

## N-Channel 60 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.)
60	12.8 at V <sub>GS</sub> = 10 V	42	11 nC
	20 at V <sub>GS</sub> = 4.5 V		

### FEATURES

- DT-SJ Power MOSFET
- Very low on-resistance
- Excellent gate charge x R<sub>DS(on)</sub> product(FOM)

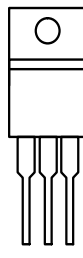


RoHS  
COMPLIANT

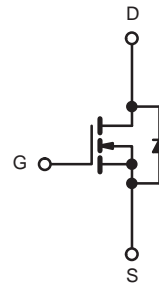
### APPLICATIONS

- Power Management
- Motor Drivers
- DC-DC Converters

TO-220 Pin Configuration



G D S  
Top View



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V <sub>DS</sub>	60	V
Gate-Source Voltage	V <sub>GS</sub>	± 20	
Continuous Drain Current (T <sub>J</sub> = 150 °C)	T <sub>C</sub> = 25 °C	42	A
	T <sub>C</sub> = 100 °C	26	
Pulsed Drain Current	I <sub>DM</sub>	168	
Single Pulse Avalanche Energy	L = 0.1 mH E <sub>AS</sub>	20	mJ
Maximum Power Dissipation	T <sub>C</sub> = 25 °C	35 <sup>c</sup>	W
	T <sub>C</sub> = 100 °C	14	
Operating Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to 150	°C
Soldering Recommendations (Peak Temperature)		260	

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b</sup>	t ≤ 10 s R <sub>thJA</sub>	-	60	°C/W
Maximum Junction-to-Case (Drain)	Steady State R <sub>thJC</sub>	-	3.57	

Notes:

- Based on T<sub>C</sub> = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- See SOA curve for voltage derating

