

N-Channel 40-V (D-S) MOSFET

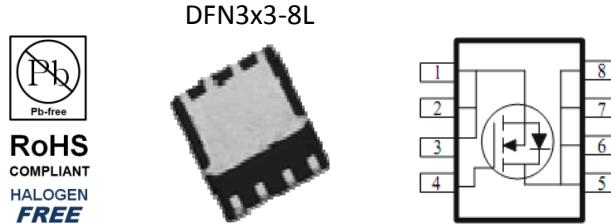
Key Features:

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

Typical Applications:

- Automotive Systems
- DC/DC Conversion Circuits
- Battery Powered Power Tools

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
40	7 @ $V_{GS} = 10V$	18
	10 @ $V_{GS} = 4.5V$	15



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current ^a	$T_A = 25^\circ C$	I_D	18	A
	$T_A = 70^\circ C$		14	
Pulsed Drain Current ^b		I_{DM}	70	
Continuous Source Current (Diode Conduction) ^a		I_S	4.6	
Power Dissipation ^a	$T_A = 25^\circ C$	P_D	3.5	W
	$T_A = 70^\circ C$		2	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	°C

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 10 \text{ sec}$	$R_{\theta JA}$	35	°C/W
	Steady State		81	

Notes

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

Electrical Characteristics

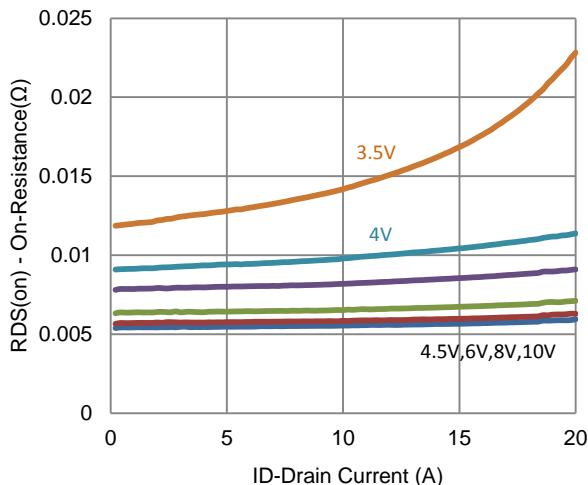
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V$, $V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32 V$, $V_{GS} = 0 V$			1	uA
		$V_{DS} = 32 V$, $V_{GS} = 0 V$, $T_J = 55^\circ C$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V$, $V_{GS} = 10 V$	25			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V$, $I_D = 6 A$			7	mΩ
		$V_{GS} = 4.5 V$, $I_D = 4.8 A$			10	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V$, $I_D = 6 A$		7		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.3 A$, $V_{GS} = 0 V$		0.78		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 20 V$, $V_{GS} = 4.5 V$, $I_D = 6 A$		18		nC
Gate-Source Charge	Q_{gs}			5.3		
Gate-Drain Charge	Q_{gd}			6.8		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 V$, $R_L = 3.4 \Omega$, $I_D = 6 A$, $V_{GEN} = 10 V$, $R_{GEN} = 6 \Omega$		15		ns
Rise Time	t_r			9		
Turn-Off Delay Time	$t_{d(off)}$			60		
Fall Time	t_f			15		
Input Capacitance	C_{iss}	$V_{DS} = 15 V$, $V_{GS} = 0 V$, $f = 1 \text{ MHz}$		2710		pF
Output Capacitance	C_{oss}			208		
Reverse Transfer Capacitance	C_{rss}			164		

Notes

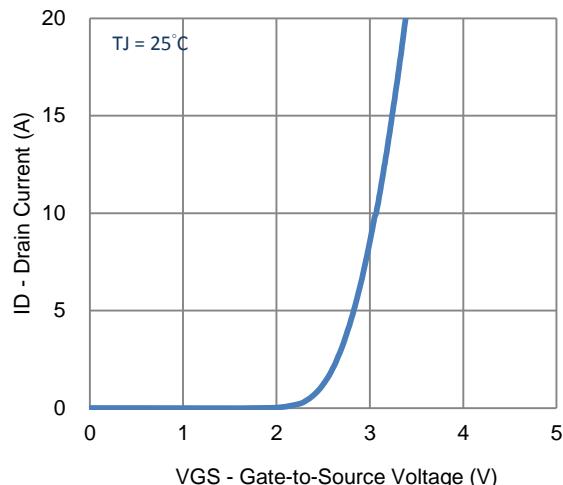
- a. Pulse test: PW <= 300μs duty cycle <= 2%.
- b. Guaranteed by design, not subject to production testing.

