

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

### Key Features:

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

### Typical Applications:

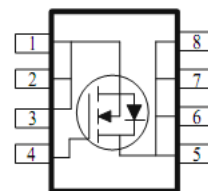
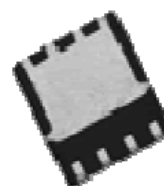
- Automotive Systems
- DC/DC Conversion Circuits
- Battery Powered Power Tools

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



RoHS  
COMPLIANT  
HALOGEN  
FREE

DFN3x3-8L



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	40	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	18	A
	$T_A = 70^\circ\text{C}$		14	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	70	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	4.6	A
Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	3.5	W
	$T_A = 70^\circ\text{C}$		2	
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 <sup>a</sup>	$t \leq 10 \text{ sec}$	$R_{\theta JA}$	35	$^\circ\text{C/W}$
	Steady State		81	

### Notes

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

## Electrical Characteristics

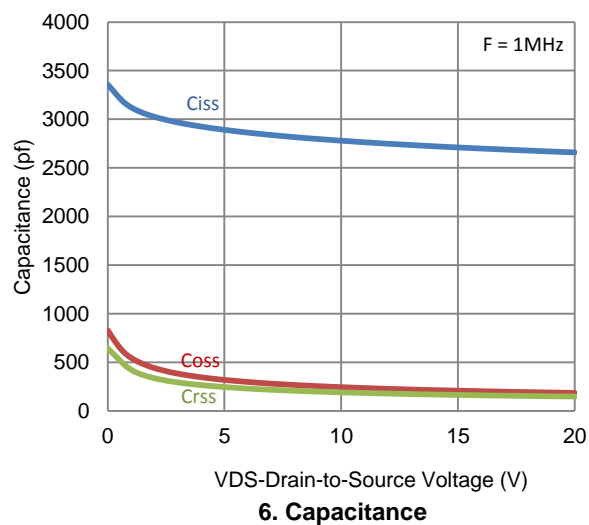
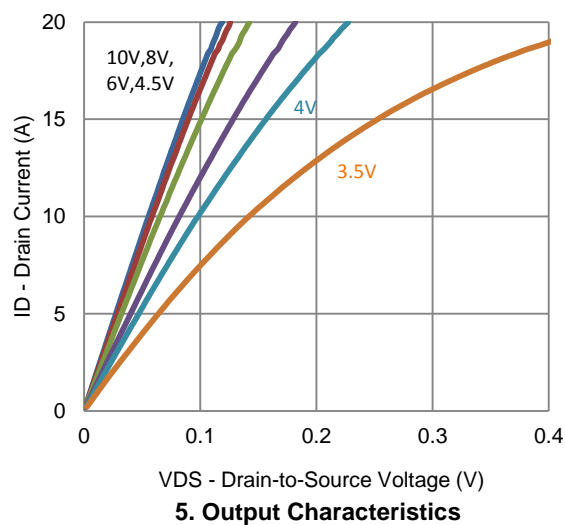
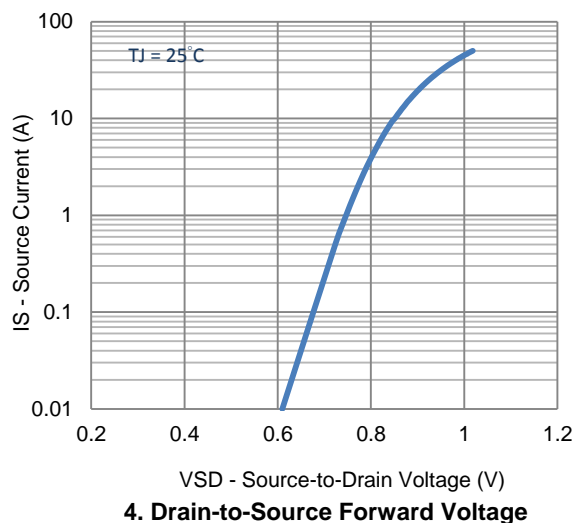
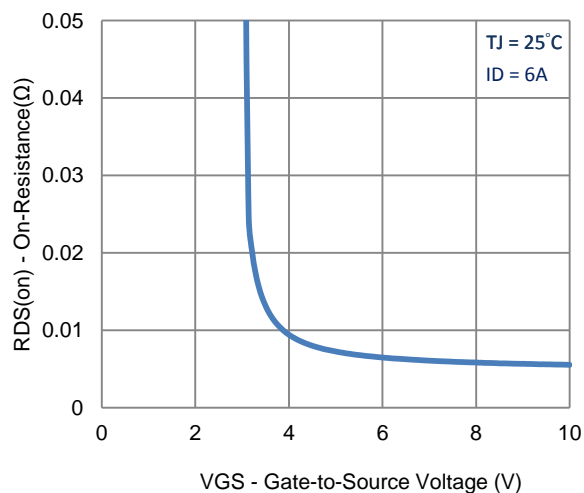
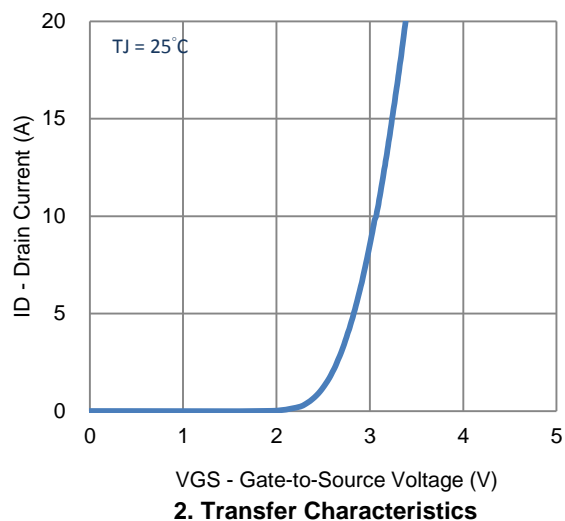
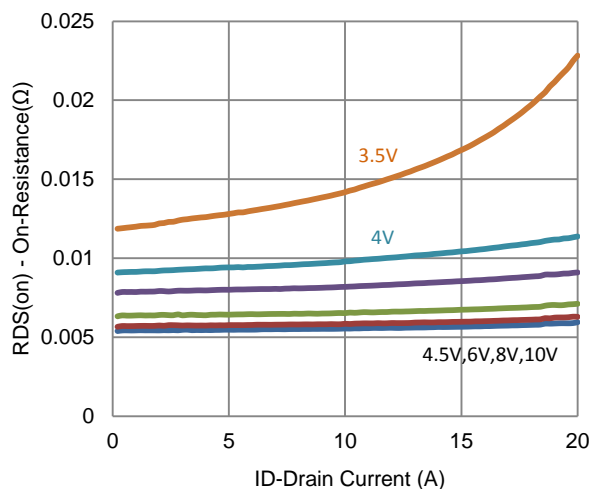
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 32 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	25			A
Drain-Source On-Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 6 A$			7	mΩ
		$V_{GS} = 4.5 V, I_D = 4.8 A$			10	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 V, I_D = 6 A$		7		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 2.3 A, V_{GS} = 0 V$		0.78		V
<b>Dynamic <sup>b</sup></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