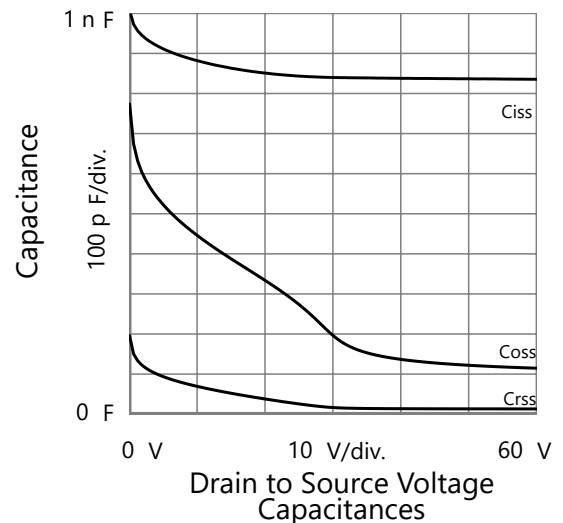
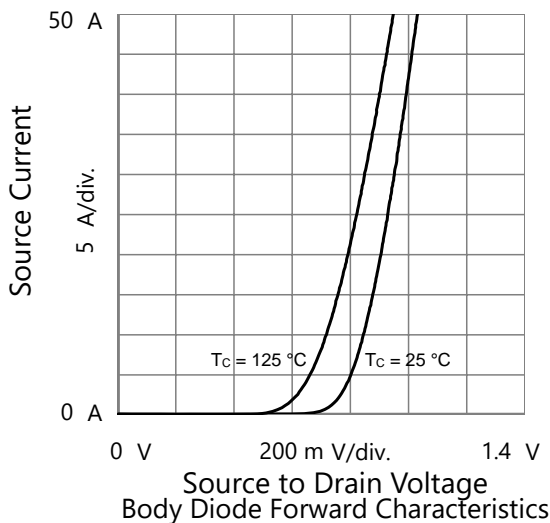
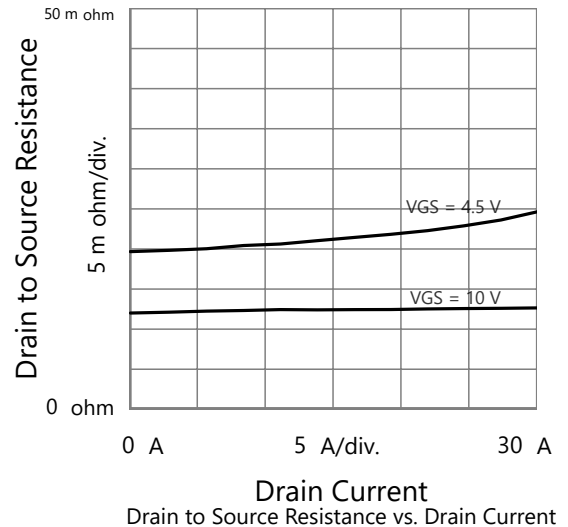
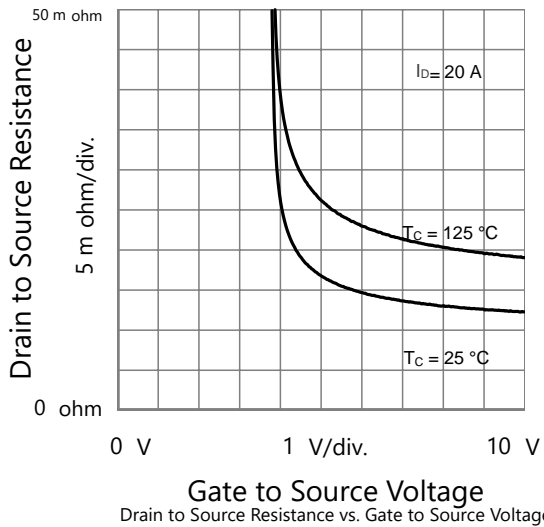
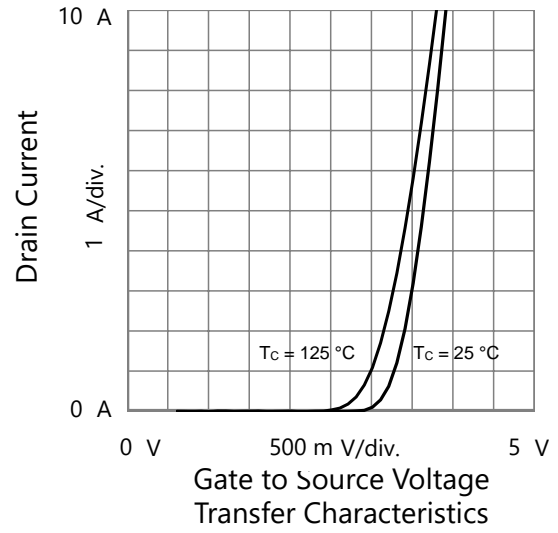
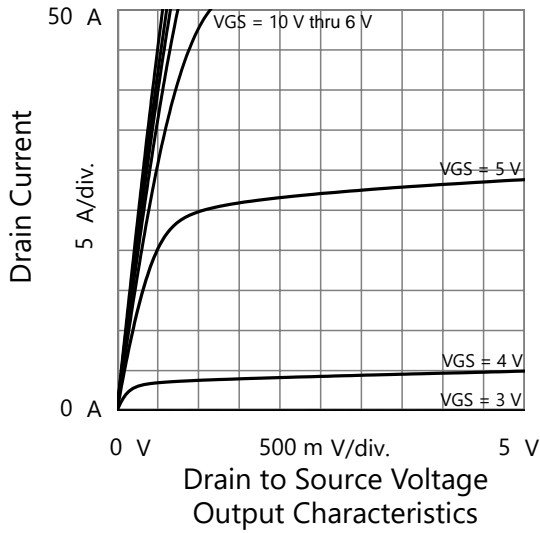
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	2	-	4	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$	-	-	1	$\mu\text{A}$
		$V_{DS} = 48\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$	-	-	10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5\text{ V}, V_{GS} = 10\text{ V}$	42	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	12.8	15	$\text{m}\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$	-	20	23	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 5\text{ V}, I_D = 20\text{ A}$	-	30	-	S
<b>Dynamic <sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$	-	830	-	$\text{pF}$
Output Capacitance	$C_{oss}$		-	196	-	
Reverse Transfer Capacitance	$C_{rss}$		-	12	-	
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 20\text{ A}$	-	11	-	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$		-	3.6	-	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$		-	2.3	-	
Gate Resistance	$R_g$	$f = 1\text{ MHz}$	-	1.5	-	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D = 20\text{ A}, V_{GEN} = 10\text{ V}, R_g = 3\text{ }\Omega$	-	8	-	ns
Rise Time <sup>c</sup>	$t_r$		-	3	-	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$		-	12	-	
Fall Time <sup>c</sup>	$t_f$		-	3	-	
<b>Drain-Source Body Diode Ratings and Characteristics <sup>b</sup></b> ( $T_C = 25\text{ }^\circ\text{C}$ )						
Continuous Source Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$	-	-	42	A
Pulsed Source Current	$I_{SM}$		-	-	168	A
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 1\text{ A}, V_{GS} = 0\text{ V}$	-	-	1	V
Reverse Recovery Time	$t_{rr}$	$I_F = 20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	-	20	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	60	-	nC