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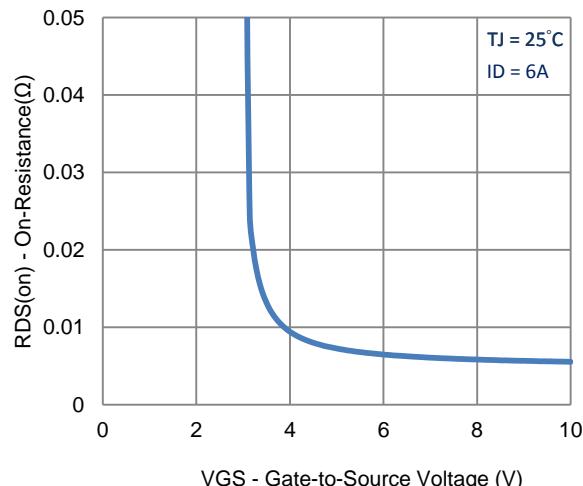
Typical Electrical Characteristics



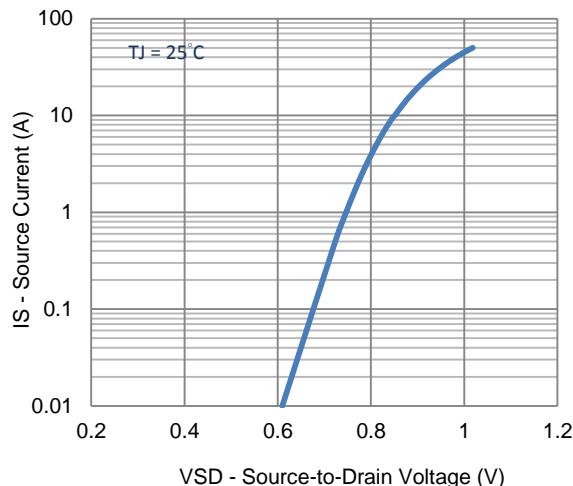
1. On-Resistance vs. Drain Current



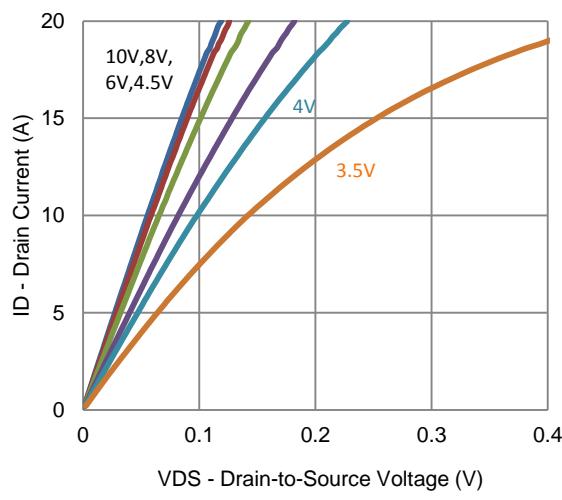
2. Transfer Characteristics



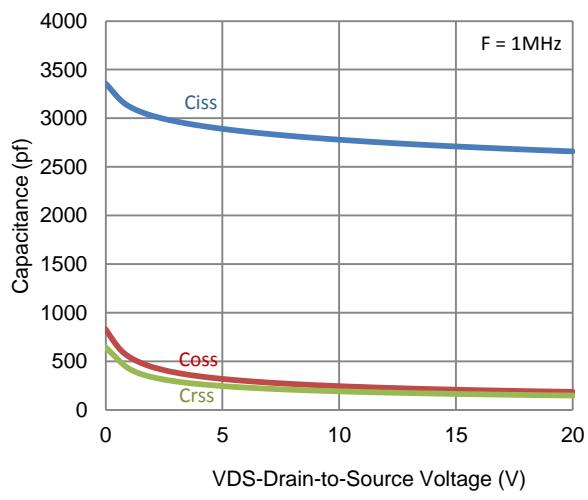
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

