

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

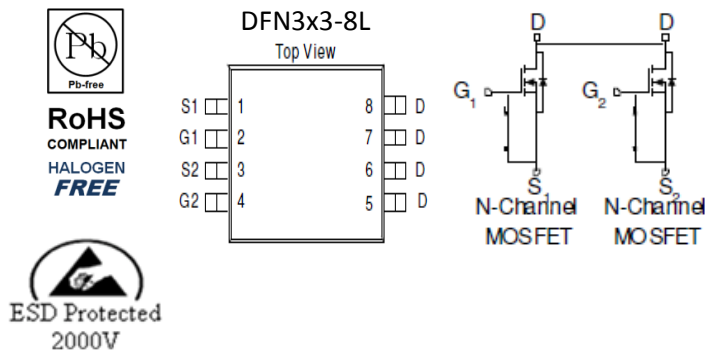
Key Features:

- 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)	$r_{DS(on)}$ (m Ω)	I_D (A)
20	14 @ $V_{GS} = 4.5V$	9.2
	16 @ $V_{GS} = 2.5V$	8.5



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

Parameter	Symbol	Limit	Units
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ^a	I_D	$T_A=25^\circ\text{C}$	9.2
		$T_A=70^\circ\text{C}$	7.5
Pulsed Drain Current ^b	I_{DM}	50	A
Continuous Source Current (Diode Conduction) ^a	I_S	2.6	A
Power Dissipation ^a	P_D	$T_A=25^\circ\text{C}$	1.5
		$T_A=70^\circ\text{C}$	1
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to 150	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$R_{\theta JA}$	t \leq 10 sec	83
		Steady State	120

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Pulse width limited by maximum junction temperature

Electrical Characteristics

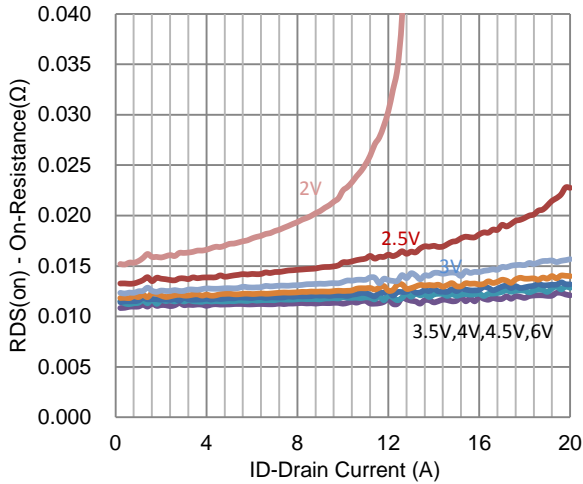
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 8 V$			± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16 V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55^\circ C$			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	m Ω
		$V_{GS} = 2.5 V, I_D = 2 A$		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	$t_{d(on)}$	$V_{DS} = 10 V, R_L = 1.4 \Omega, I_D = 7.4 A,$ $V_{GEN} = 4.5 V, R_{GEN} = 6 \Omega$		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

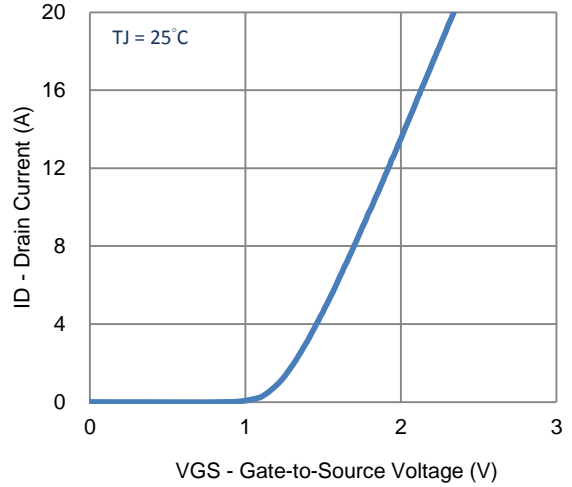
- Pulse test: PW \leq 300us duty cycle \leq 2%.
- Guaranteed by design, not subject to production testing.