**Notes**

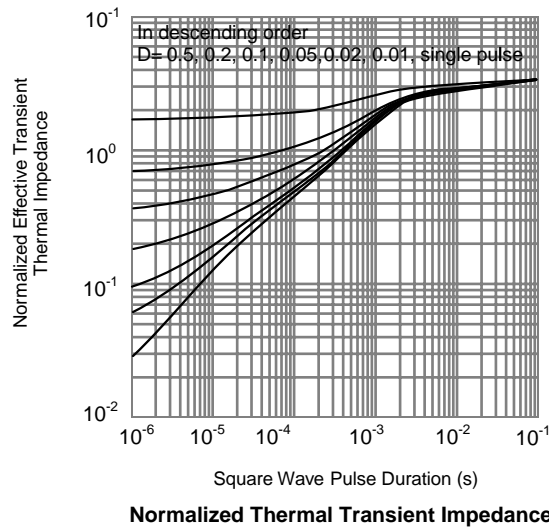
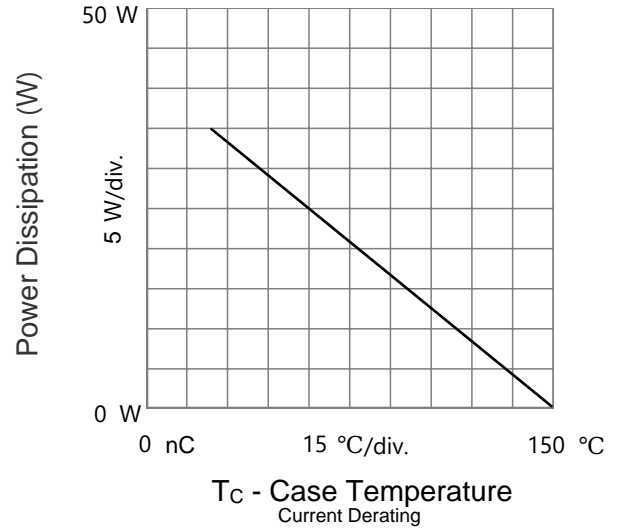
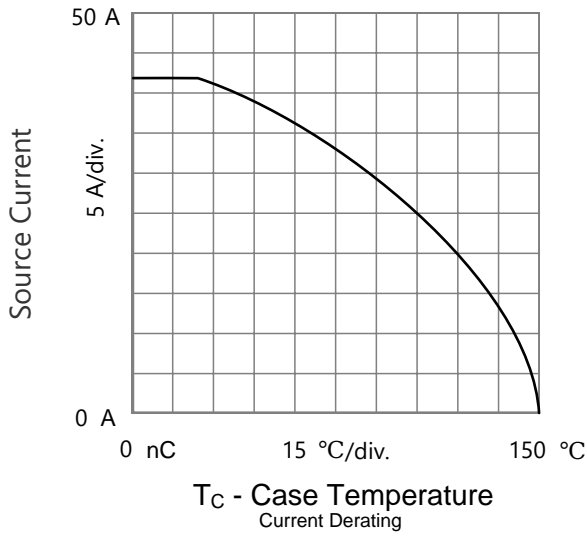
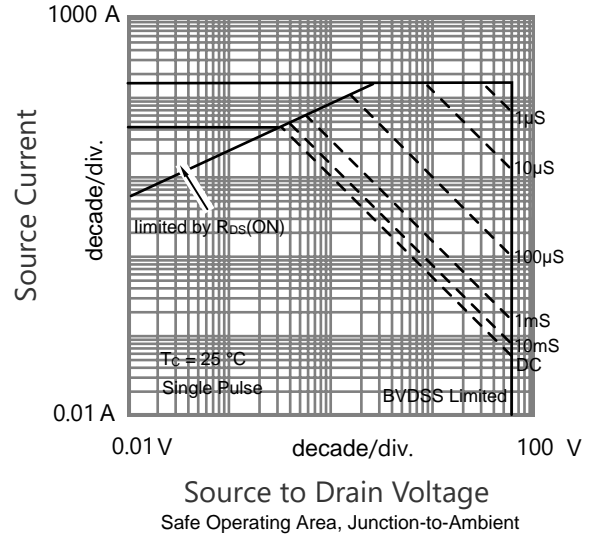
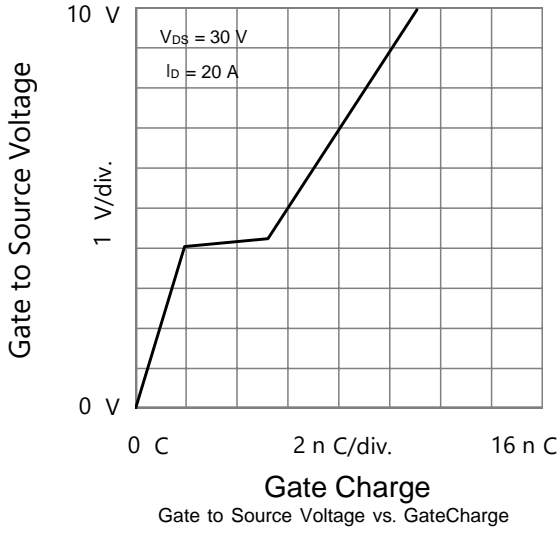
- Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.
- Independent of operating temperature.

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



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