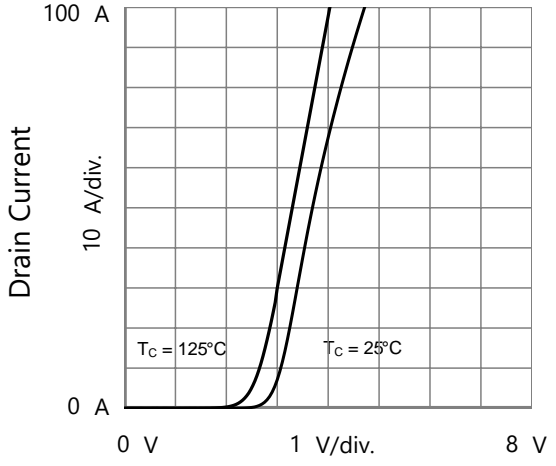
b. Guaranteed by design, not subject to production testing.

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.

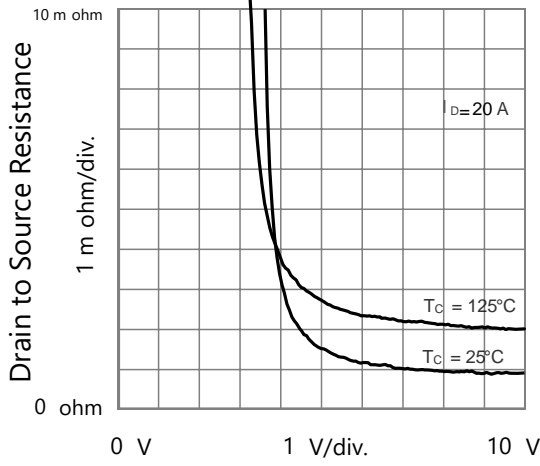
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



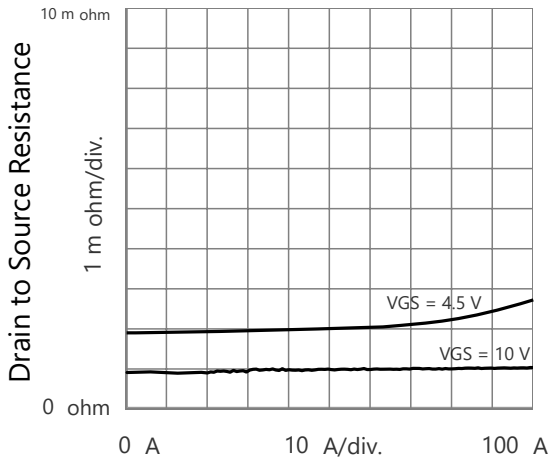
Drain to Source Voltage  
Output Characteristics



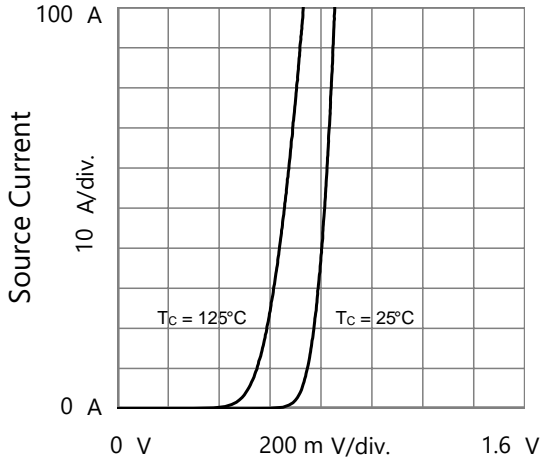
Gate to Source Voltage  
Transfer Characteristics



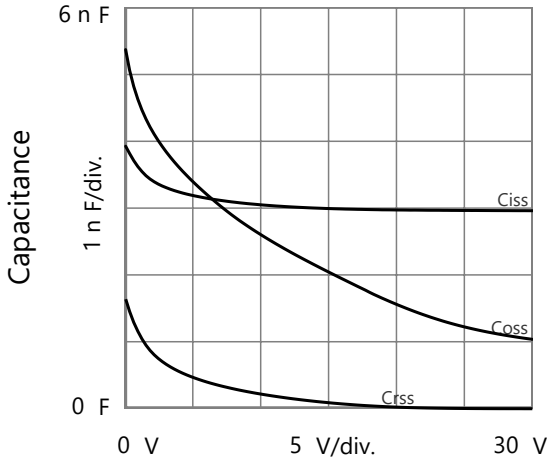
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

