

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

Key Features:

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

Typical Applications:

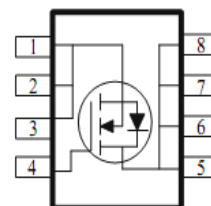
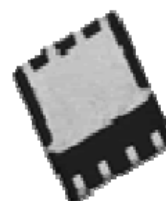
- DC/DC Conversion
- Power Routing
- Motor Drives

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
40	9 @ $V_{GS} = 10V$	20
	12 @ $V_{GS} = 4.5V$	17

DFN5X6-8L



RoHS
COMPLIANT
HALOGEN
FREE



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}	± 20	
Continuous Drain Current ^a	I_D	$T_A = 25^\circ\text{C}$	20
		$T_A = 70^\circ\text{C}$	16
Pulsed Drain Current ^b	I_{DM}	80	A
Continuous Source Current (Diode Conduction) ^a	I_S	6.3	A
Power Dissipation ^a	P_D	$T_A = 25^\circ\text{C}$	5
		$T_A = 70^\circ\text{C}$	3.2
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 ^a	$R_{\theta JA}$	t \leq 10 sec	25
		Steady State	65

Notes

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

Electrical Characteristics

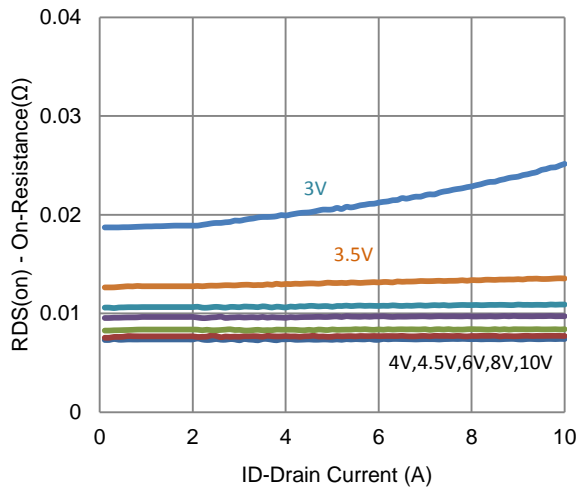
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 32 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55^\circ C$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 10 V$	30			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 10 A$			9	m Ω
		$V_{GS} = 4.5 V, I_D = 8 A$			12	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 10 A$		9		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 3.2 A, V_{GS} = 0 V$		0.77		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 20 V, V_{GS} = 4.5 V,$ $I_D = 10 A$		20		nC
Gate-Source Charge	Q_{gs}			4.4		
Gate-Drain Charge	Q_{gd}			10.1		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 20 V, R_L = 2 \Omega,$ $I_D = 10 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		7		ns
Rise Time	t_r			22		
Turn-Off Delay Time	$t_{d(off)}$			66		
Fall Time	t_f			25		
Input Capacitance	C_{iss}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		1987		pF
Output Capacitance	C_{oss}			253		
Reverse Transfer Capacitance	C_{rss}			216		

Notes

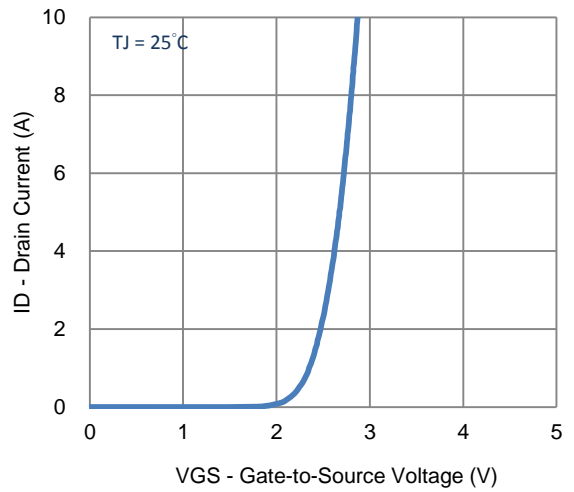
- Pulse test: PW \leq 300us duty cycle \leq 2%.
- Guaranteed by design, not subject to production testing.

