

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

### Key Features:

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

### Typical Applications:

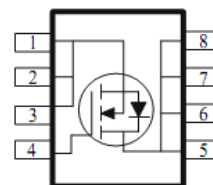
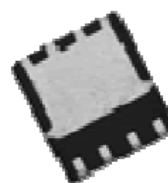
- DC/DC Conversion
- Power Routing
- Motor Drives

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
40	10 @ $V_{GS} = 10V$	44
	13 @ $V_{GS} = 4.5V$	38



**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	$T_C = 25^\circ\text{C}$	$I_D$	44	A
	$T_C = 70^\circ\text{C}$		35	
	$T_A = 25^\circ\text{C}$		15 <sup>a</sup>	
	$T_A = 70^\circ\text{C}$		12 <sup>a</sup>	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	60	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	4.5	
Power Dissipation	$T_C = 25^\circ\text{C}$	$P_D$	29	W
	$T_C = 70^\circ\text{C}$		18	
	$T_A = 25^\circ\text{C}$		3.5 <sup>a</sup>	
	$T_A = 70^\circ\text{C}$		2 <sup>a</sup>	
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>	$t \leq 10$ sec	$R_{\theta JA}$	35	$^\circ\text{C/W}$
	Steady State		81	
Maximum Junction-to-Case	Steady State	$R_{\theta JC}$	4.4	