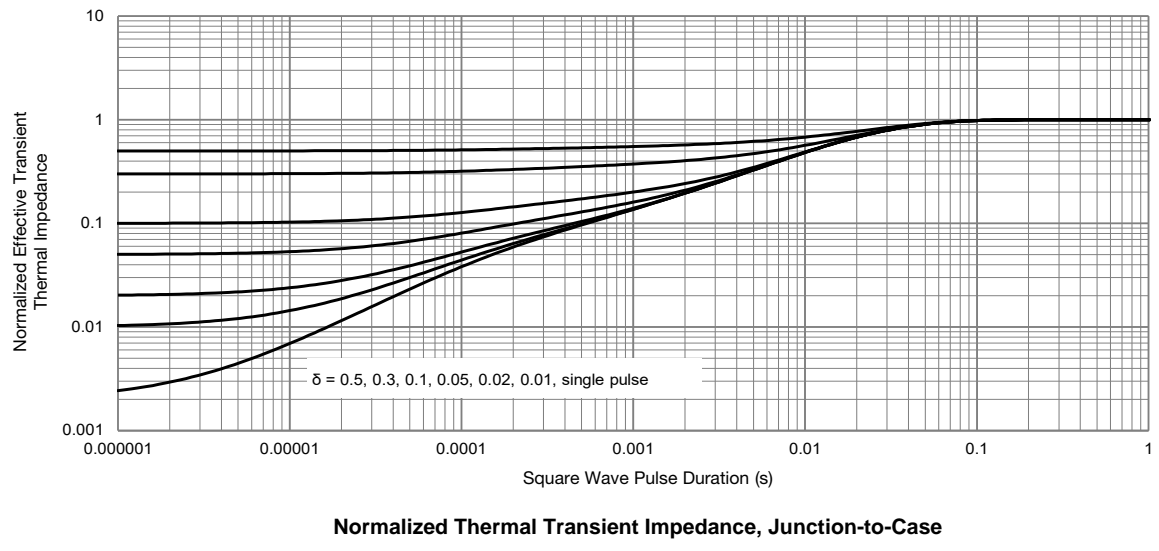
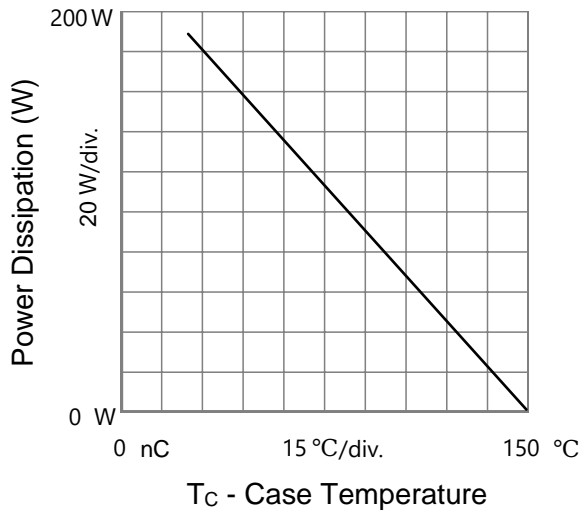
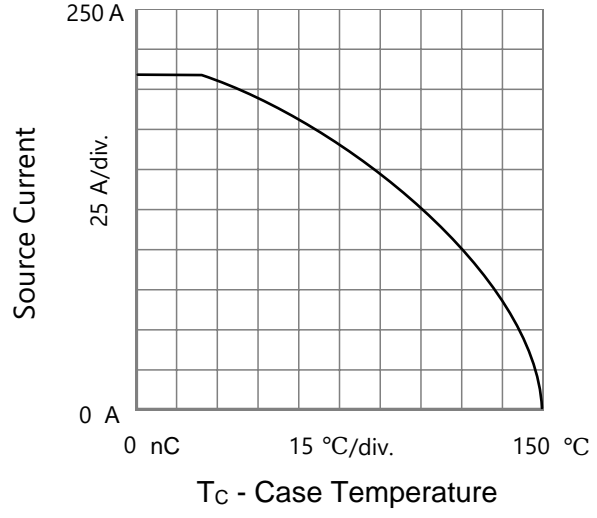
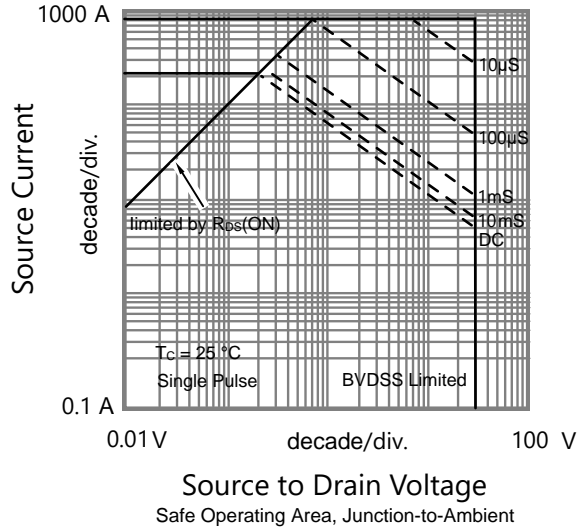
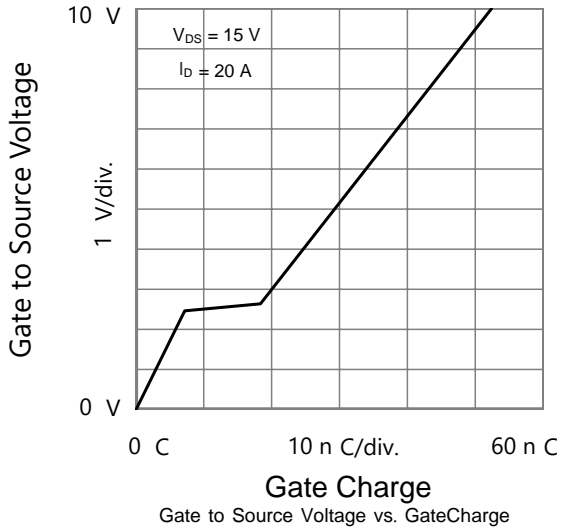


Source to Drain Voltage  
Body Diode Forward Characteristics



Drain to Source Voltage  
Capacitances

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



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