N-Channel 30-V (D-S) Power MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (mΩ)(TYP.)	I_D (A)[a]	Q_g (Typ.)
30	9.8 at V_{GS} = 10 V	10	23 nC
	11 at V_{GS} = 4.5 V		

FEATURES

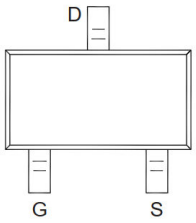
- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested
- ESD Protected

Pb-free
RoHS
COMPLIANT

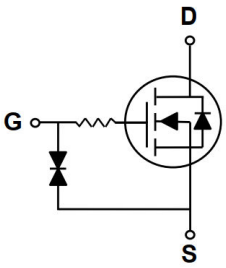
APPLICATIONS

- DC/DC Converter

SOT-23-3L Pin Configuration



Top View



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	10[a, d]	A
	T_C = 70 °C		8.6[d]	
Pulsed Drain Current		I_{DM}	40	
Single Pulse Avalanche Current	L = 0.1 mH	I_{AS}	8	
Single Pulse Avalanche Energy		E_{AS}	70	mJ
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	10[a, d]	A
Maximum Power Dissipation	T_C = 25 °C	P_D	4.5[a]	W
	T_C = 70 °C		3	
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, c]	t ≤ 10 s	R_{thJA}	25	50	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	3.5	4.5	

Notes:
a. Based on T_C = 25 °C.
b. Surface mounted on 1" x 1" FR4 board.
c. Maximum under steady state conditions is 90 °C/W.
d. 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	30			V
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	0.5		1.5	V
Gate-Source Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 10	uA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0 V			1	µA
		V_{DS} = 24 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	10			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 8 A		9.8	12	mΩ
		V_{GS} = 4.5 V, I_D = 6 A		11	15	
Forward Transconductance[a]	g_{fs}	V_{DS} = 5 V, I_D = 8 A		40		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = 15 V , V_{GS} = 0 V, f = 100 KHz		848		pF
Output Capacitance	C_{oss}			326		
Reverse Transfer Capacitance	C_{rss}			48		
Total Gate Charge	Q_g	V_{DS} = 15 V, V_{GS} = 10V, I_D = 8 A		23		nC
Gate-Source Charge	Q_{gs}			1.2		
Gate-Drain Charge	Q_{gd}			3.6		
Gate Resistance	R_g	f = 1 MHz		660		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = 15 V, R_L = 0.555 Ω I_D = 8 A, V_{GEN} = 10 V, R_g = 1 Ω		385		nS
Rise Time	t_r			580		
Turn-Off Delay Time	$t_{d(off)}$			1600		
Fall Time	t_f			920		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			10	A
Pulse Diode Forward Current[a]	I_{SM}				40	
Body Diode Voltage	V_{SD}	I_S = 1 A			1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 8 A, di/dt = 100 A/µs, T_J = 25 °C		10		nS
Body Diode Reverse Recovery Charge	Q_{rr}			12		nC

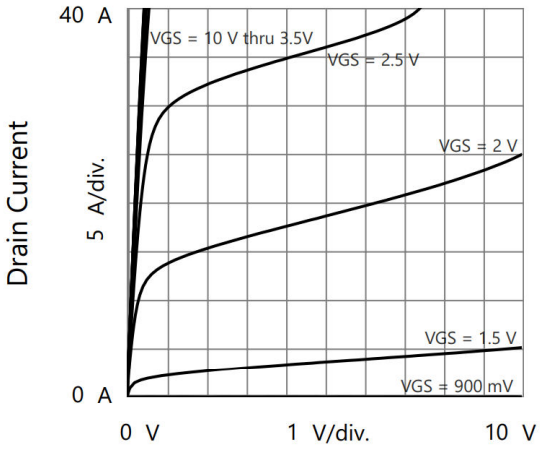
Notes:

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

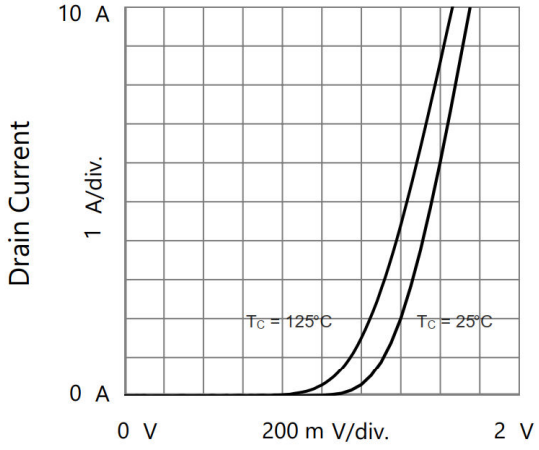
b. Guaranteed by design, not subject to production testing.

