N-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(Typ.)	I_D (A)[a, e]	Q_g (Typ.)
60	1.8 at V_{GS} = 10 V	180	105 nC
	2.8 at V_{GS} = 4.5 V		

FEATURES

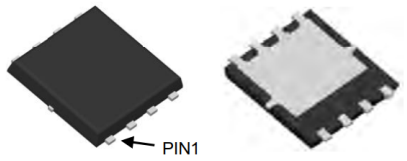
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

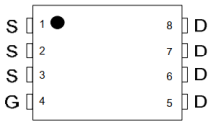
RoHS COMPLIANT

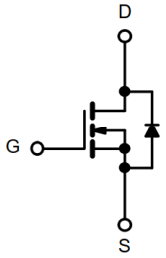
APPLICATIONS

- Notebook PC Core
- VRM/POL

DFN5X6







N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V_{DS}	60	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	180[a, e]	A
	T_C = 70 °C		160[e]	
	T_A = 25 °C		30[b, c]	
	T_A = 70 °C		20[b, c]	
Pulsed Drain Current		I_{DM}	720	
Avalanche Current Pulse	L = 0.1 mH	I_{AS}	175	
Single Pulse Avalanche Energy		E_{AS}	650	mJ
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	180[a, e]	A
	T_A = 25 °C		4.69[b, c]	
Maximum Power Dissipation	T_C = 25 °C	P_D	250[a]	W
	T_C = 70 °C		175	
	T_A = 25 °C		7.5[b, c]	
	T_A = 70 °C		5.3[b, c]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[b, d]	t ≤ 10 s	R_{thJA}	18	25	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	0.6	0.8	

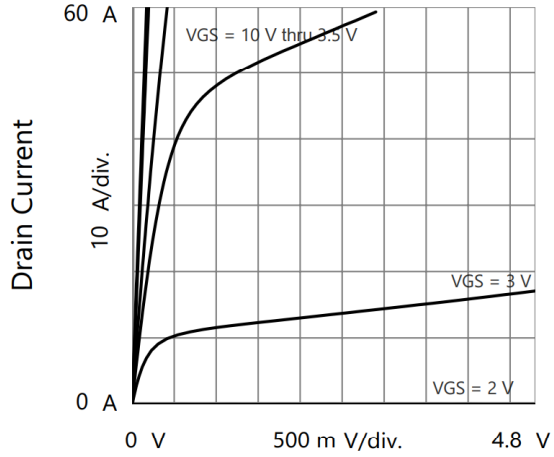
Notes:
a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. t = 10 s.
d. Maximum under steady state conditions is 90 °C/W.
e. Calculated based on maximum junction temperature.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min .**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = 250 µA	60	-	-	V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = 250 µA	-	35	-	mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$		-	- 5.5	-	
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	1.0		3.0	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-		± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 60 V, V_{GS} = 0 V	-		1	µA
		V_{DS} =60 V, V_{GS} = 0 V, T_J = 55 °C	-		10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 5 V, V_{GS} = 10 V	180			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 30 A	-	1.8	2.5	mΩ
		V_{GS} = 4.5 V, I_D = 30 A	-	2.8	3.6	
Forward Transconductance[a]	g_{fs}	V_{DS} = 5 V, I_D = 20 A	-	110		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} =30 V , V_{GS} = 0 V, f = 1 MHz	-	7080	-	pF
Output Capacitance	C_{oss}		-	1440	-	
Reverse Transfer Capacitance	C_{rss}		-	3	-	
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 10 V, I_D = 30 A	-	105	-	nC
Gate-Source Charge	Q_{gs}		-	84	-	
Gate-Drain Charge	Q_{gd}		-	16	-	
Gate Resistance	R_g	f = 1 MHz	-	1.5	-	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 30 V, R_L = 0.555Ω I_D =30 A, V_{GEN} = 10 V, R_g = 1Ω	-	19	-	ns
Rise Time	t_r		-	20	-	
Turn-Off Delay Time	$t_{d(off)}$		-	31	-	
Fall Time	t_f		-	6	-	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C	-		180	A
Pulse Diode Forward Current[a]	I_{SM}		-		720	
Body Diode Voltage	V_{SD}	I_S = 20 A	-	0.8	1.2	
V Body Diode Reverse Recovery Time	t_{rr}	I_F = 20 A, di/dt = 100 A/µs, T_J = 25 °C	-	55	78	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	97	170	nC
Reverse Recovery Fall Time	t_a		-	29		ns
Reverse Recovery Rise Time	t_b		-	23		

