

N-Channel 190-V (D-S) MOSFET

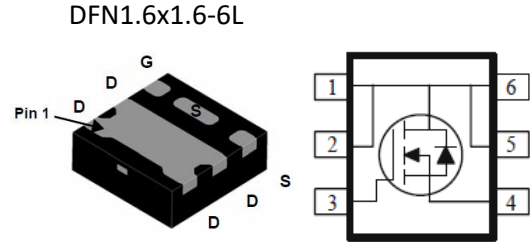
Key Features:

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

Typical Applications:

- Boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
190	1.8 @ $V_{GS} = 10V$	1.9
	2.4 @ $V_{GS} = 4.5V$	1.7



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	190	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current	$T_C = 25^\circ\text{C}$	I_D	1.9	A
	$T_C = 70^\circ\text{C}$		1.6	
	$T_A = 25^\circ\text{C}$		0.9 ^a	
	$T_A = 70^\circ\text{C}$		0.7 ^a	
Pulsed Drain Current ^b		I_{DM}	5	
Continuous Source Current (Diode Conduction) ^a		I_S	0.9	
Power Dissipation	$T_C = 25^\circ\text{C}$	P_D	9.6	W
	$T_C = 70^\circ\text{C}$		6.2	
	$T_A = 25^\circ\text{C}$		1.8 ^a	
	$T_A = 70^\circ\text{C}$		1.2 ^a	
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	$t \leq 10$ sec	$R_{\theta JA}$	70	$^\circ\text{C/W}$
	Steady State		110	
Maximum Junction-to-Case	Steady State	$R_{\theta JC}$	13	

Notes

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

Electrical Characteristics

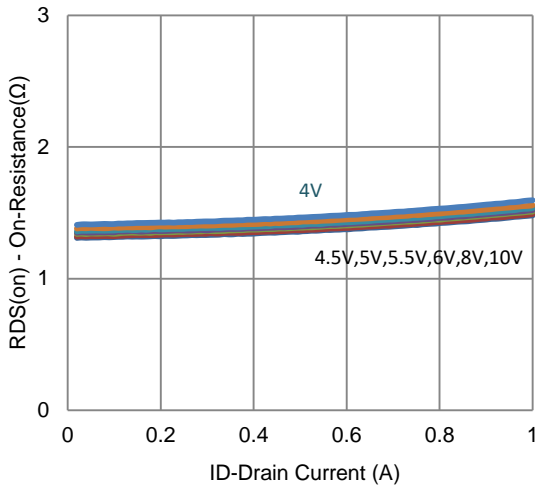
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 152 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 152 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	1.5			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 0.5 A$			1.8	Ω
		$V_{GS} = 4.5 V, I_D = 0.4 A$			2.4	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 0.5 A$		1		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 0.45 A, V_{GS} = 0 V$		0.77		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 95 V, V_{GS} = 4.5 V,$ $I_D = 0.5 A$		4.5		nC
Gate-Source Charge	Q_{gs}			1.1		
Gate-Drain Charge	Q_{gd}			1.9		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 95 V, R_L = 190 \Omega,$ $I_D = 0.5 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		5		ns
Rise Time	t_r			6		
Turn-Off Delay Time	$t_{d(off)}$			21		
Fall Time	t_f			12		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz$		245		pF
Output Capacitance	C_{oss}			18		
Reverse Transfer Capacitance	C_{rss}			17		

Notes

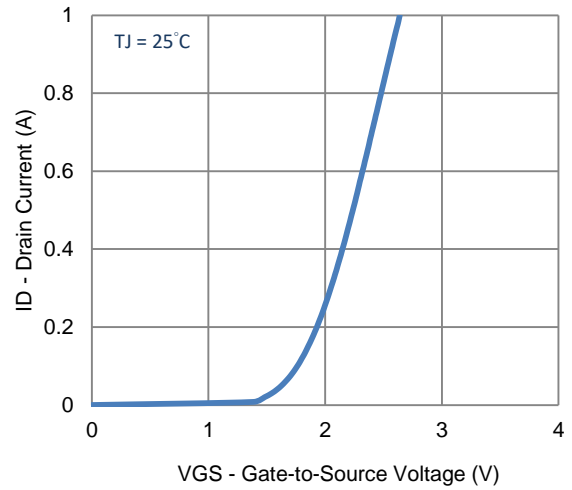
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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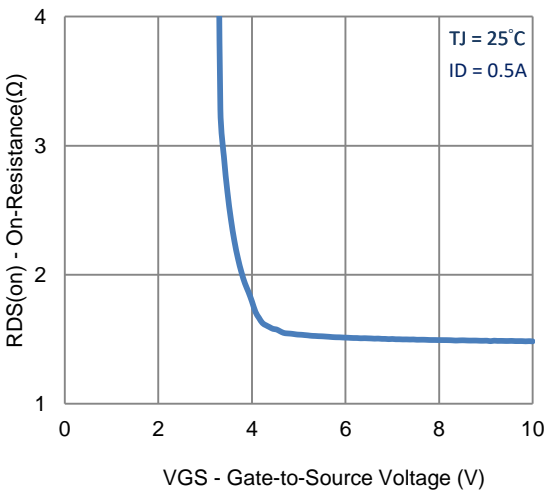
Typical Electrical Characteristics