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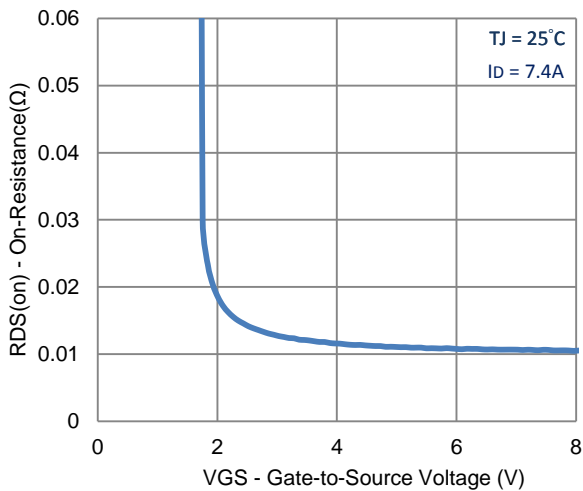
Typical Electrical Characteristics



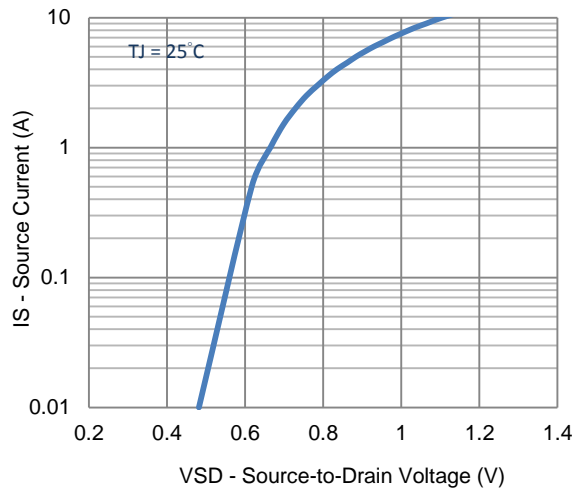
1. On-Resistance vs. Drain Current



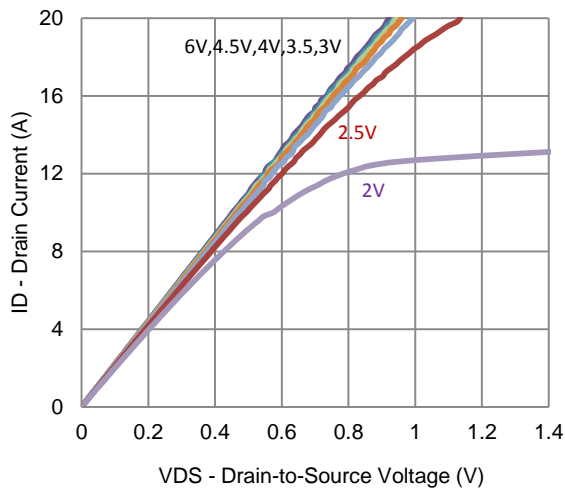
2. Transfer Characteristics



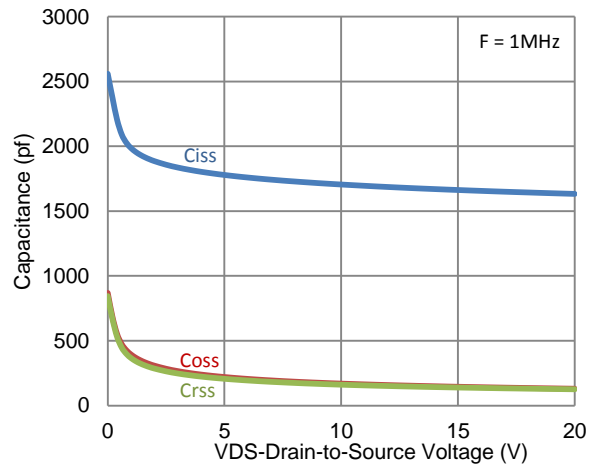
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