### Notes

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

## Electrical Characteristics

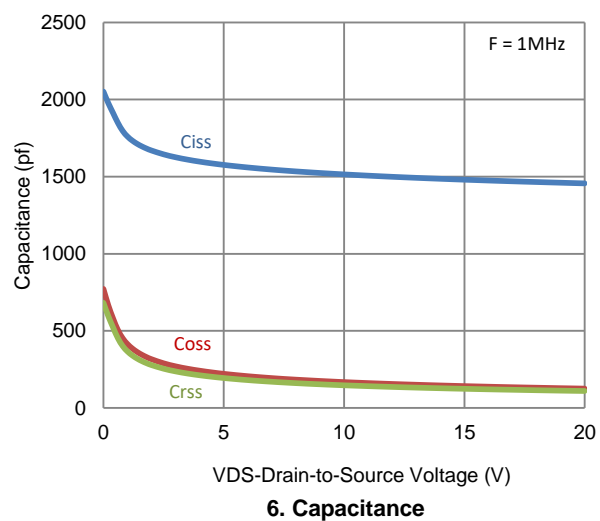
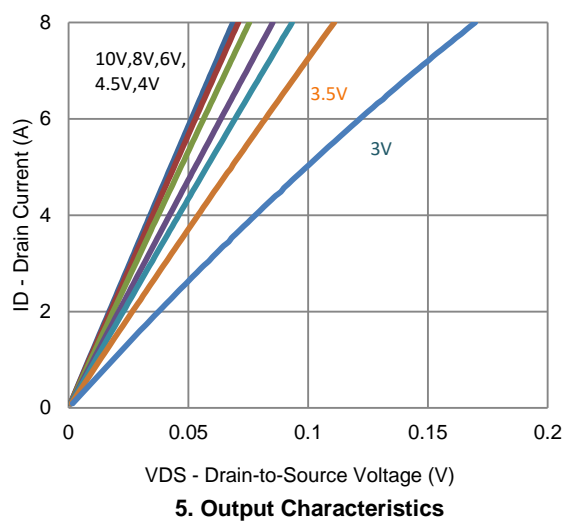
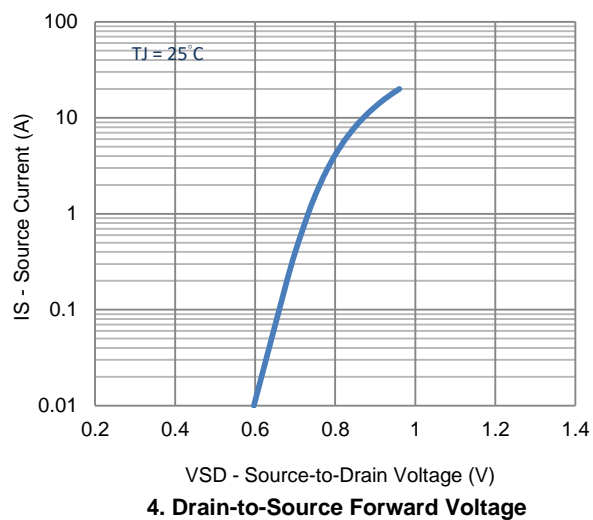
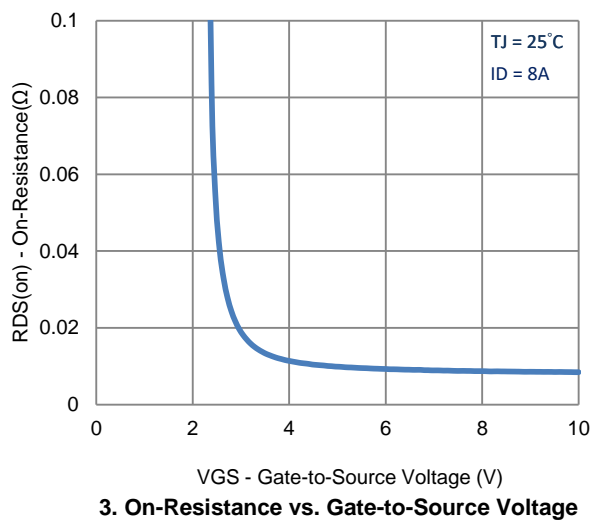
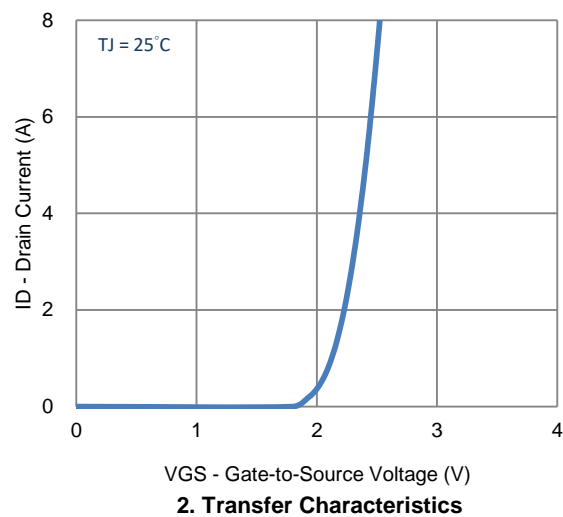
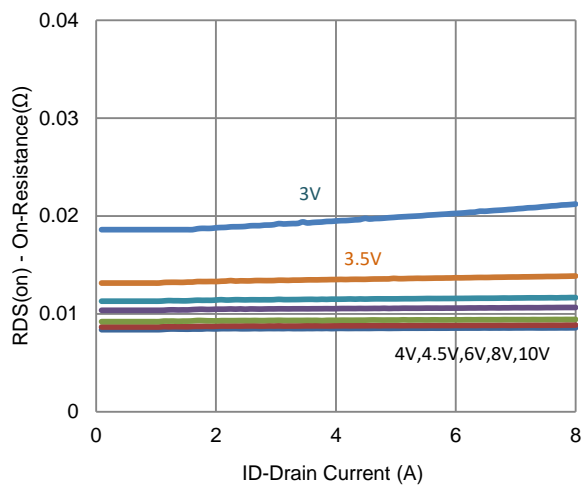
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 32 V, V_{GS} = 0 V$			1	$\mu A$
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	20			A
Drain-Source On-Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 8 A$			10	m $\Omega$
		$V_{GS} = 4.5 V, I_D = 6 A$			13	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 V, I_D = 8 A$		28		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 2.2 A, V_{GS} = 0 V$		0.77		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 20 V, V_{GS} = 4.5 V,$ $I_D = 8 A$		15		nC
Gate-Source Charge	$Q_{gs}$			3.9		
Gate-Drain Charge	$Q_{gd}$			5.2		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 V, R_L = 2.5 \Omega,$ $I_D = 8 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		5		ns
Rise Time	$t_r$			9		
Turn-Off Delay Time	$t_{d(off)}$			47		
Fall Time	$t_f$			15		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		1480		pF
Output Capacitance	$C_{oss}$			142		
Reverse Transfer Capacitance	$C_{rss}$			124		