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.

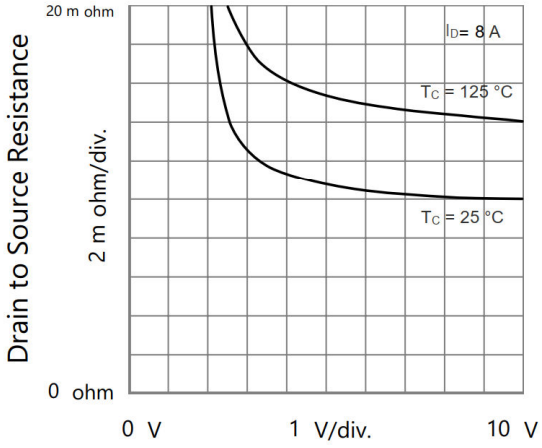
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



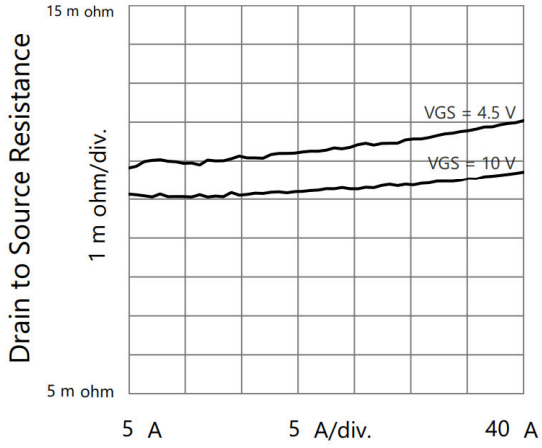
Drain to Source Voltage
Output Characteristics



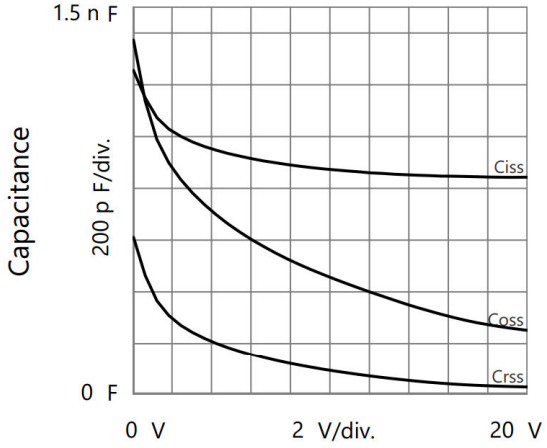
Gate to Source Voltage
Transfer Characteristics



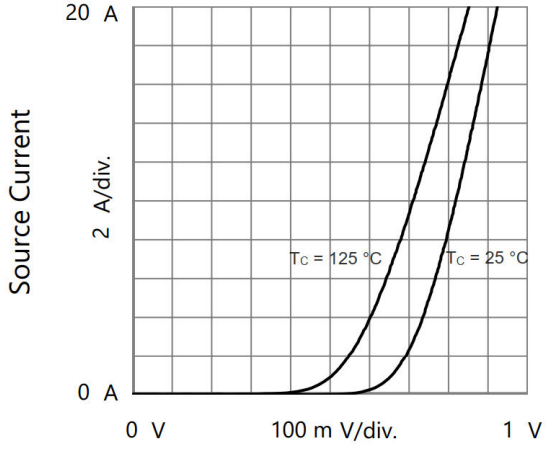
Gate to Source Voltage
Drain to Source Resistance vs. Gate to Source Voltage



