

## N-Channel 60 V (D-S) MOSFET

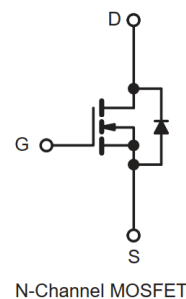
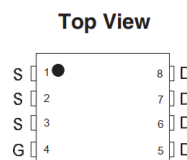
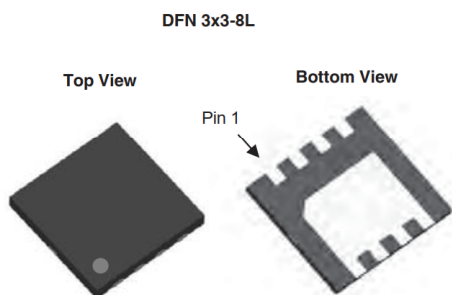
PRODUCT SUMMARY			
V <sub>DS</sub> (V)	R <sub>DS(on)</sub> (mΩ) (Typ.)	I <sub>D</sub> (A) <sup>a</sup>	Q <sub>g</sub> (Typ.)
60	6.6 at V <sub>GS</sub> = 10 V	56	30.7 nC
	9.7 at V <sub>GS</sub> = 4.5 V		

### FEATURES

- DT-Trench Power MOSFET
- 100 % R<sub>g</sub> and UIS tested

### APPLICATIONS

- Notebook PC Core
- VRM/POL



### ABSOLUTE MAXIMUM RATINGS (T<sub>C</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> = 175 °C)	I <sub>D</sub>	T <sub>C</sub> = 25 °C	56	A
		T <sub>C</sub> = 100 °C	39	
Pulsed Drain Current (t = 100 μs)	I <sub>DM</sub>	224		
Single Avalanche Energy <sup>a</sup>	E <sub>AS</sub>	55	mJ	
Maximum Power Dissipation	P <sub>D</sub>	T <sub>C</sub> = 25 °C	39 <sup>b,c</sup>	W
		T <sub>C</sub> = 100 °C	18 <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>	38	°C/W
Junction-to-Case (Drain)	R <sub>thJC</sub>	3.8	

Notes:

- T<sub>C</sub> = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 45 °C/W.

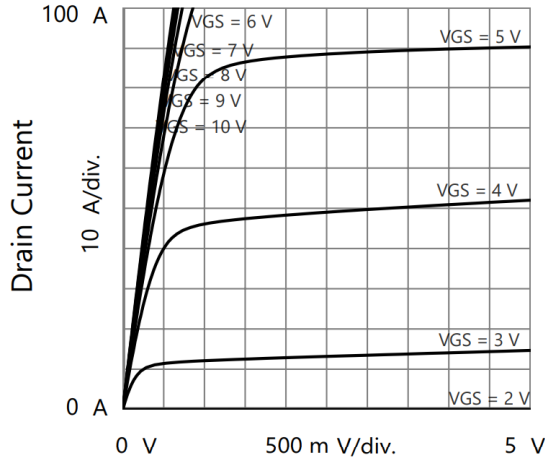
<b>SPECIFICATIONS</b> ( $T_J = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1	-	3	
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>	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	56	-	-	A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 12\text{ A}$	-	6.6	7.9	m $\Omega$
		$V_{GS} = 4.5\text{ V}, I_D = 9\text{ A}$	-	9.7	12.8	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 5\text{ V}, I_D = 12\text{ A}$	-	90	-	S
<b>Dynamic <sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 30\text{ V}, f = 1\text{ MHz}$	-	1830	-	pF
Output Capacitance	$C_{oss}$		-	456	-	
Reverse Transfer Capacitance	$C_{rss}$		-	5	-	
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 12\text{ A}$	-	30.7	-	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$		-	3.7	-	
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$		-	4.8	-	
Gate Resistance	$R_g$	$f = 1\text{ MHz}$	-	1.8	-	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(on)}$	$V_{DS} = 30\text{ V}, I_D = 12\text{ A}, R_g = 2.5\text{ }\Omega$ $V_{GS} = 10\text{ V}$	-	12	-	ns
Rise Time <sup>c</sup>	$t_r$		-	9	-	
Turn-Off Delay Time <sup>c</sup>	$t_{d(off)}$		-	22	-	
Fall Time <sup>c</sup>	$t_f$		-	17	-	
<b>Drain-Source Body Diode Ratings and Characteristics <sup>b</sup> (<math>T_C = 25\text{ }^\circ\text{C}</math>)</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$	-	-	56	A
Pulsed Current ( $t = 100\text{ }\mu\text{s}$ )	$I_{SM}$		-	-	224	A
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 12\text{ A}, V_{GS} = 0\text{ V}$	-	-	1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F = 12\text{ A}, di/dt = 300\text{ A}/\mu\text{s}$	-	49	-	ns
Reverse Recovery Charge	$Q_{rr}$		-	75	-	nC