## Notes

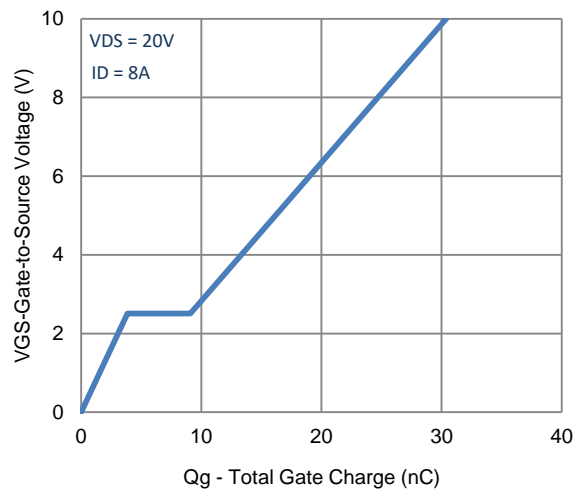
- Pulse test: PW ≤ 300us duty cycle ≤ 2%.
- Guaranteed by design, not subject to production testing.

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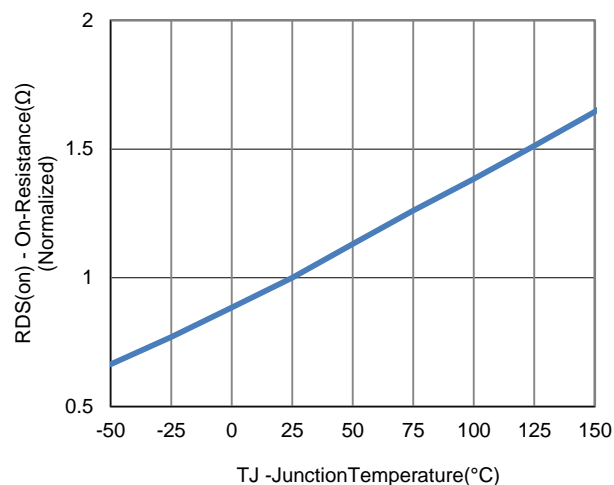
## Typical Electrical Characteristics



