N-Channel 20-V (D-S) MOSFET

Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

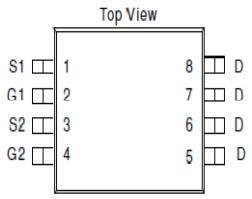
Typical Applications:
- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

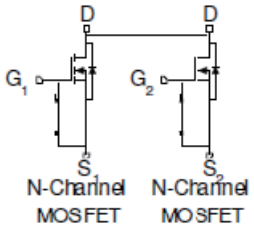
PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D(A)
20	14 @ V_{GS} = 4.5V	9.2
	16 @ V_{GS} = 2.5V	8.5

Pb-free
RoHS COMPLIANT
HALOGEN FREE

ESD Protected
2000V

DFN3x3-8L
Top View





ABSOLUTE MAXIMUM RATINGS (T_A = 25℃ UNLESS OTHERWISE NOTED)				
Parameter		**Symbol**	**Limit**	**Units**
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±12	
Continuous Drain Current [a]	T_A=25℃	I_D	9.2	A
	T_A=70℃		7.5	
Pulsed Drain Current [b]		I_{DM}	50	
Continuous Source Current (Diode Conduction) [a]		I_S	2.6	A
Power Dissipation [a]	T_A=25℃	P_D	1.5	W
	T_A=70℃		1	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	℃

THERMAL RESISTANCE RATINGS				
Parameter		**Symbol**	**Maximum**	**Units**
Maximum Junction-to-Ambient [a]	t <= 10 sec	$R_{\theta JA}$	83	℃/W
	Steady State		120	

Notes

a. Surface Mounted on 1” x 1” FR4 Board.

b. Pulse width limited by maximum junction temperature

Electrical Characteristics

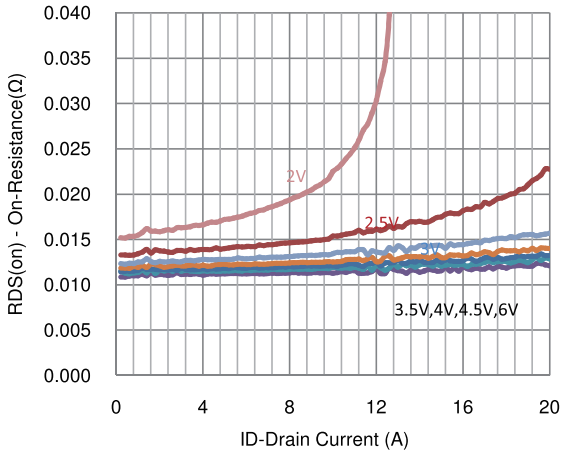
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±8 V			±10	uA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 16 V, V_{GS} = 0 V			1	uA
		V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55℃			25	
On-State Drain Current	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 4.5 V	25			A
Drain-Source On-Resistance	$r_{DS(on)}$	V_{GS} = 4.5 V, I_D = 2 A		12	14	mΩ
		V_{GS} = 2.5 V, I_D = 2 A		14	16	
Forward Transconductance	g_{fs}	V_{DS} = 10 V, I_D = 7.4 A		40		S
Diode Forward Voltage	V_{SD}	I_S = 1.3 A, V_{GS} = 0 V		0.7		V
Dynamic						
Total Gate Charge	Q_g	V_{DS} = 10 V, V_{GS} = 4.5 V, I_D = 7.4 A		17		nC
Gate-Source Charge	Q_{gs}			4.4		
Gate-Drain Charge	Q_{gd}			3.9		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 10 V, R_L = 1.4 Ω, I_D = 7.4 A, V_{GEN} = 4.5 V, R_{GEN} = 6 Ω		16		ns
Rise Time	t_r			14		
Turn-Off Delay Time	$t_{d(off)}$			75		
Fall Time	t_f			17		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz		1663		pF
Output Capacitance	C_{oss}			145		
Reverse Transfer Capacitance	C_{rss}			139		