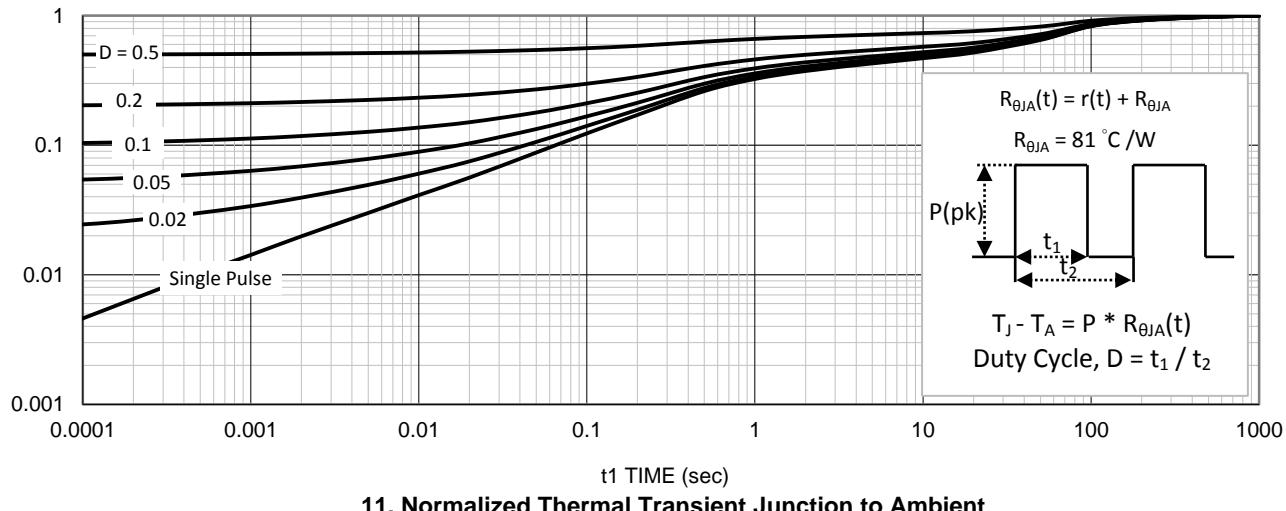
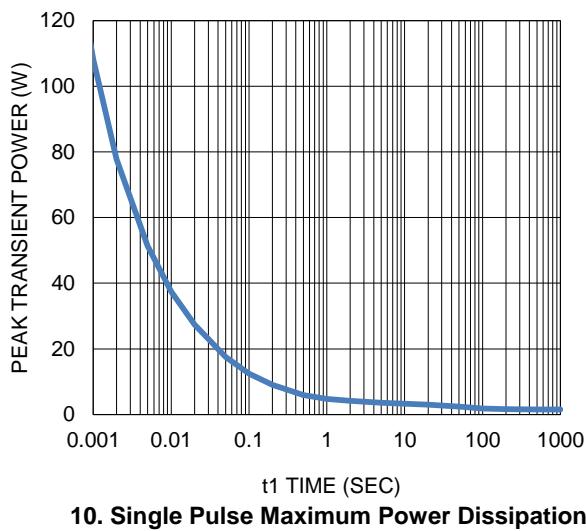
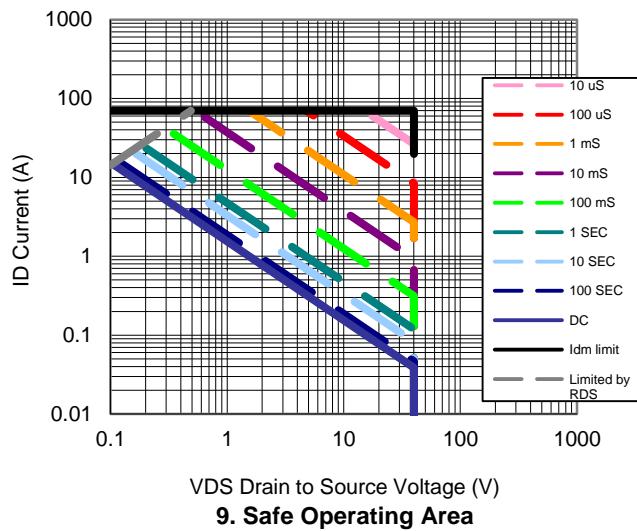
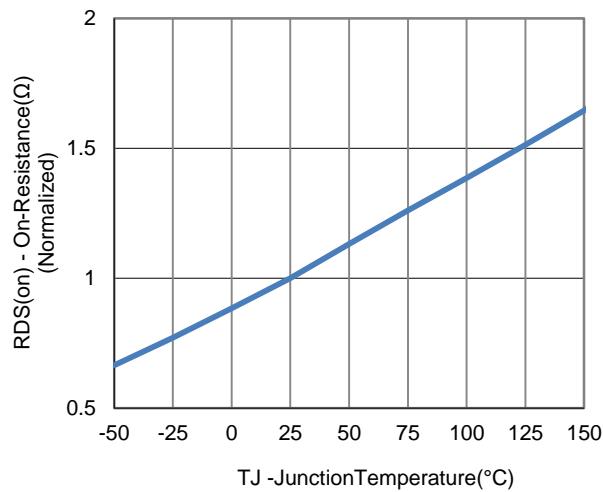
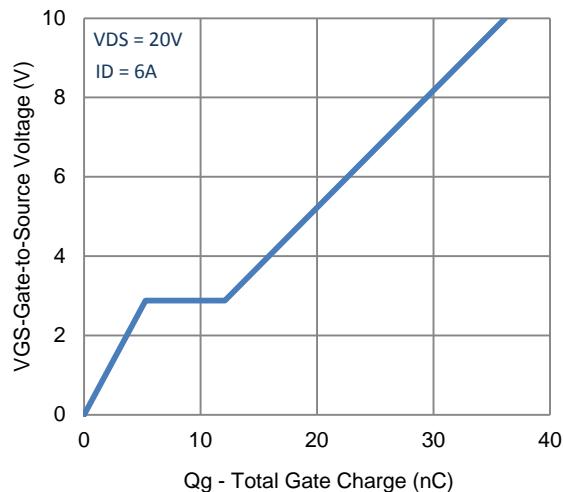


