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

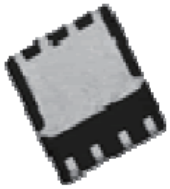
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

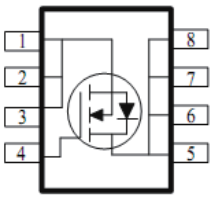
Typical Applications:
- DC/DC Conversion
- Power Routing
- Motor Drives

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
40	5.5 @ V_{GS} = 10V	25
	7 @ V_{GS} = 4.5V	22

Pb-free
RoHS
COMPLIANT
HALOGEN
FREE

DFN5X6-8L





ABSOLUTE MAXIMUM RATINGS (T_A = 25°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°C	I_D	25	A
	T_A=70°C		20	
Pulsed Drain Current [b]		I_{DM}	50	
Continuous Source Current (Diode Conduction) [a]		I_S	7.3	A
Power Dissipation [a]	T_A=25°C	P_D	5	W
	T_A=70°C		3.2	
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 <= 10 sec	$R_{\theta JA}$	25	°C/W
	Steady State		65	

Notes

a. Surface Mounted on 1” x 1” FR4 Board.

b. Pulse width limited by maximum junction temperature

Electrical Characteristics

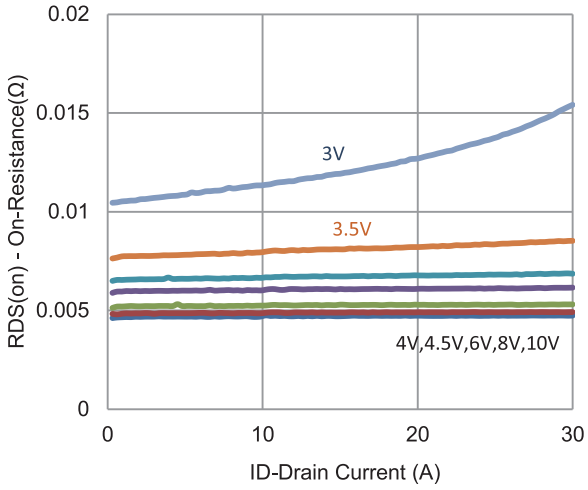
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32 V, V_{GS} = 0 V			1	uA
		V_{DS} = 32 V, V_{GS} = 0 V, T_J = 55°C			25	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} = 5 V, V_{GS} = 10 V	40			A
Drain-Source On-Resistance [a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A			5.5	mΩ
		V_{GS} = 4.5 V, I_D = 16 A			7	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A		23		S
Diode Forward Voltage [a]	V_{SD}	I_S = 3.65 A, V_{GS} = 0 V		0.75		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = 20 V, V_{GS} = 4.5 V, I_D = 20 A		32		nC
Gate-Source Charge	Q_{gs}			12		
Gate-Drain Charge	Q_{gd}			10		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 20 V, R_L = 1 Ω, I_D = 20 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		10		ns
Rise Time	t_r			13		
Turn-Off Delay Time	$t_{d(off)}$			86		
Fall Time	t_f			24		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		2829		pF
Output Capacitance	C_{oss}			289		
Reverse Transfer Capacitance	C_{rss}			250		

Notes

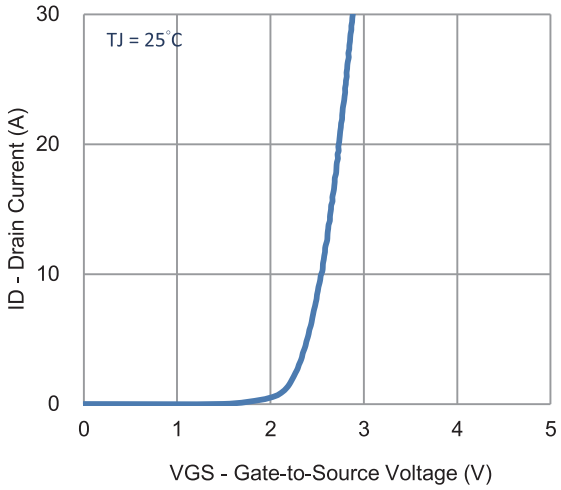
a. Pulse test: PW <= 300us duty cycle <= 2%.

b. Guaranteed by design, not subject to production testing.