Notes

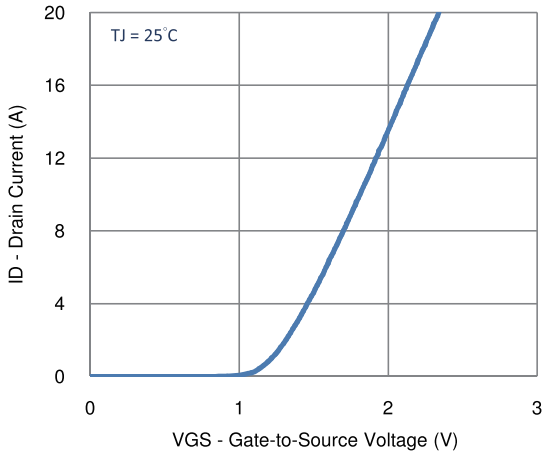
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

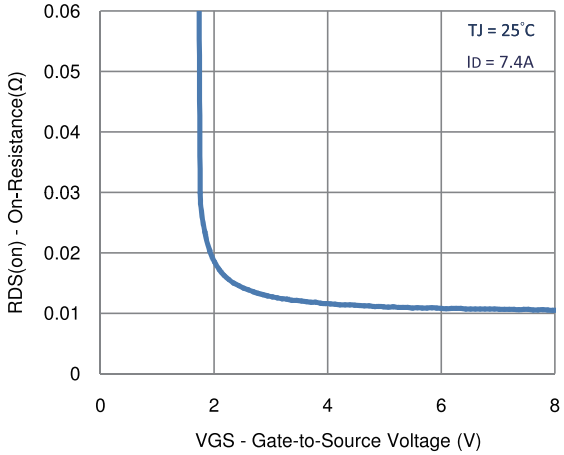
Typical Electrical Characteristics



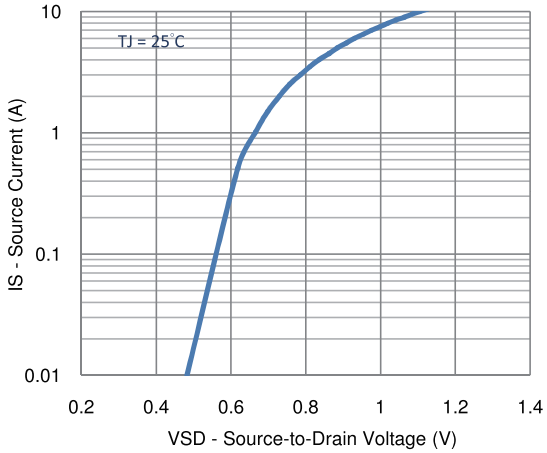
1. On-Resistance vs. Drain Current



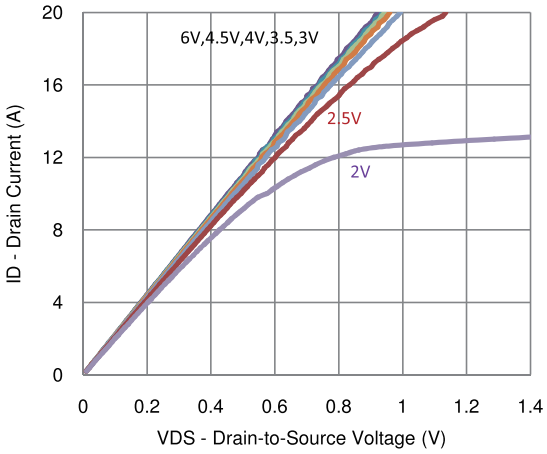
2. Transfer Characteristics



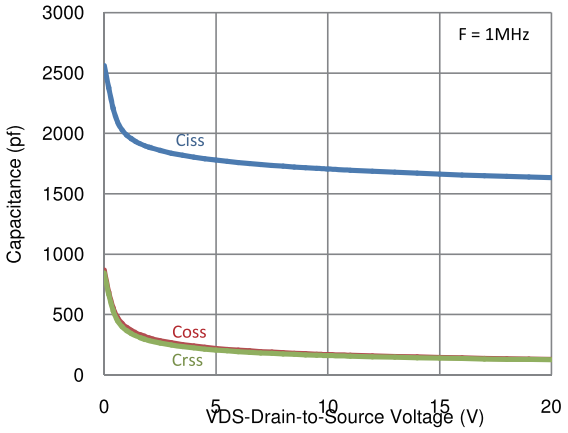
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