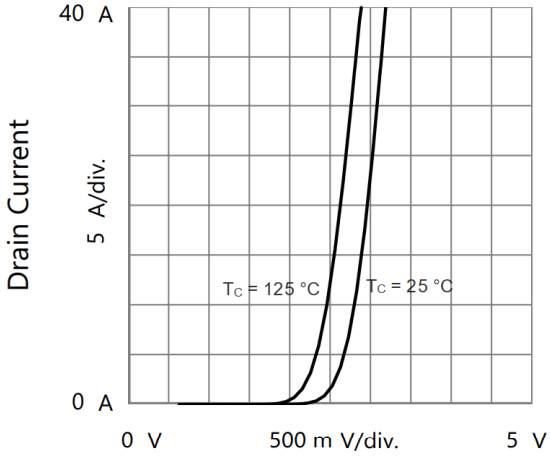
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

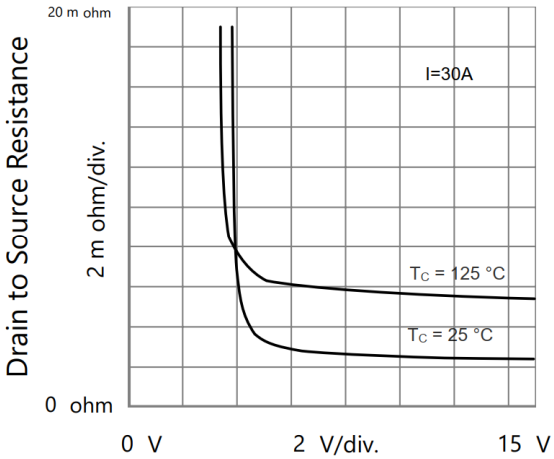
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



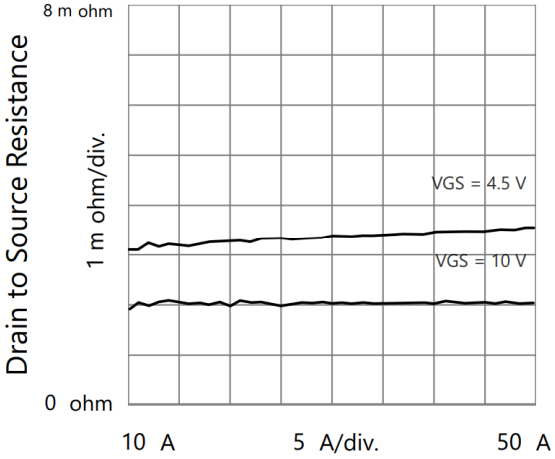
Drain to Source Voltage
Output Characteristics



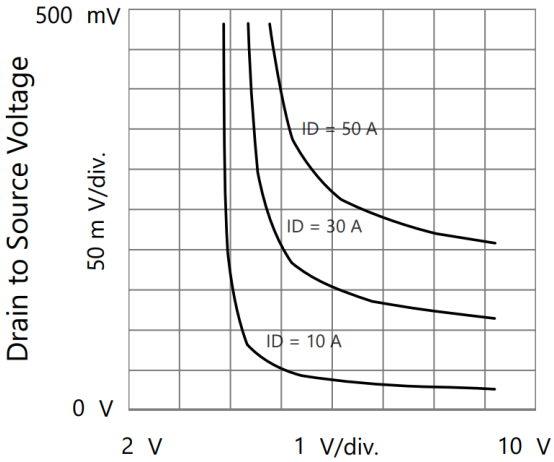
Gate to Source Voltage
Transfer Characteristics



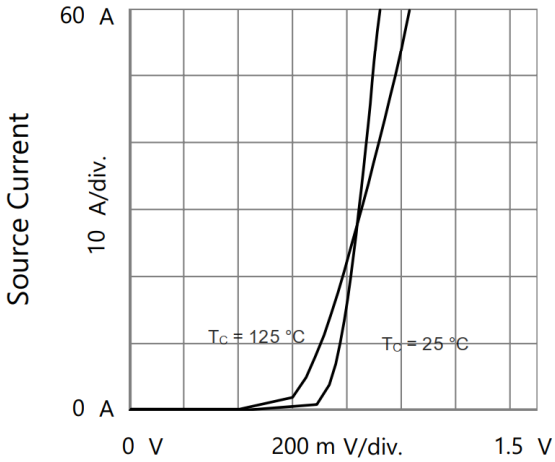
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