**Notes**

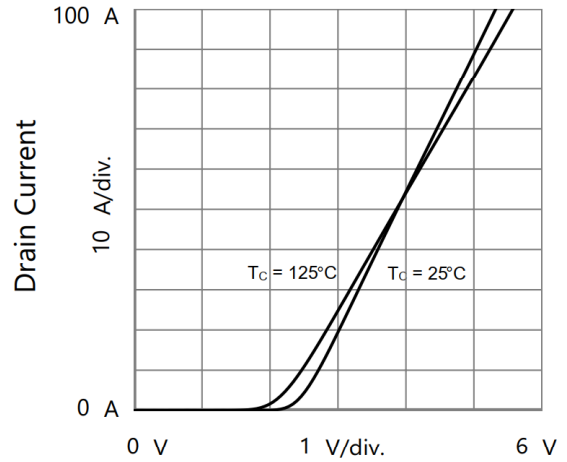
- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
 b. Guaranteed by design, not subject to production testing.  
 c. Independent of operating temperature.

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.

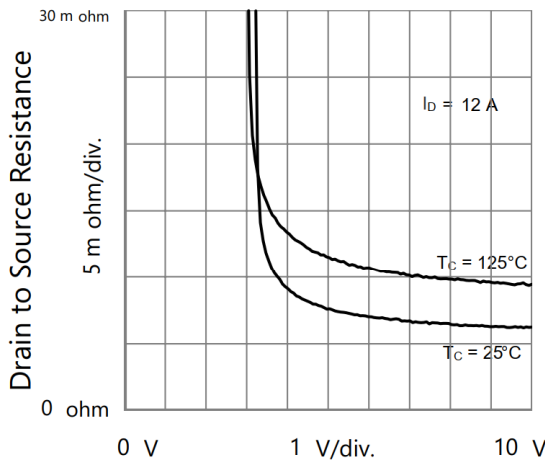
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



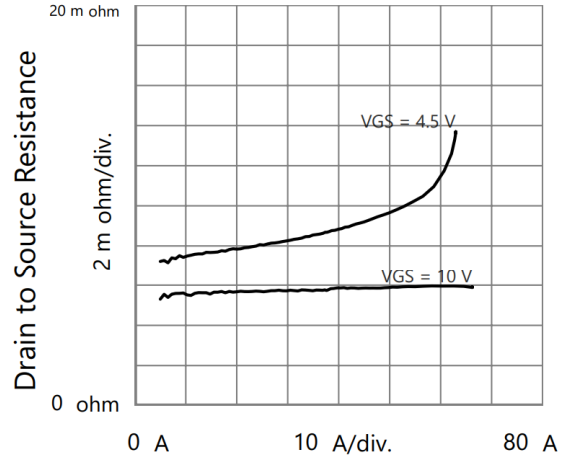
Drain to Source Voltage  
Output Characteristics



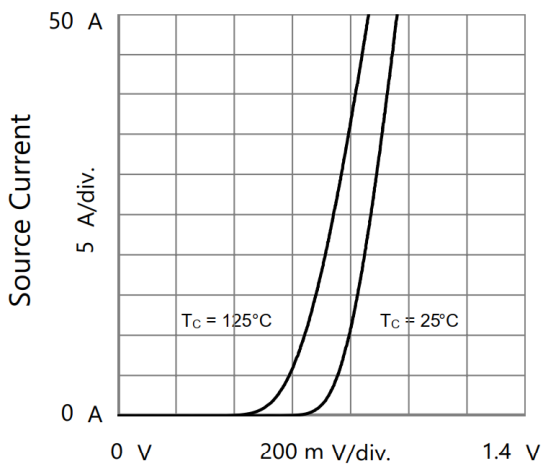
Gate to Source Voltage  
Transfer Characteristics



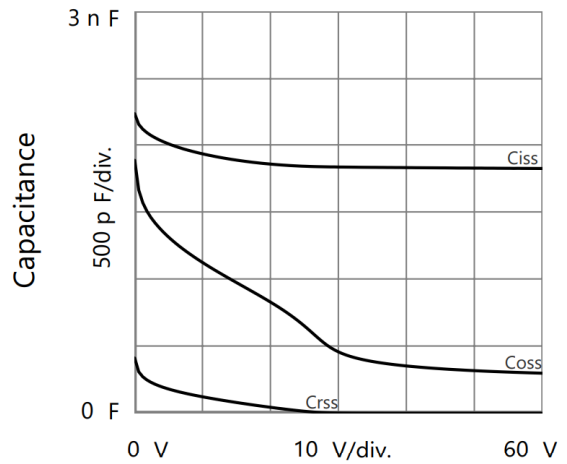
Gate to Source Voltage  
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current  
Drain to Source Resistance vs. Drain Current