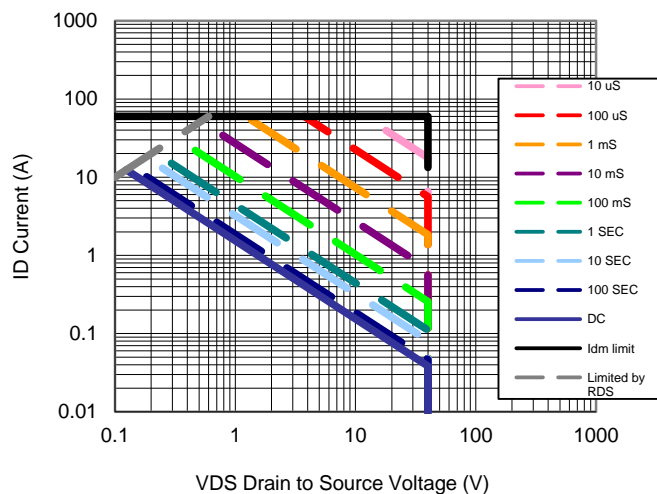
## Typical Electrical Characteristics



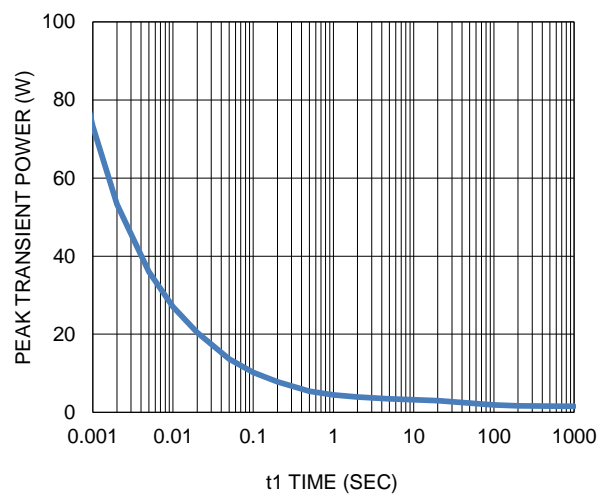
7. Gate Charge



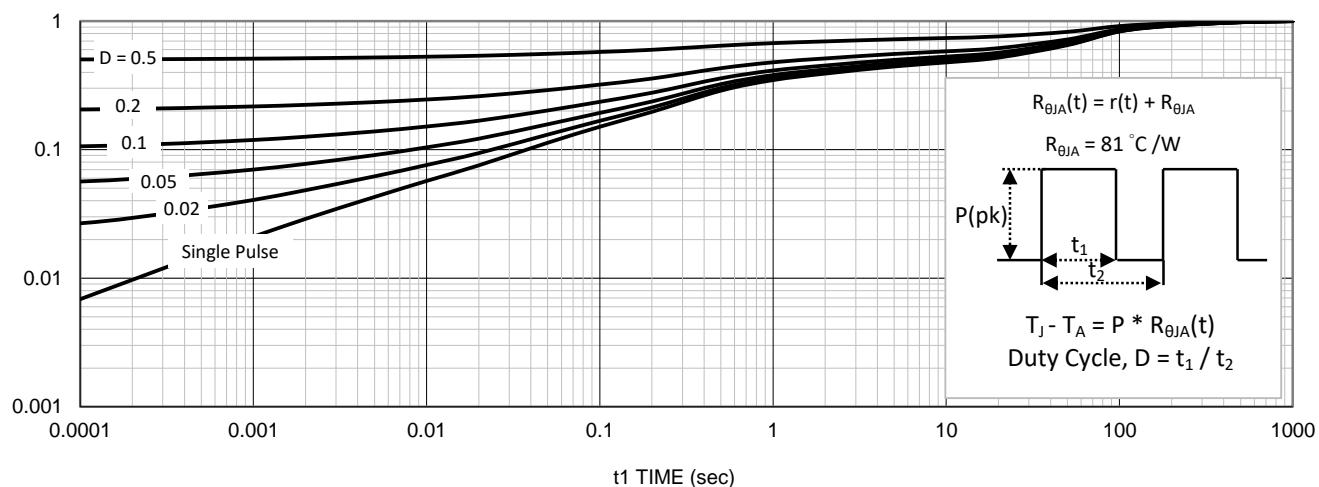
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

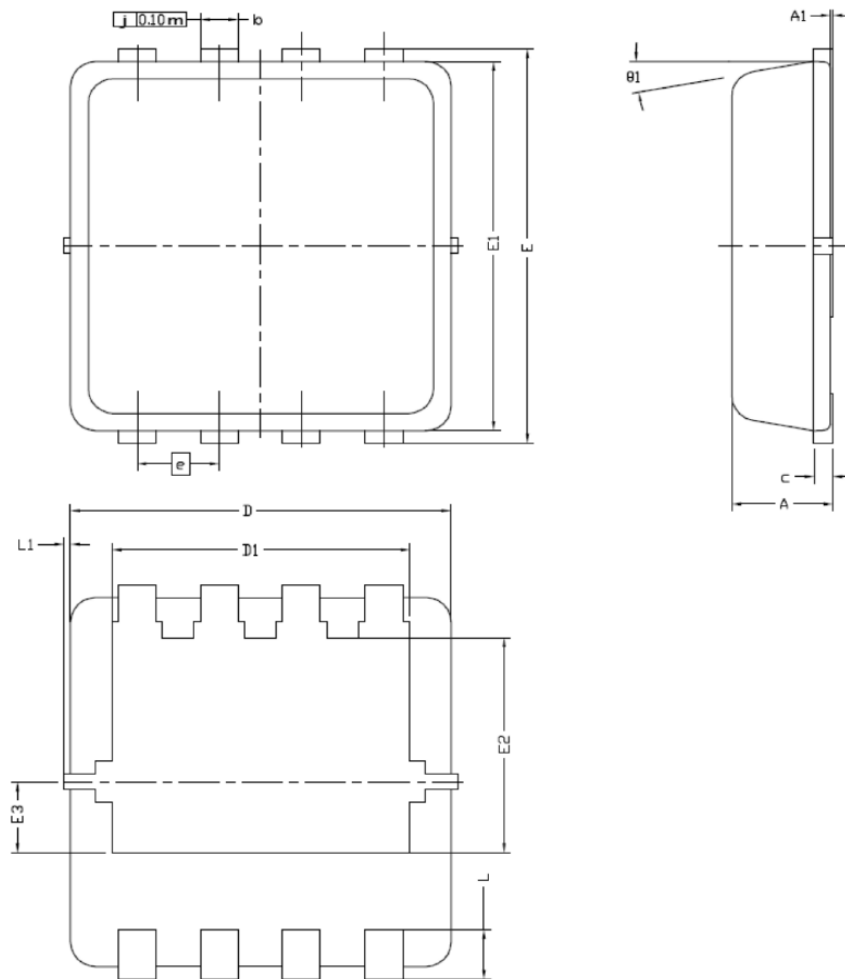


10. Single Pulse Maximum Power Dissipation



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°