Drain Current
Drain to Source Resistance vs. Drain Current

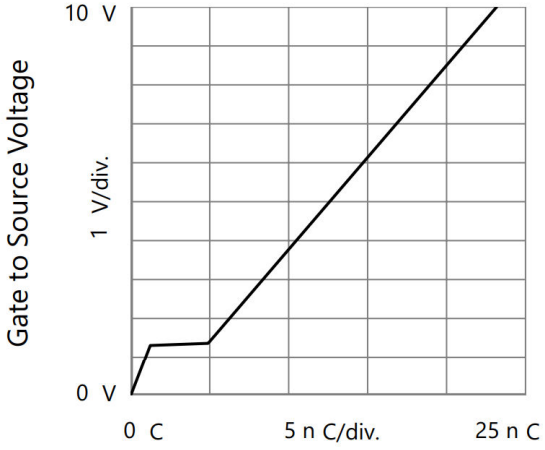


Drain to Source Voltage
Capacitances



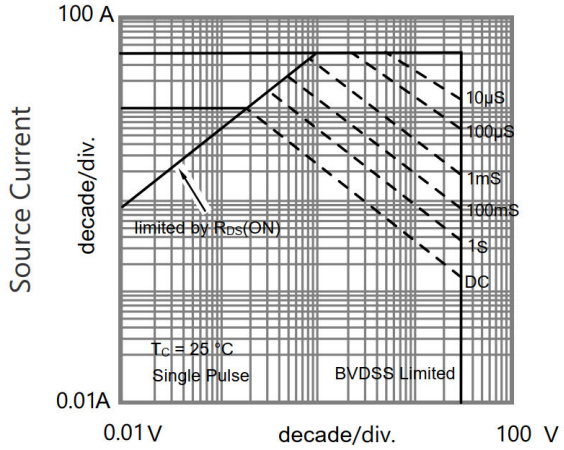
Source to Drain Voltage
Body Diode Forward Characteristics

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



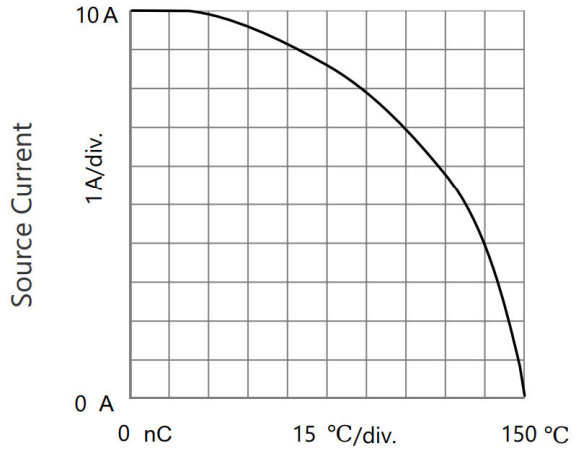
Gate Charge

Gate to Source Voltage vs. GateCharge



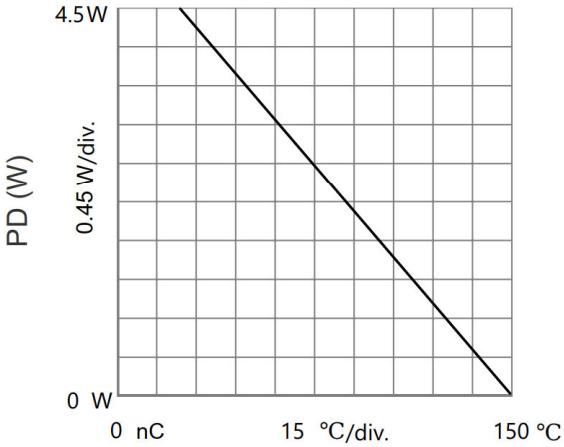
Source to Drain Voltage

Safe Operating Area, Junction-to-Ambient



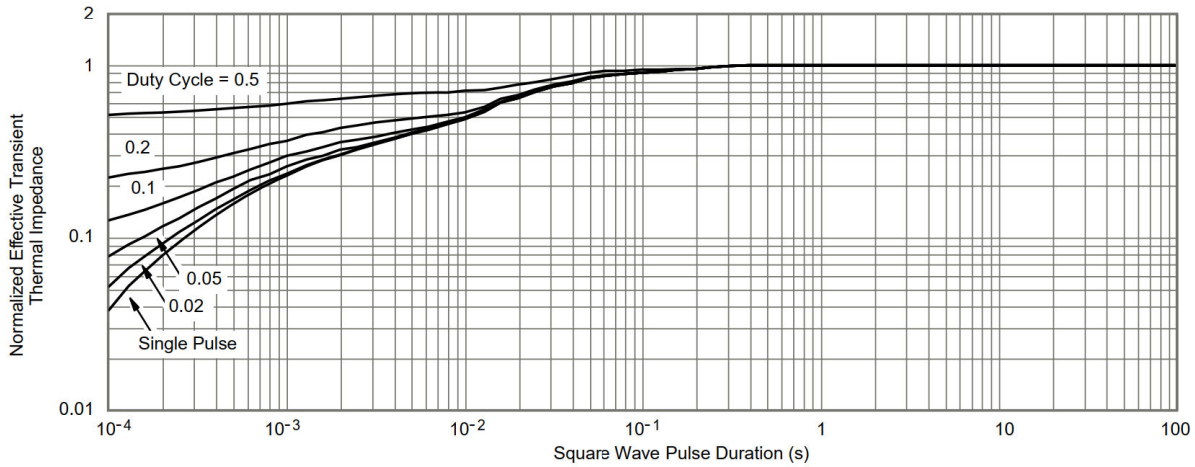
T_C - Case Temperature

Current Derating



T_C - Case Temperature

Power Derating



Normalized Thermal Transient Impedance, Junction-to-Case

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