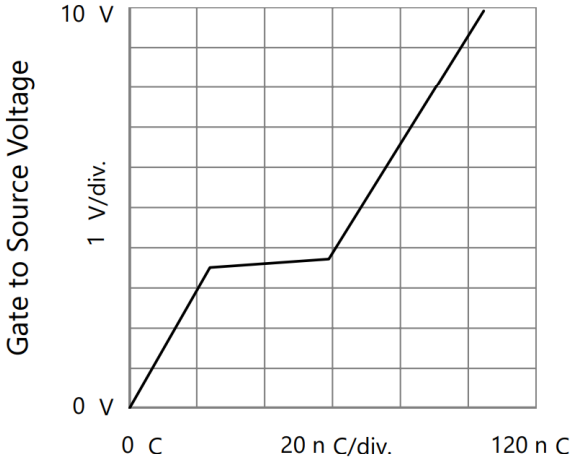


Gate to Source Voltage
Drain to Source Voltage vs. Gate to Source Voltage

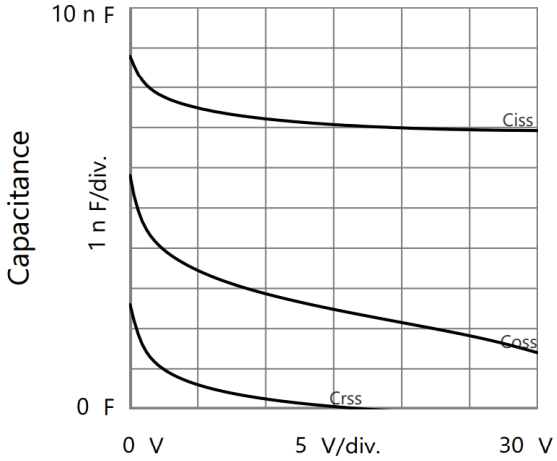


Source to Drain Voltage
Body Diode Forward Characteristics

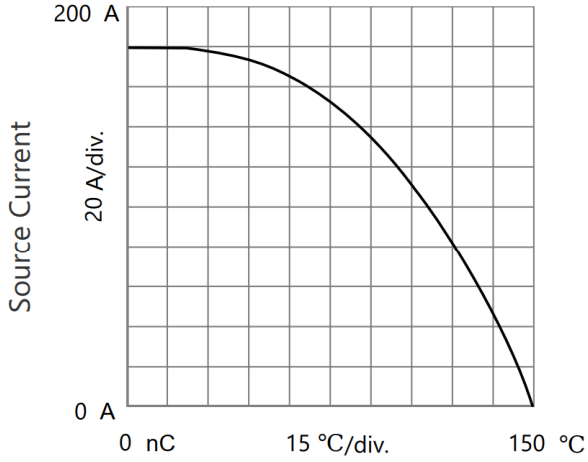
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



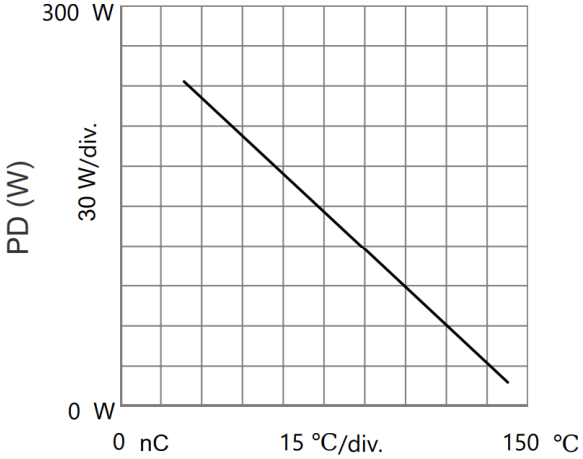
Gate Charge
Gate to Source Voltage vs. Gate Charge



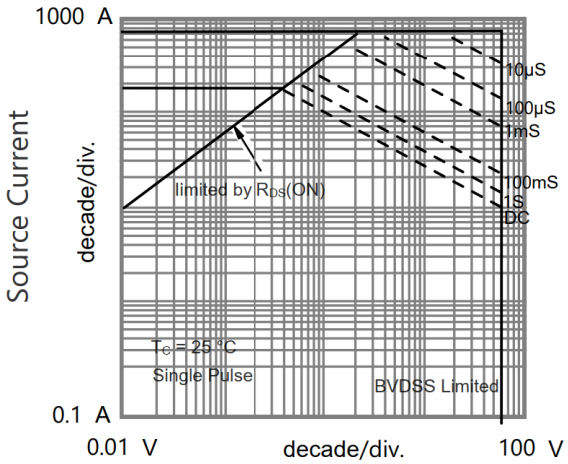
Drain to Source Voltage
Capacitances



T_C - Case Temperature
Current Derating



T_C - Case Temperature
Power Derating



Source to Drain Voltage
Safe Operating Area, Junction-to-Ambient

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