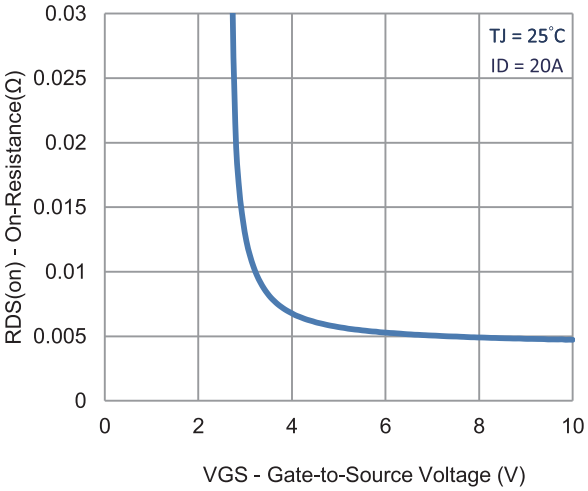
Typical Electrical Characteristics



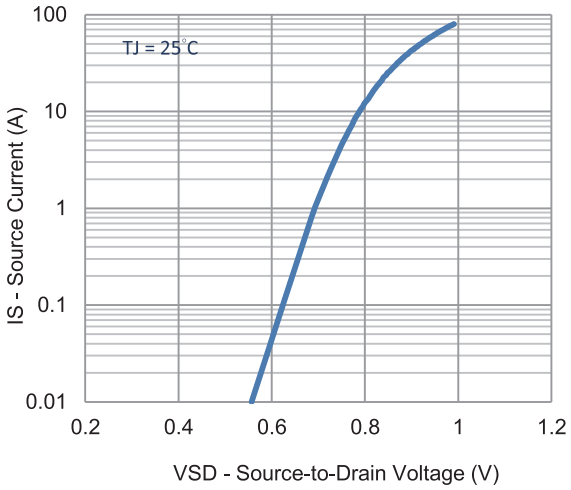
1. On-Resistance vs. Drain Current



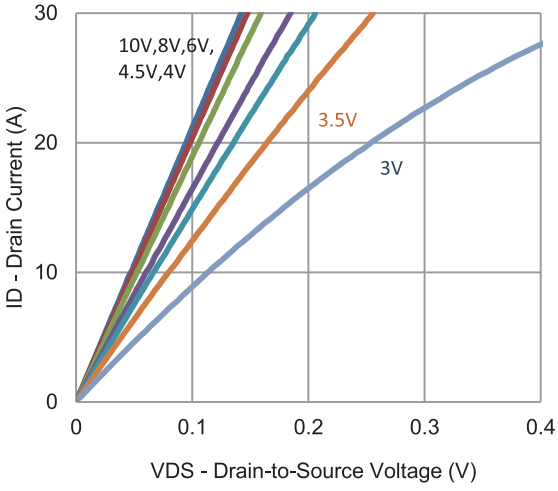
2. Transfer Characteristics



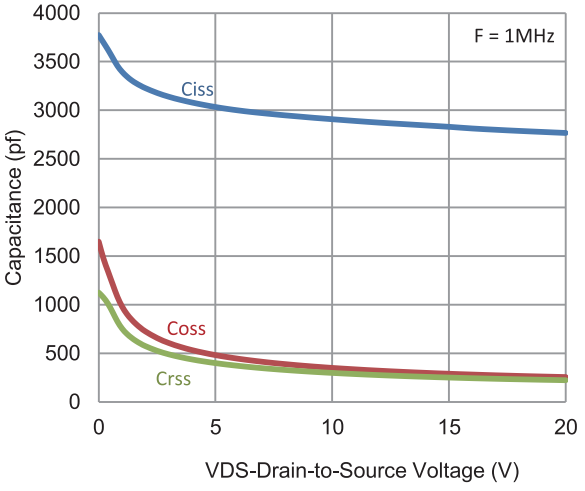
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