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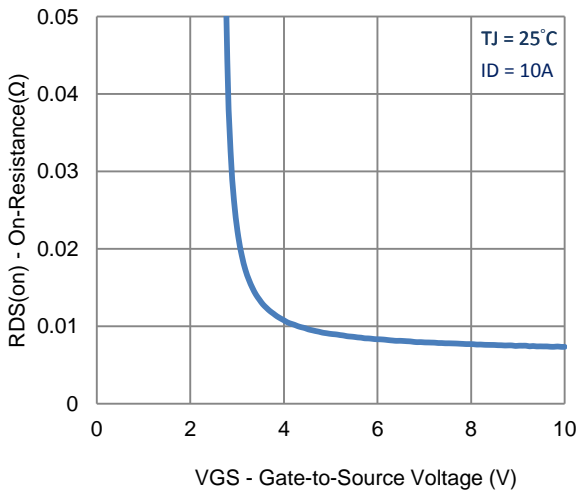
Typical Electrical Characteristics



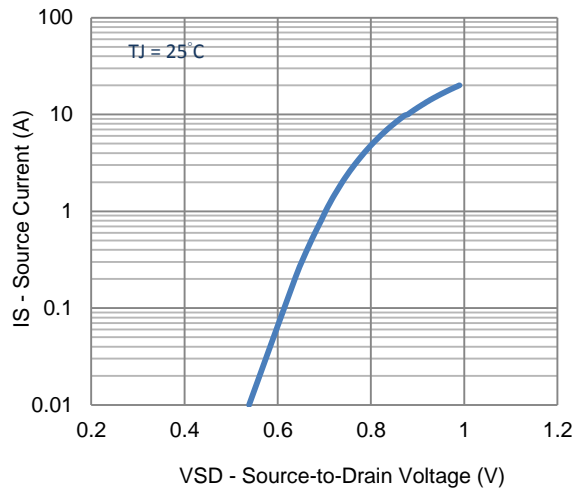
1. On-Resistance vs. Drain Current



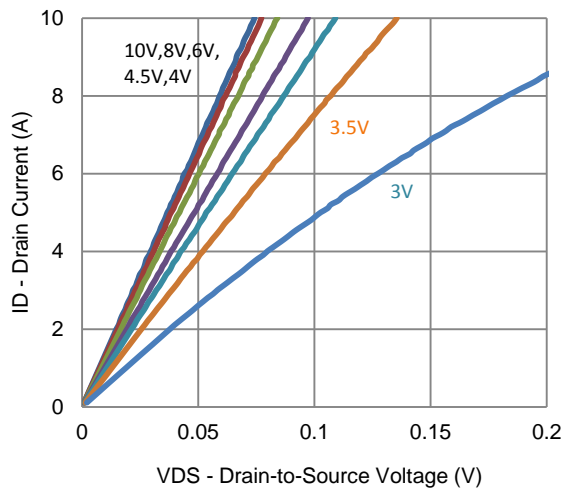
2. Transfer Characteristics



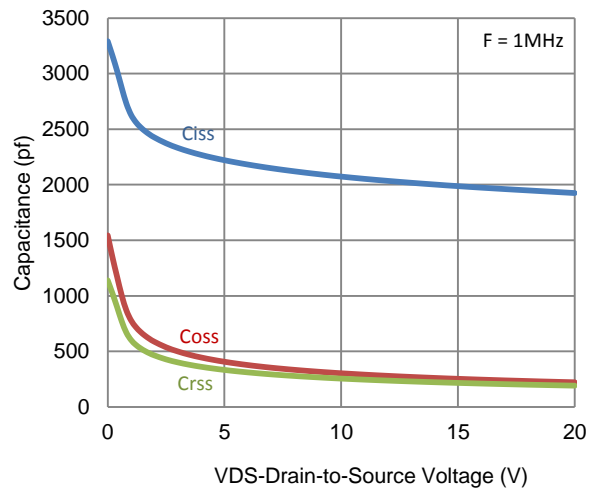
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