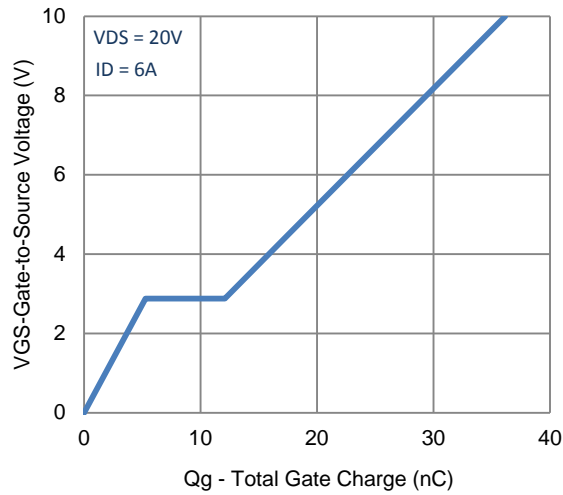
- a. Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

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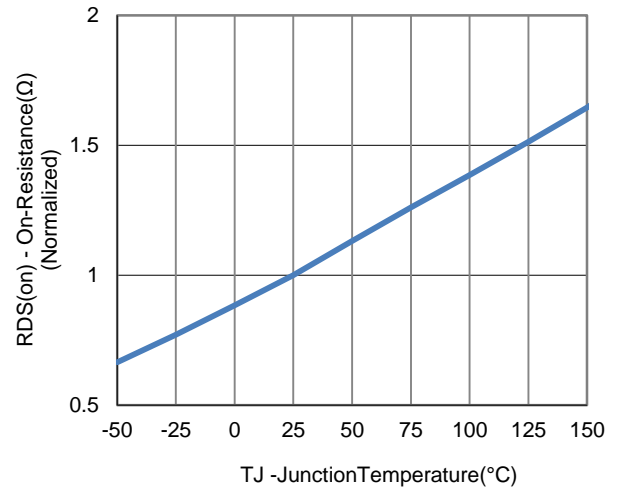
## Typical Electrical Characteristics



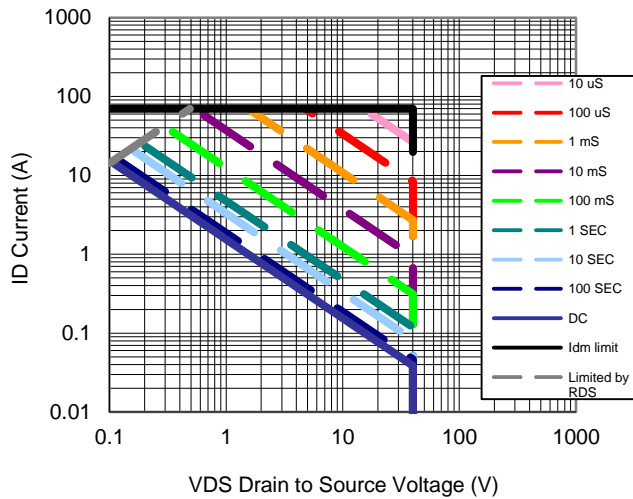
## Typical Electrical Characteristics



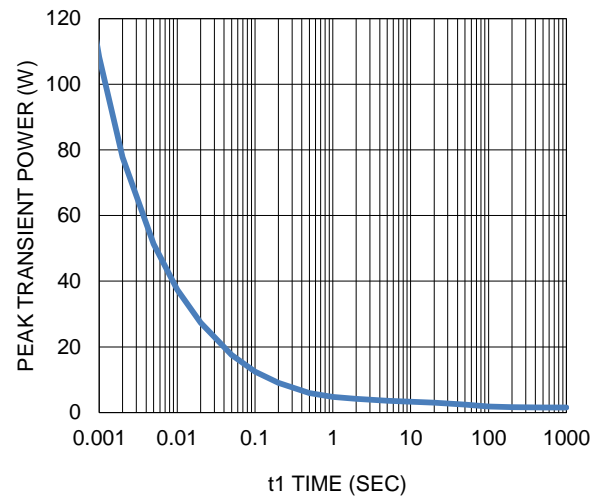
7. Gate Charge



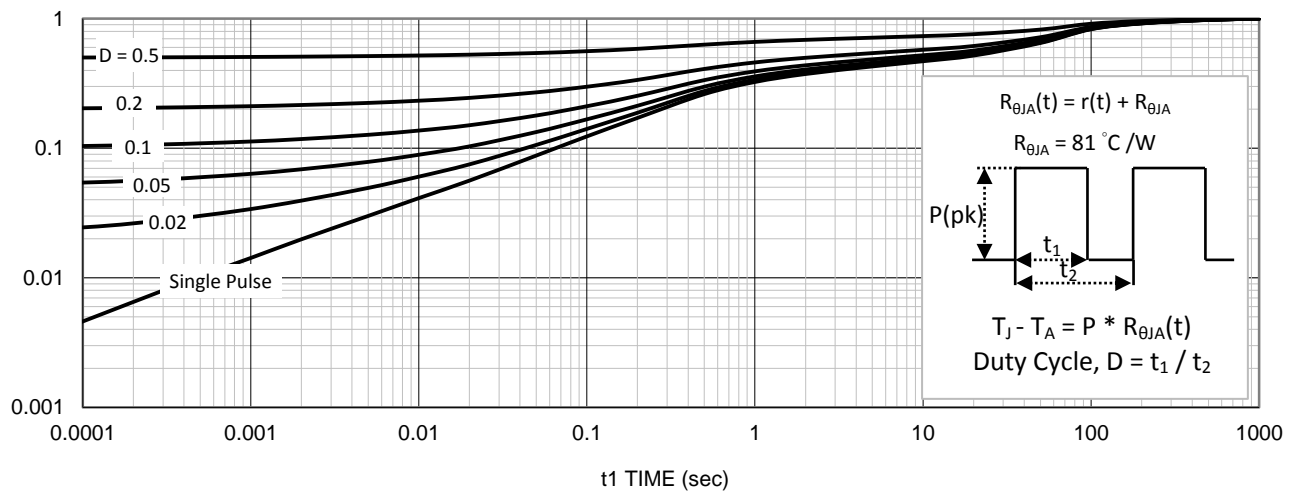
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