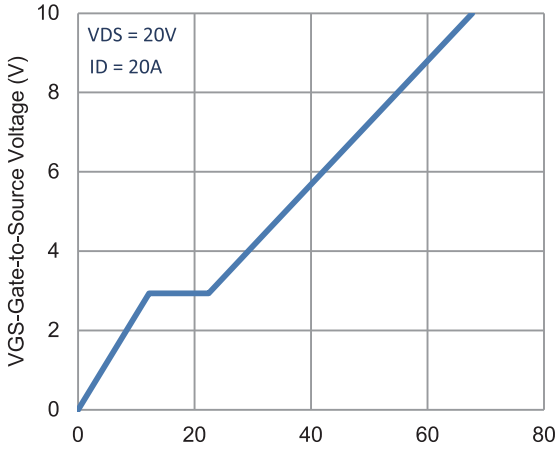


5. Output Characteristics

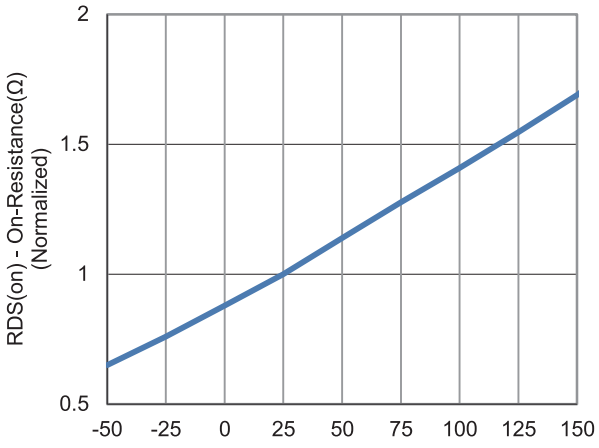


6. Capacitance

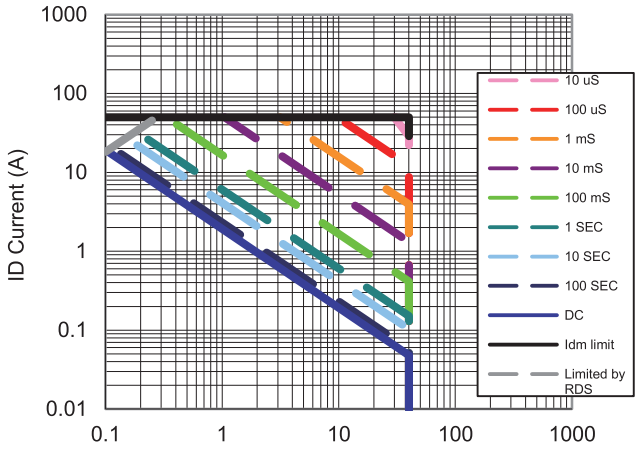
Typical Electrical Characteristics



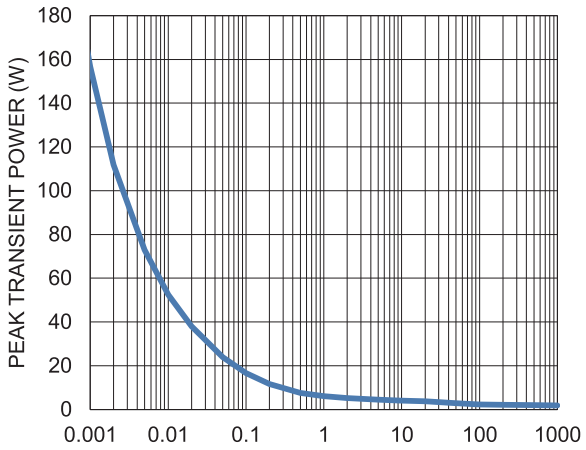