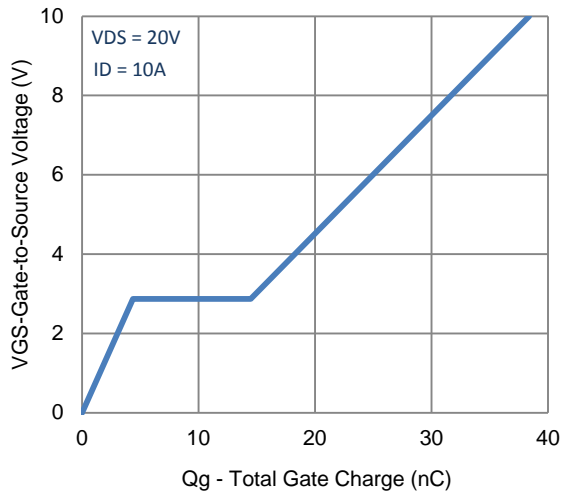


5. Output Characteristics

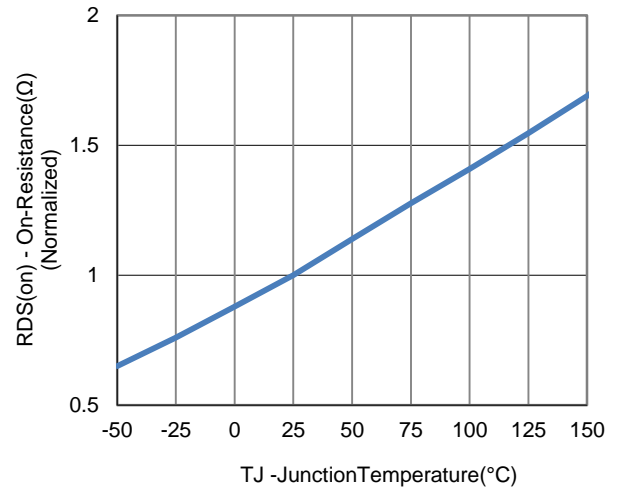


6. Capacitance

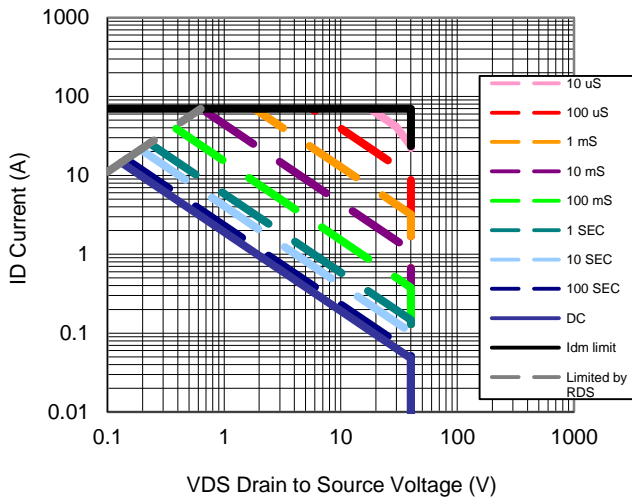
Typical Electrical Characteristics



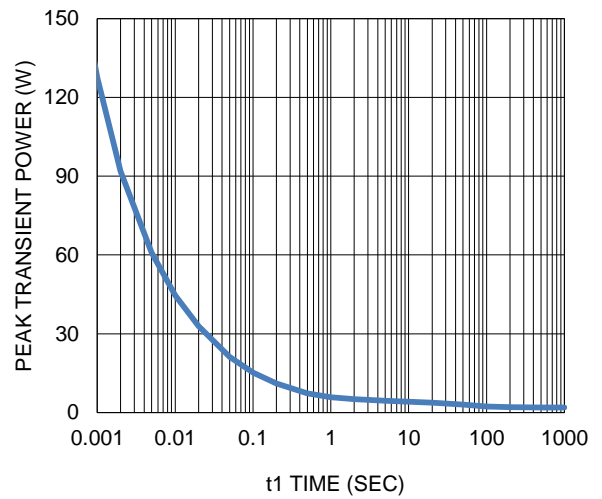
7. Gate Charge



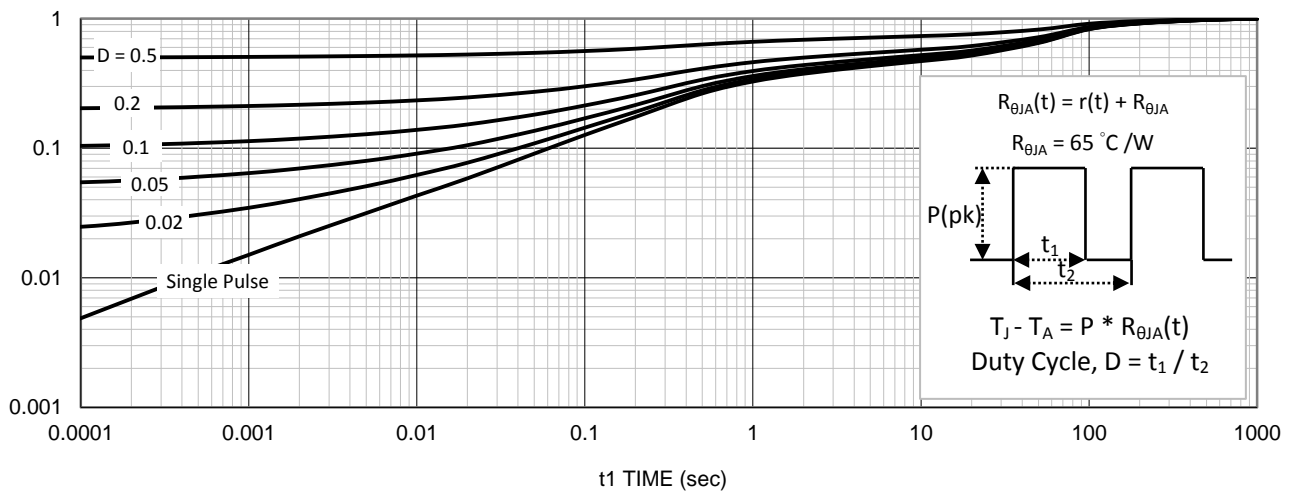
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