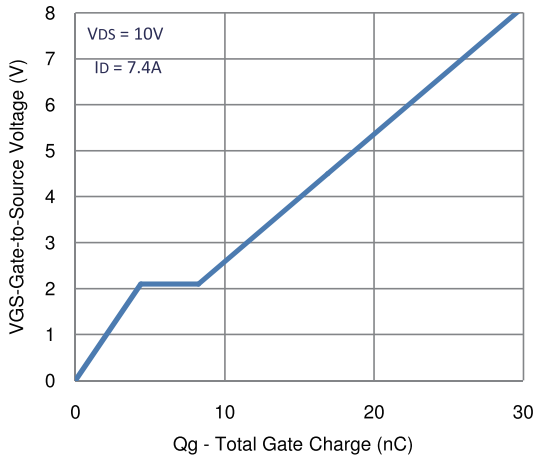


5. Output Characteristics

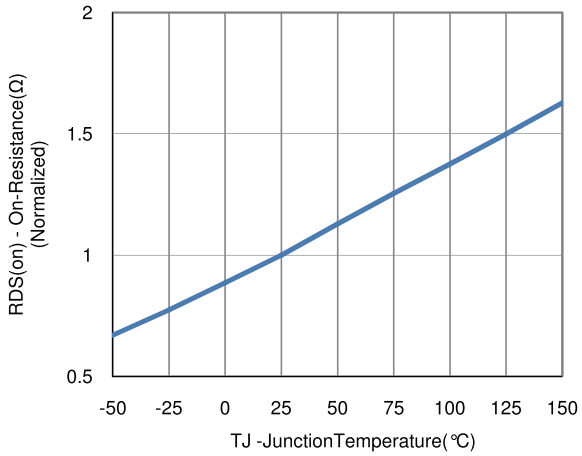


6. Capacitance

Typical Electrical Characteristics

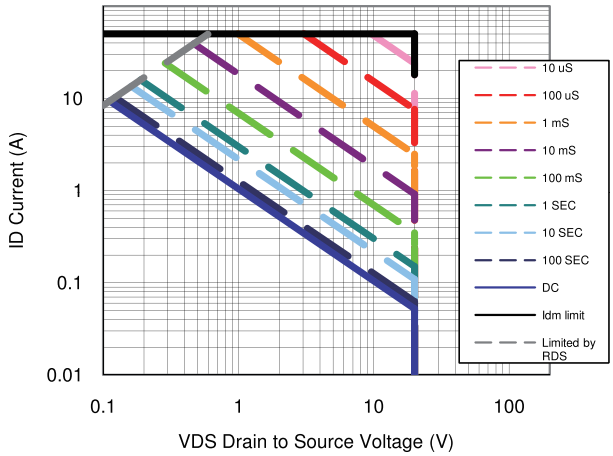


7. Gate Charge

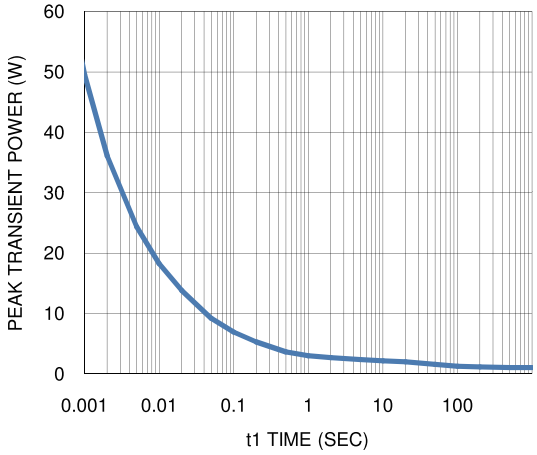


8. Normalized On-Resistance Vs Junction Temperature

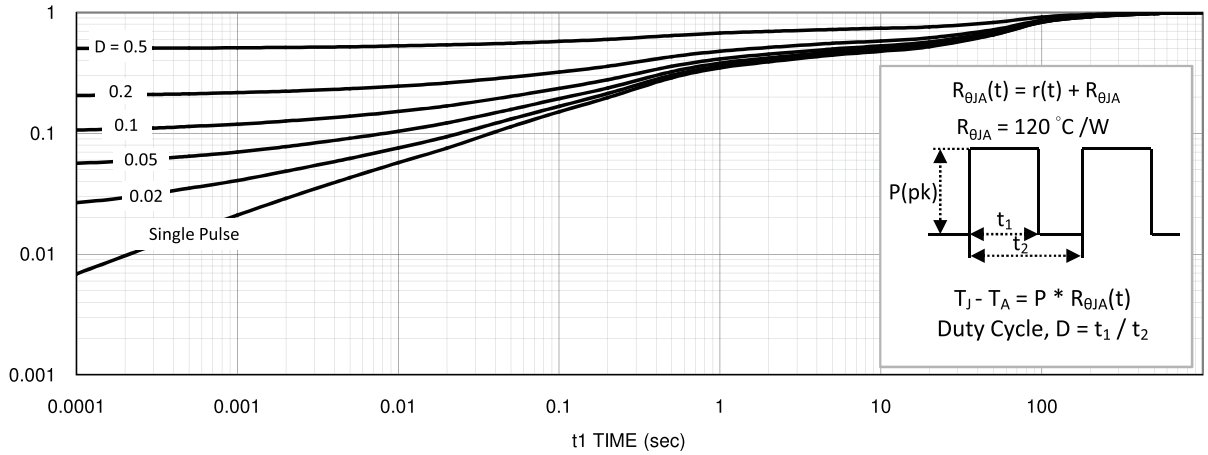
ID = 2.3A



9. Safe Operating Area