7. Gate Charge



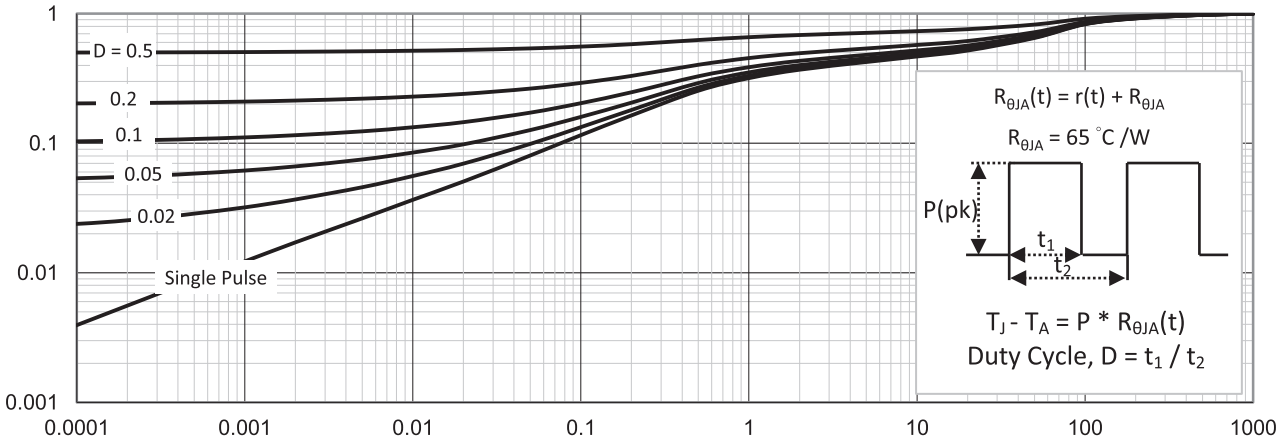
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

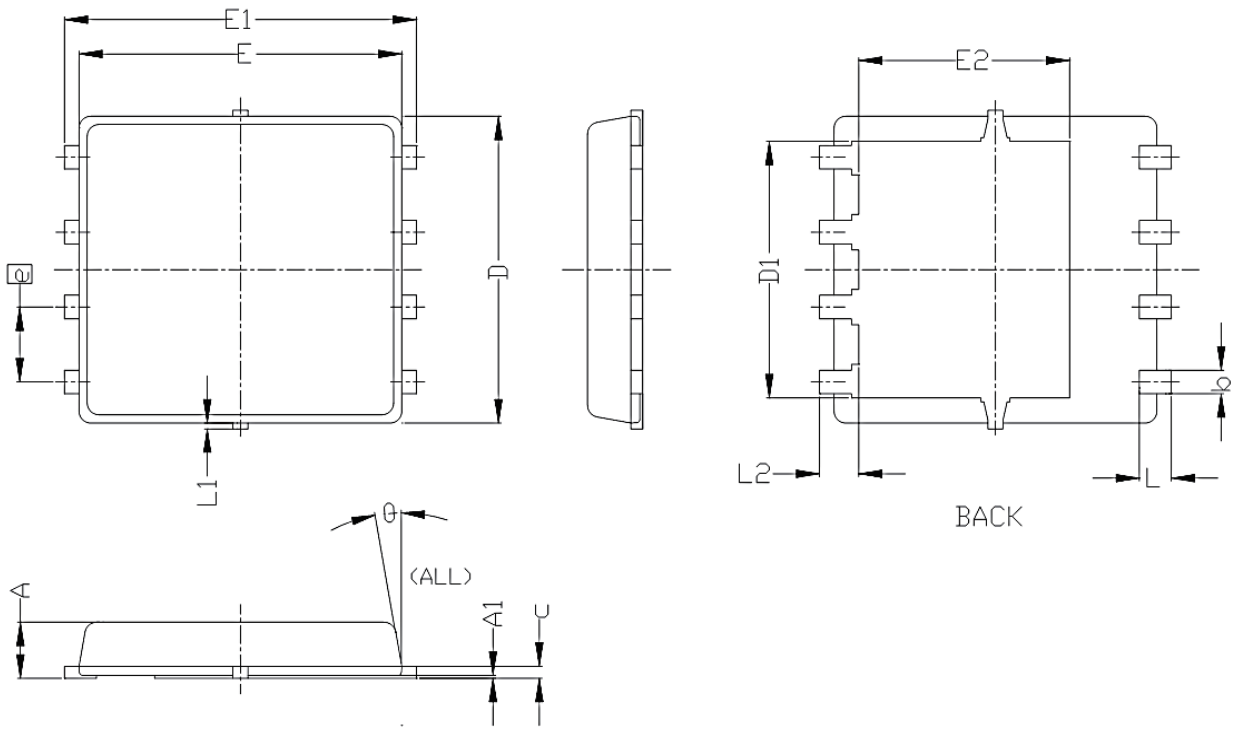


10. Single Pulse Maximum Power Dissipation



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°