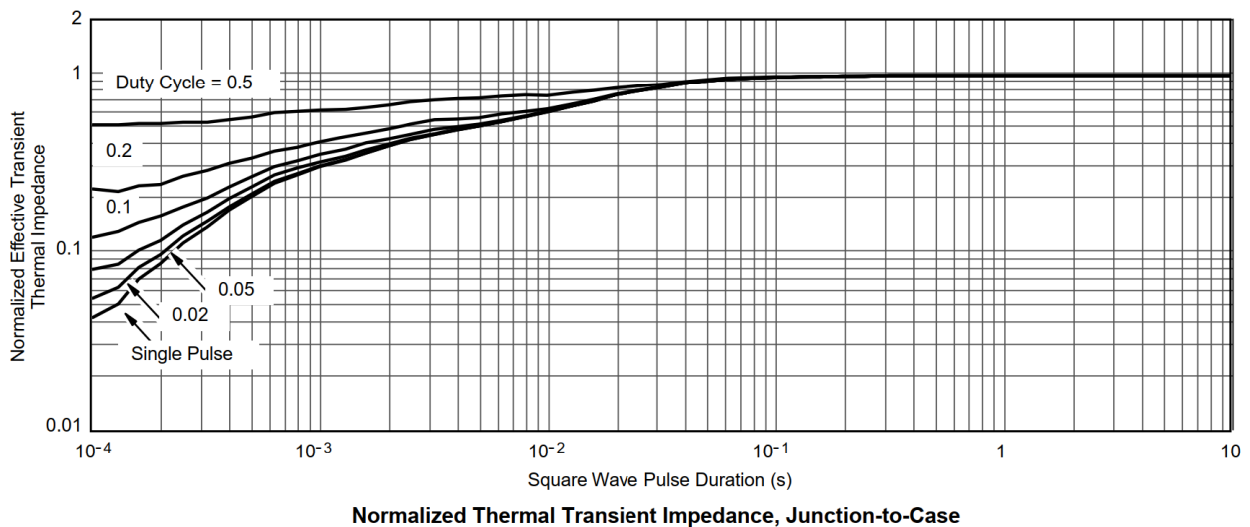
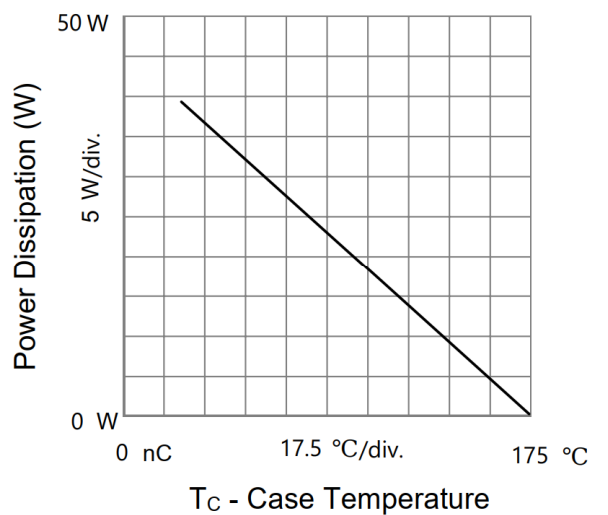
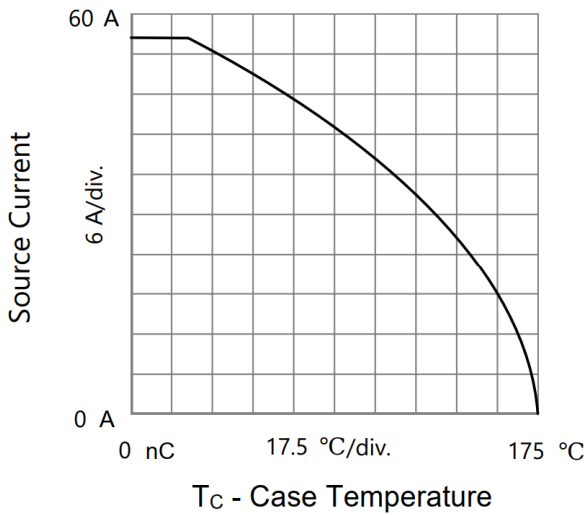
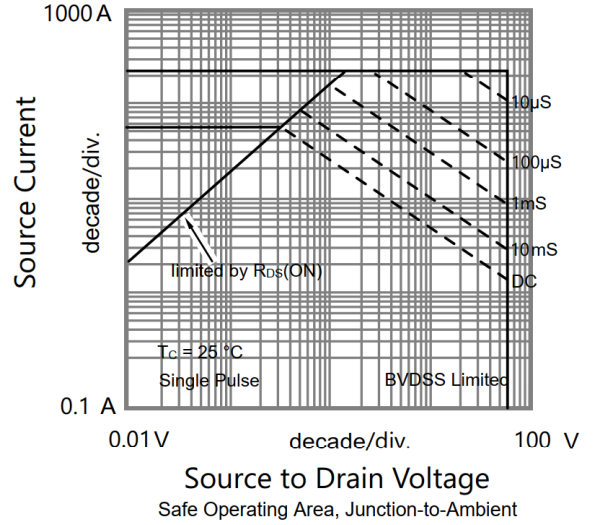
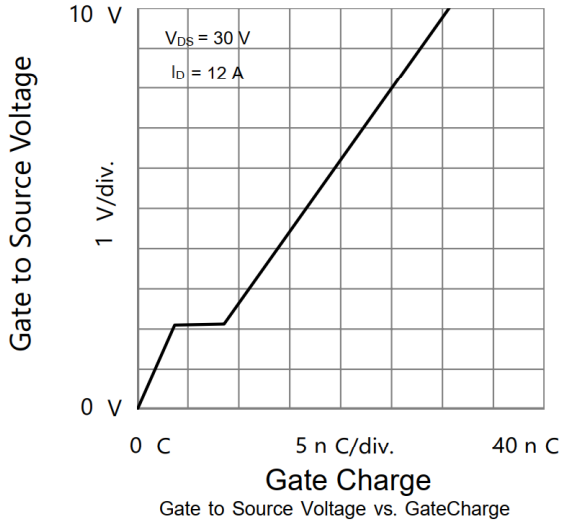