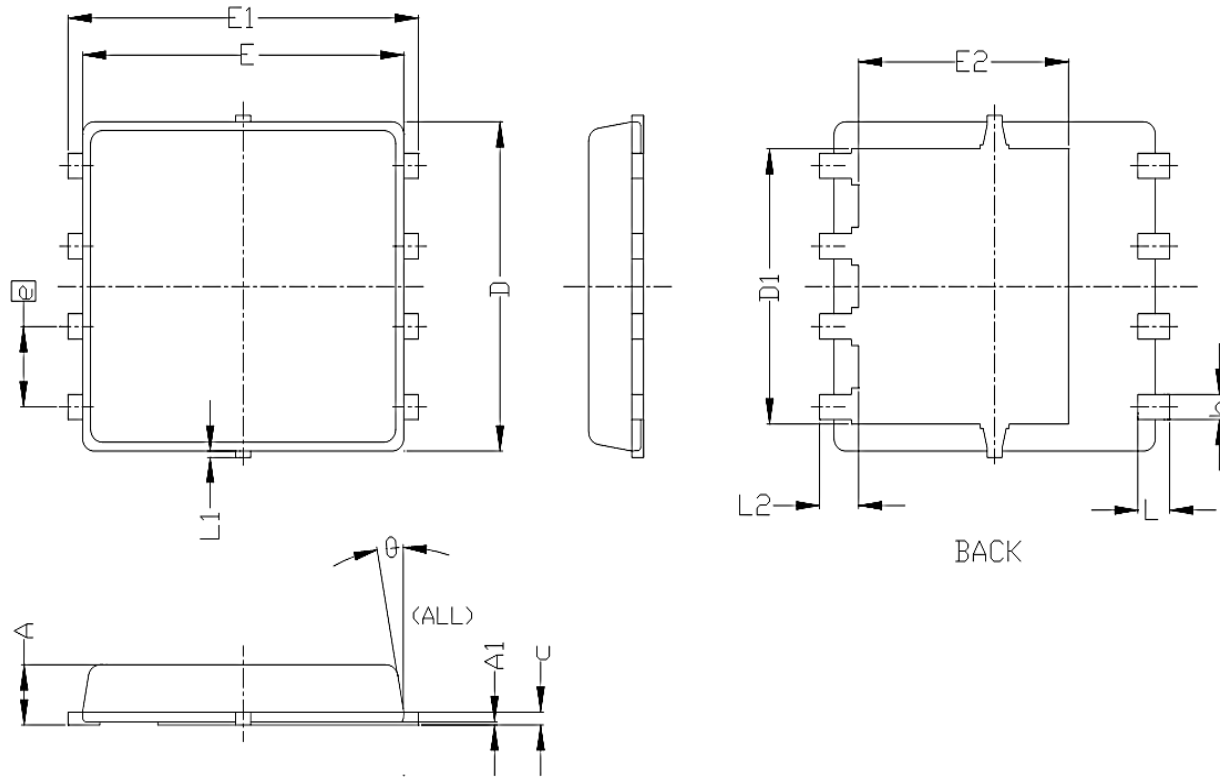


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	---	0.05	0.000	---	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D1	4.35 BSC			0.171 BSC		
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	3.62 BSC			0.143 BSC		
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	---	0.15	0	---	0.006
L2	0.68 REF			0.027 REF		
θ	0°	---	10°	0°	---	10°