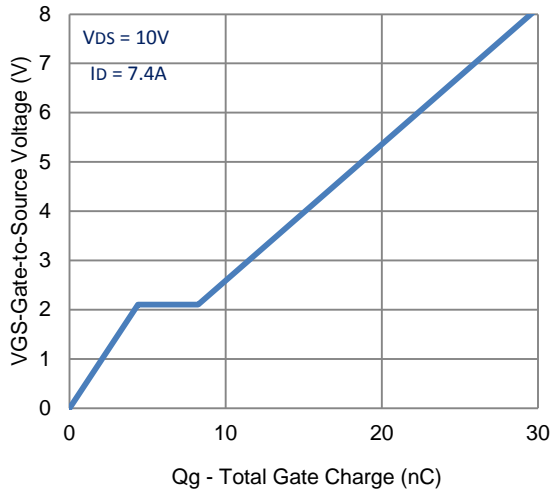


5. Output Characteristics

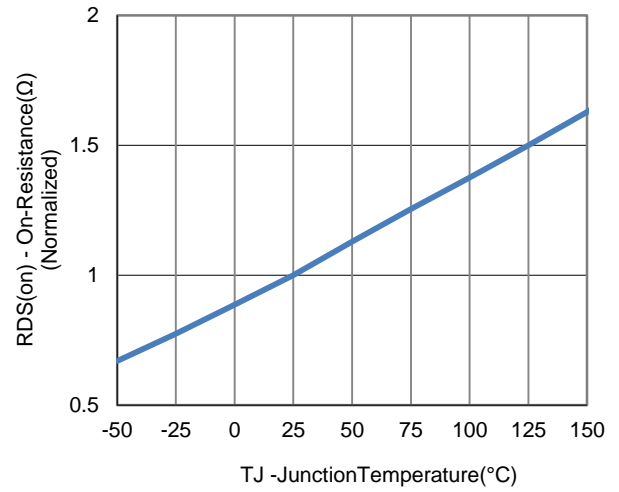


6. Capacitance

Typical Electrical Characteristics

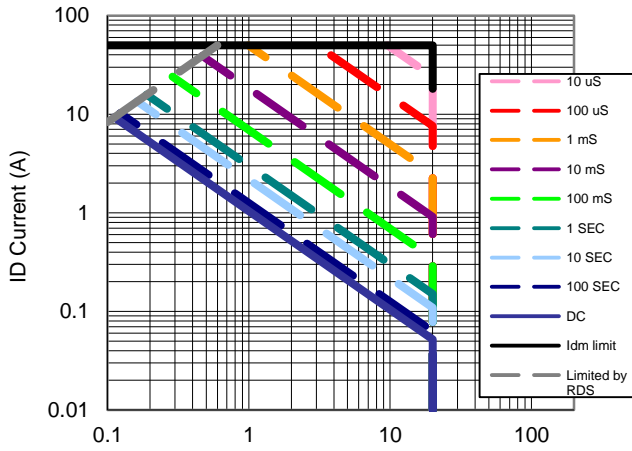


7. Gate Charge

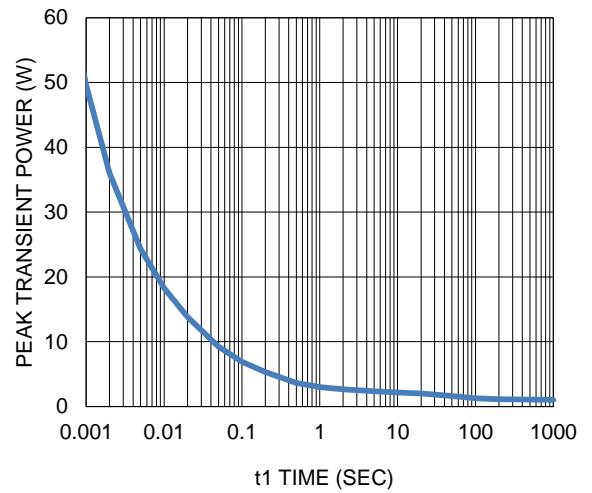


8. Normalized On-Resistance Vs Junction Temperature