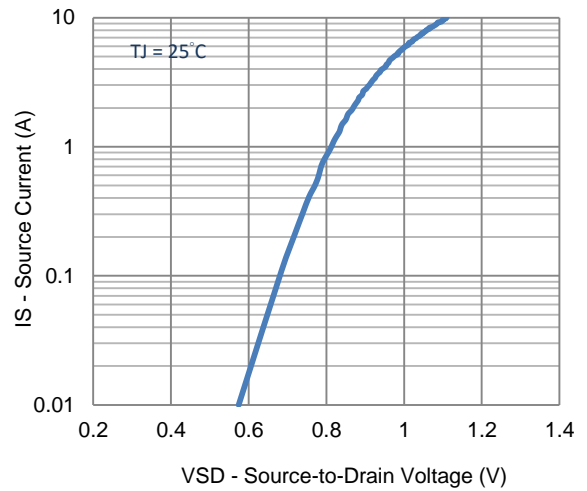
1. On-Resistance vs. Drain Current



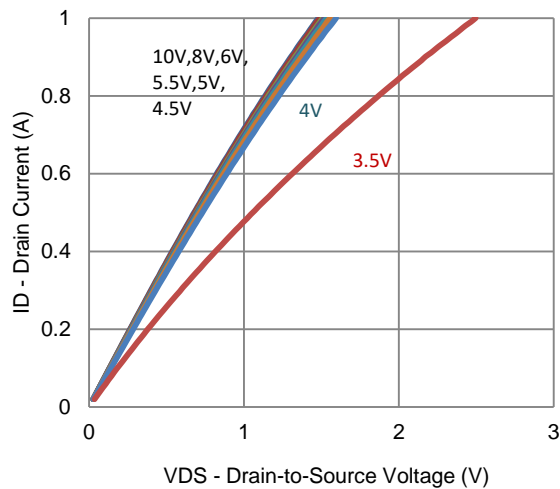
2. Transfer Characteristics



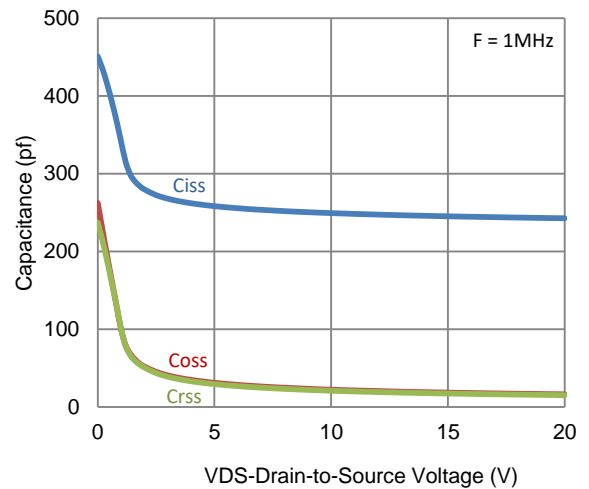
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