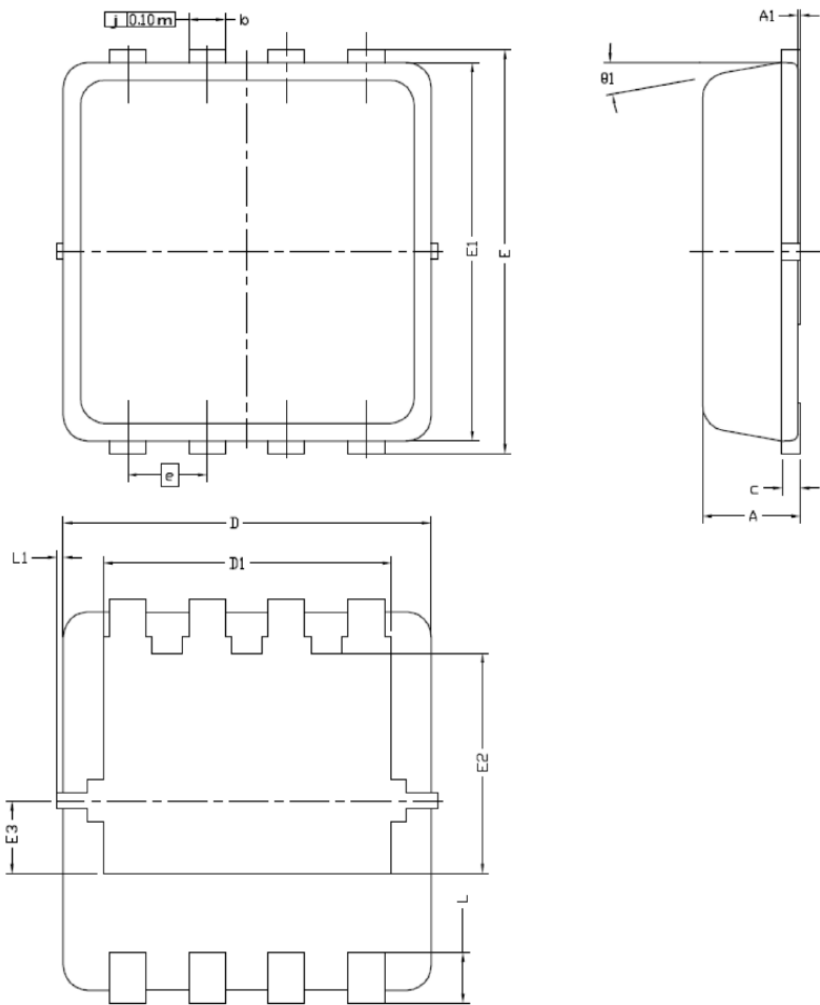


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



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	0.10	0.152	0.25	0.004	0.006	0.010
D	3.00 BSC			0.118 BSC		
D1	2.35 BSC			0.093 BSC		
E	3.20 BSC			0.126 BSC		
E1	3.00 BSC			0.118 BSC		
E2	1.75 BSC			0.069 BSC		
E3	0.575 BSC			0.023 BSC		
e	0.65 BSC			0.026 BSC		
L	0.30	0.40	0.50	0.0118	0.0157	0.0197
L1	0	---	0.100	0	---	0.004
θ1	0°	10°	12°	0°	10°	12°