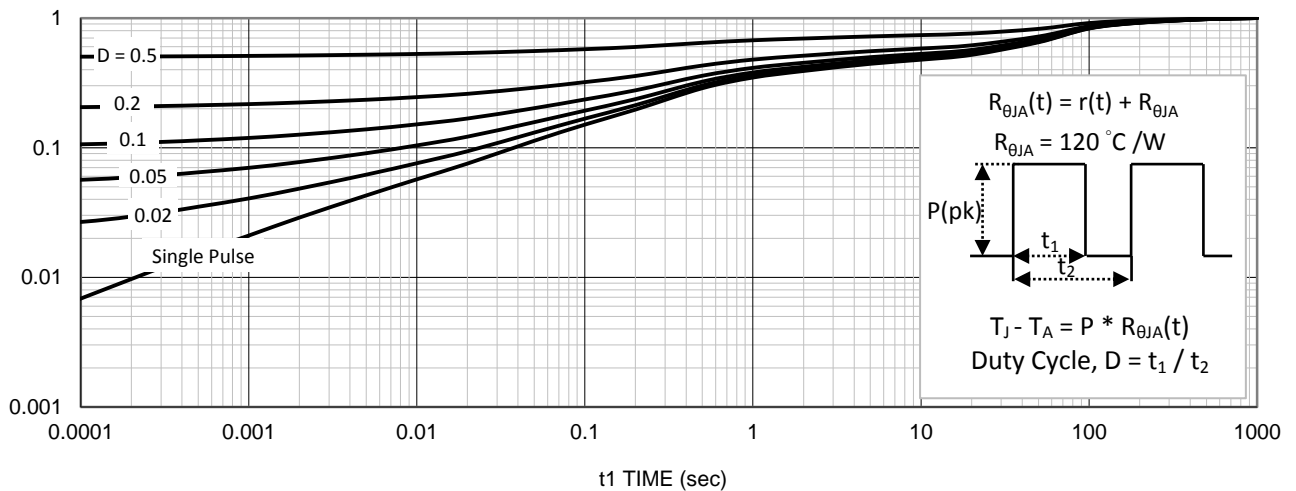
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9. Safe Operating Area

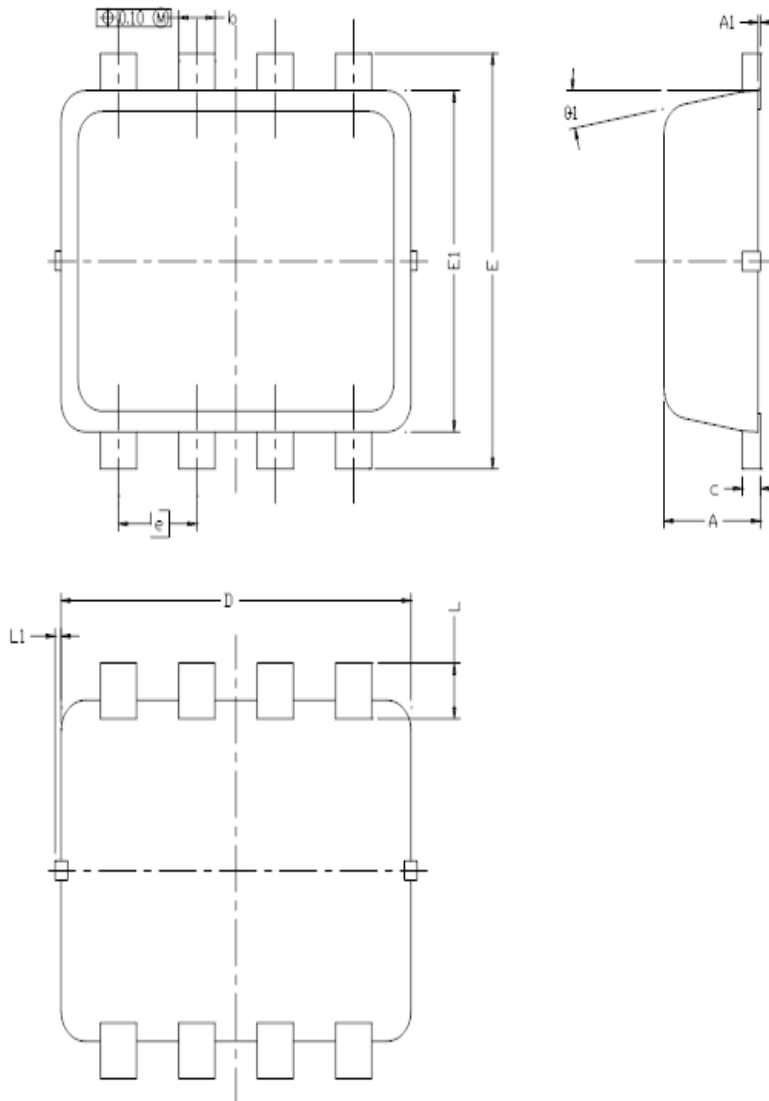


10. Single Pulse Maximum Power Dissipation



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
$\theta 1$	0	10	12	0	10	12