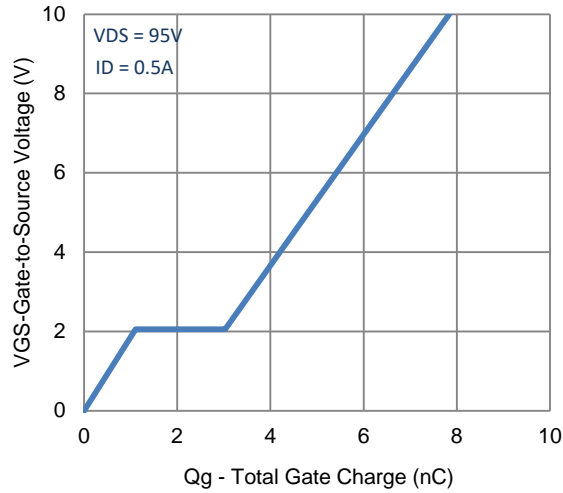


5. Output Characteristics

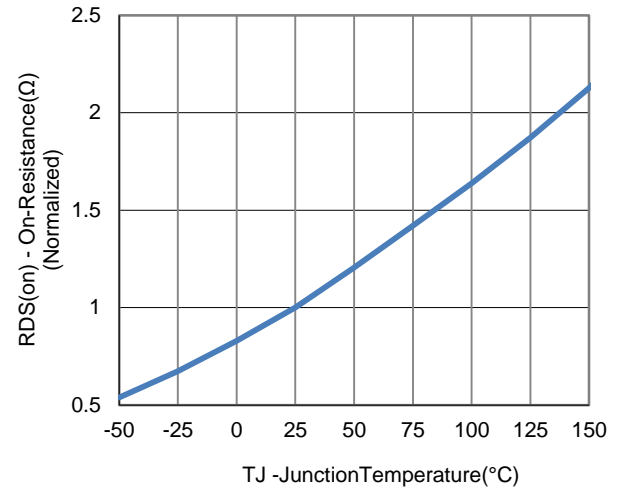


6. Capacitance

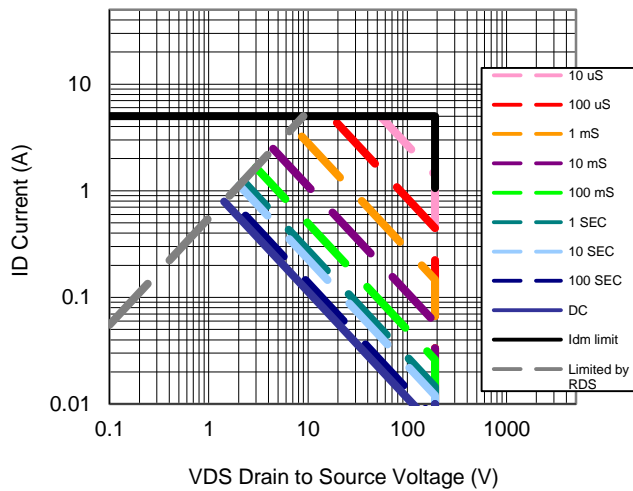
Typical Electrical Characteristics



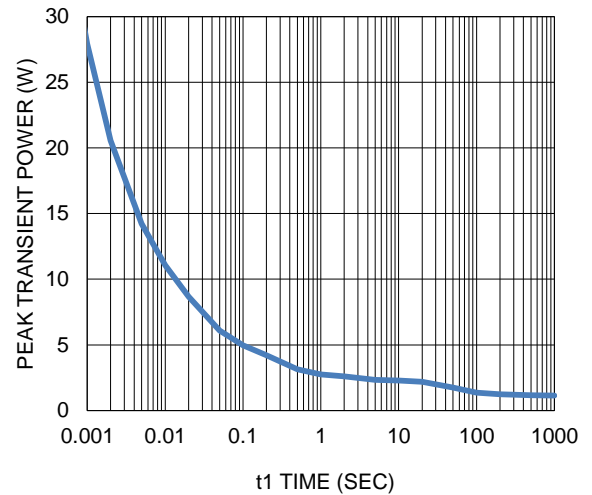
7. Gate Charge



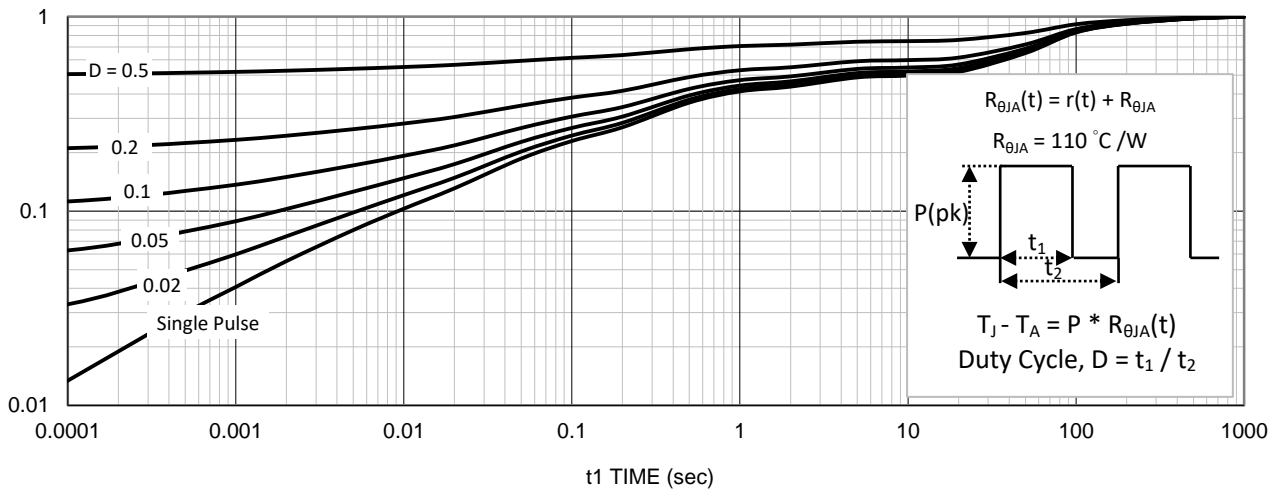
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