Source to Drain Voltage  
Body Diode Forward Characteristics

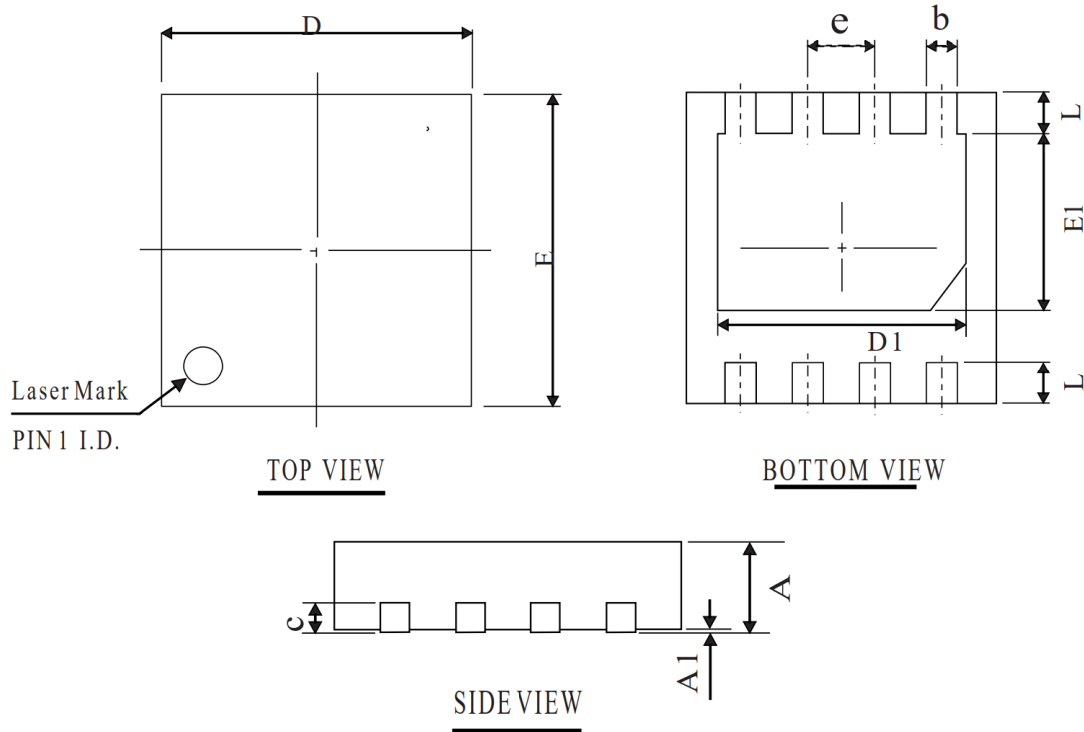


Drain to Source Voltage  
Capacitances

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



## DFN3\*3-8L PACKAGE OUTLINE



COMMON DIMENSIONS  
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.60	0.75	0.90
A1	0.00	0.02	0.08
b	0.20	0.30	0.45
D	2.85	3.00	3.15
E	2.85	3.00	3.15
D1	2.10	2.40	2.70
E1	1.50	1.70	2.00
L	0.20	0.40	0.60
c	0.203 REF		
e	0.65 BSC		

OTHER DIMENSIONS

A	0.50	0.55	0.60
A	0.40	0.45	0.50

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