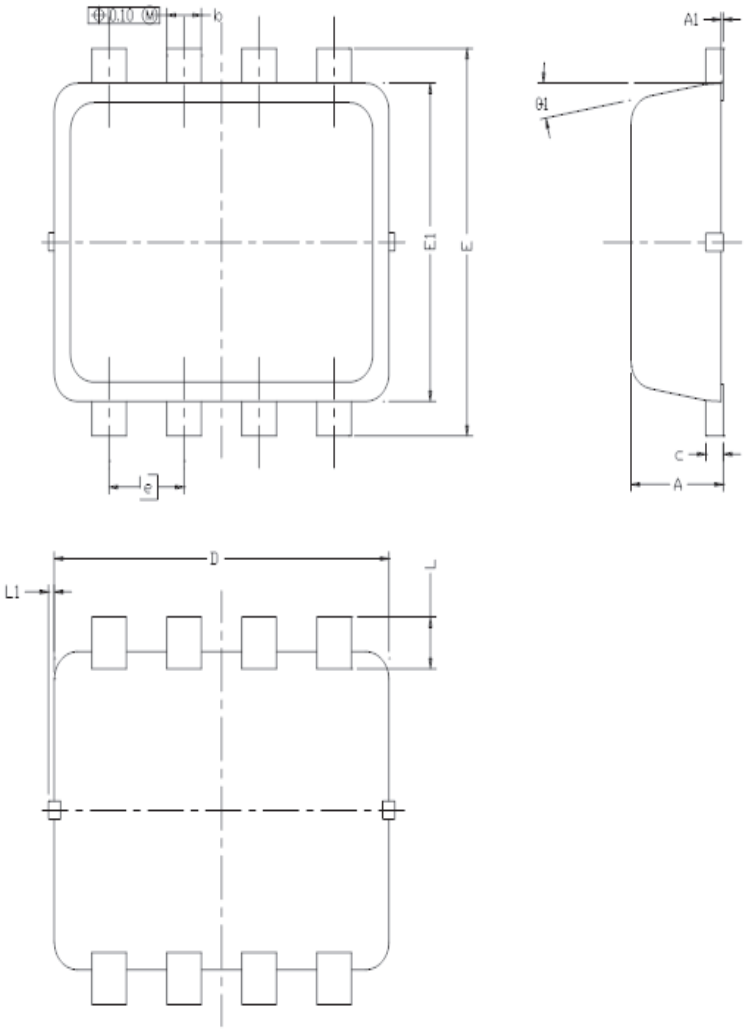


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.700	0.80	0.900	0.0276	0.0315	0.0354
A1	0.00	---	0.05	0.000	---	0.002
b	0.24	0.30	0.35	0.009	0.012	0.014
c	0.08	0.152	0.25	0.003	0.006	0.010
D	2.90 BSC			0.114 BSC		
E	2.80 BSC			0.110 BSC		
E1	2.30 BSC			0.091 BSC		
e	0.65 BSC			0.026 BSC		
L	0.20	0.375	0.450	0.008	0.0148	0.0177
L1	0	---	0.100	0	---	0.004
θ1	0	10	12	0	10	12