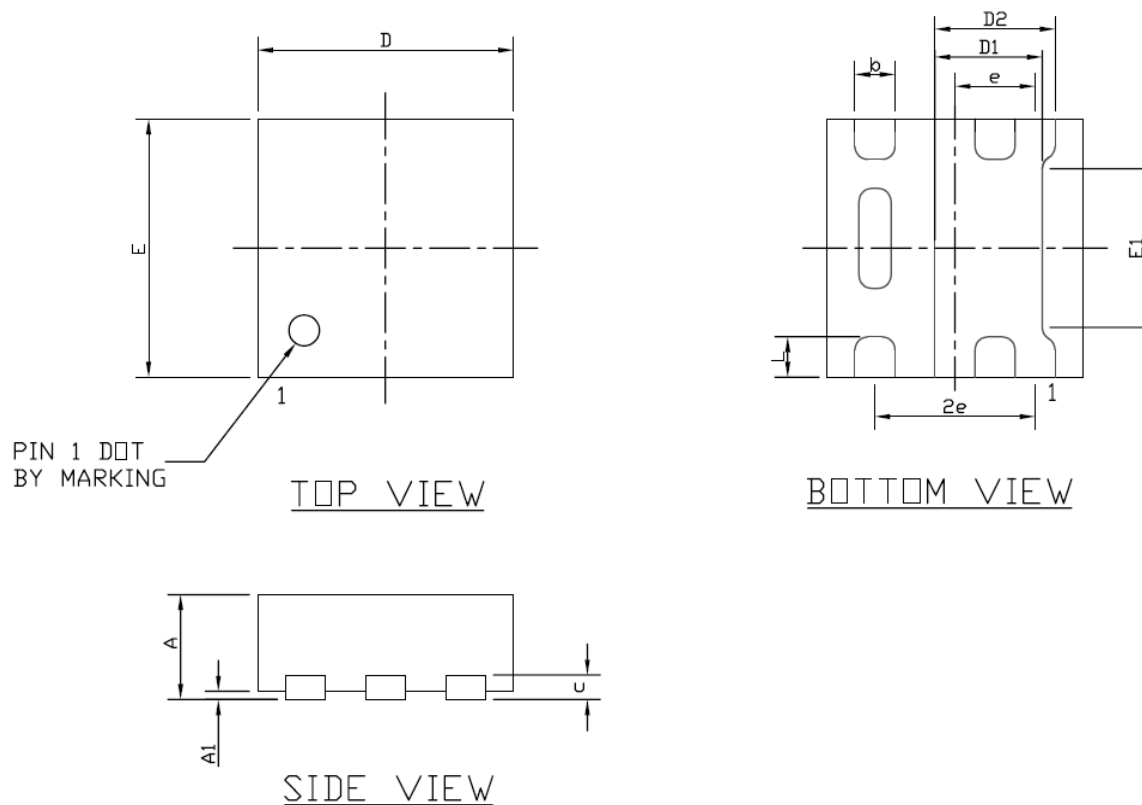


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.022	0.024
A1	0.00	---	0.05	0.000	---	0.002
b	0.22	0.25	0.28	0.009	0.010	0.011
c	0.152 Ref.			0.006 Ref.		
D	1.55	1.60	1.65	0.061	0.063	0.065
D1	0.67 TYP			0.026 TYP		
D2	0.75 TYP			0.030 TYP		
E	1.55	1.60	1.65	0.061	0.063	0.065
E1	0.98 TYP			0.039 TYP		
e	0.50 BSC			0.020 BSC		
L	0.20	0.25	0.30	0.008	0.010	0.012