5. Output Characteristics

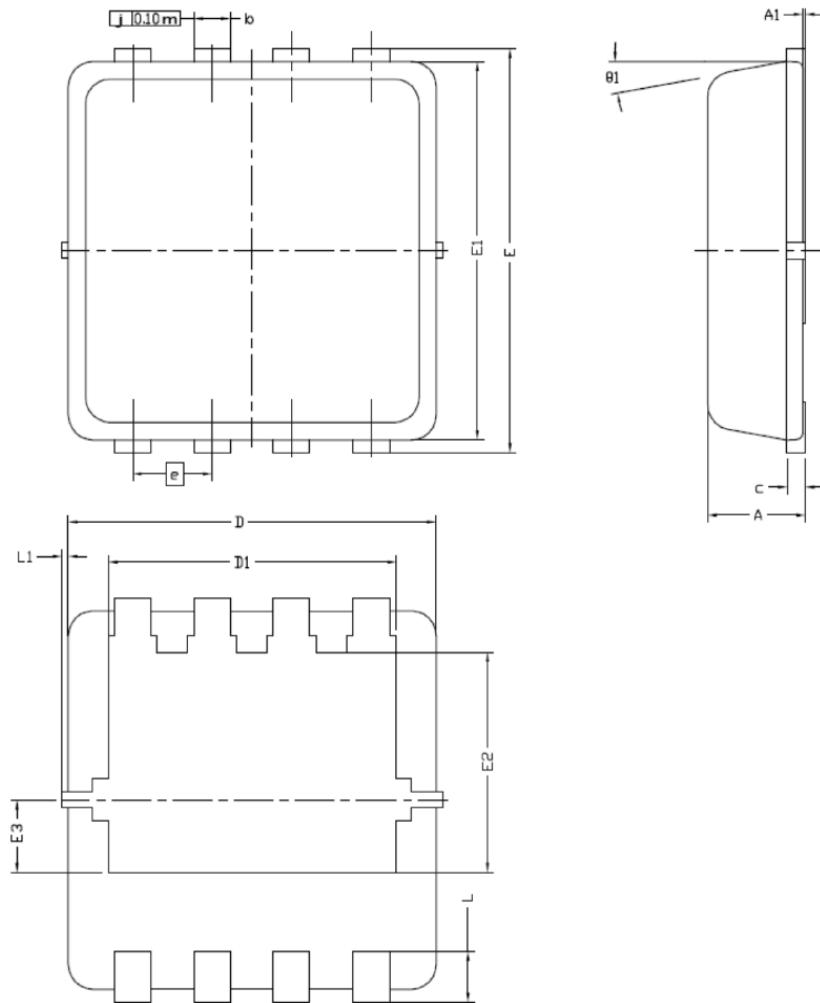


6. Capacitance

Typical Electrical Characteristics



Package Information



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
<i>A</i>	0,700	0,80	0,900	0,0276	0,0315	0,0354
<i>A</i> 1	0,00	---	0,05	0,000	---	0,002
<i>b</i>	0,24	0,30	0,35	0,009	0,012	0,014
<i>c</i>	0,10	0,152	0,25	0,004	0,006	0,010
<i>D</i>	3,00 BSC			0,118 BSC		
<i>D</i> 1	2,35 BSC			0,093 BSC		
<i>E</i>	3,20 BSC			0,126 BSC		
<i>E</i> 1	3,00 BSC			0,118 BSC		
<i>E</i> 2	1,75 BSC			0,069 BSC		
<i>E</i> 3	0,575 BSC			0,023 BSC		
<i>e</i>	0,65 BSC			0,026 BSC		
<i>L</i>	0,30	0,40	0,50	0,0118	0,0157	0,0197
<i>L</i> 1	0	---	0,100	0	---	0,004
<i>θ</i> 1	0°	10°	12°	0°	10°	12°