N-Channel 60-V (D-S) MOSFET

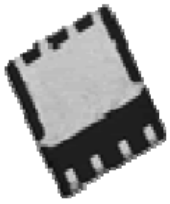
Key Features:
- Low $r_{DS(on)}$ trench technology
- Low thermal impedance
- Fast switching speed

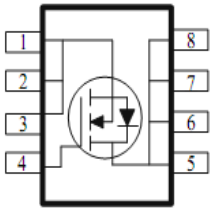
Typical Applications:
- Automotive Systems
- DC/DC Conversion Circuits
- Battery Powered Power Tools

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (mΩ)	I_D (A)
60	4.3 @ V_{GS} = 10V	28
	4.9 @ V_{GS} = 4.5V	26

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}	60	V
Gate-Source Voltage		V_{GS}	±20	
Continuous Drain Current [a]	T_A=25°C	I_D	28	A
	T_A=70°C		22	
Pulsed Drain Current [b]		I_{DM}	100	
Continuous Source Current (Diode Conduction) [a]		I_S	7	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

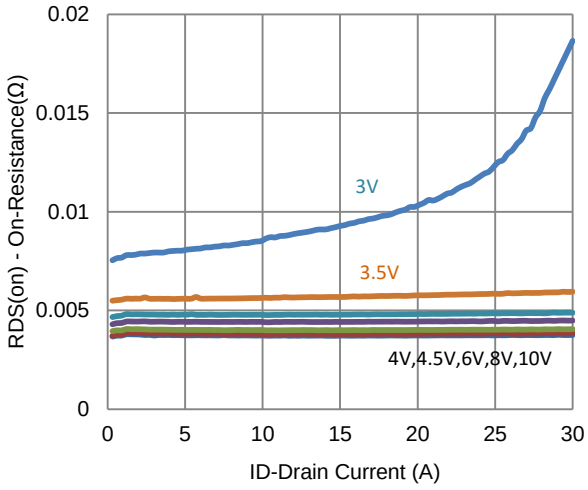
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 uA	1			V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 48 V, V_{GS} = 0 V			1	uA
		V_{DS} = 48 V, V_{GS} = 0 V, T_J = 55°C			10	
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			4.3	mΩ
		V_{GS} = 4.5 V, I_D = 16 A			4.9	
Forward Transconductance [a]	g_{fs}	V_{DS} = 15 V, I_D = 20 A		106		S
Diode Forward Voltage [a]	V_{SD}	I_S = 3.5 A, V_{GS} = 0 V		0.72		V
Dynamic [b]						
Total Gate Charge	Q_g	V_{DS} = 30 V, V_{GS} = 4.5 V, I_D = 2 A		60		nC
Gate-Source Charge	Q_{gs}			20		
Gate-Drain Charge	Q_{gd}			17		
Turn-On Delay Time	$t_{d(on)}$	V_{DS} = 30 V, R_L = 15 Ω, I_D = 2 A, V_{GEN} = 10 V, R_{GEN} = 6 Ω		20		ns
Rise Time	t_r			20		
Turn-Off Delay Time	$t_{d(off)}$			176		
Fall Time	t_f			50		
Input Capacitance	C_{iss}	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz		7283		pF
Output Capacitance	C_{oss}			477		
Reverse Transfer Capacitance	C_{rss}			292		

Notes

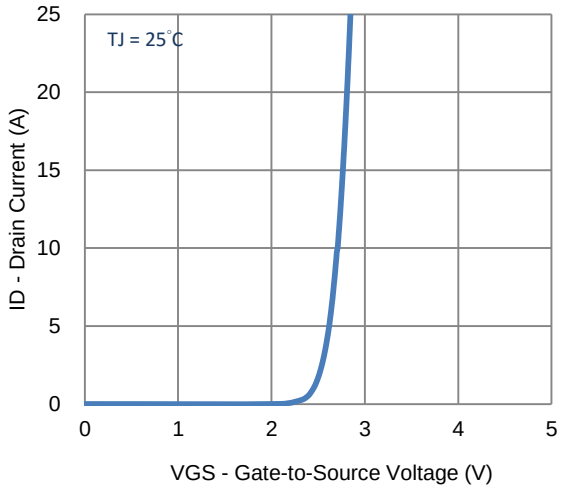
a. Pulse test: PW <= 300us duty cycle <= 2%.

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

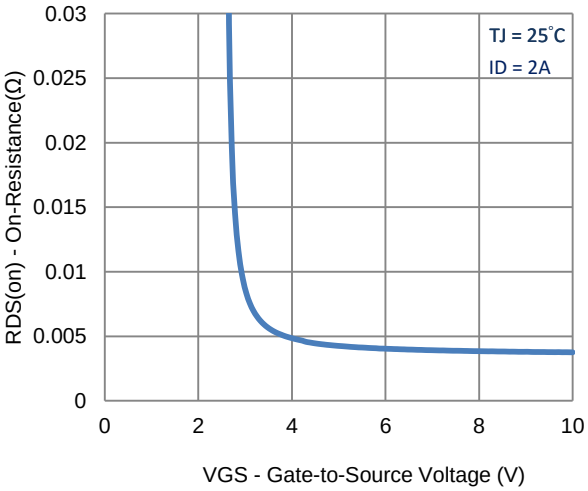
Typical Electrical Characteristics



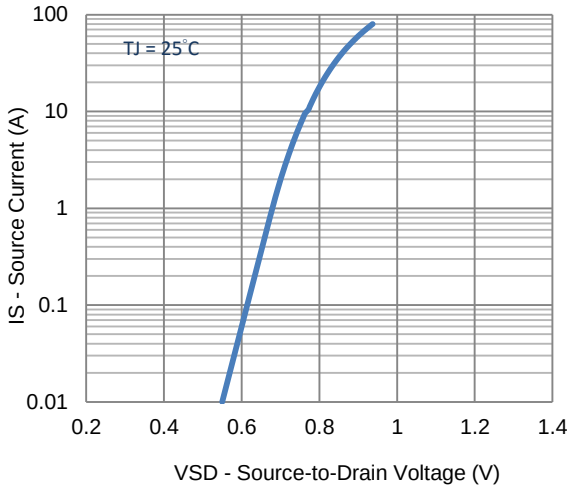
1. On-Resistance vs. Drain Current



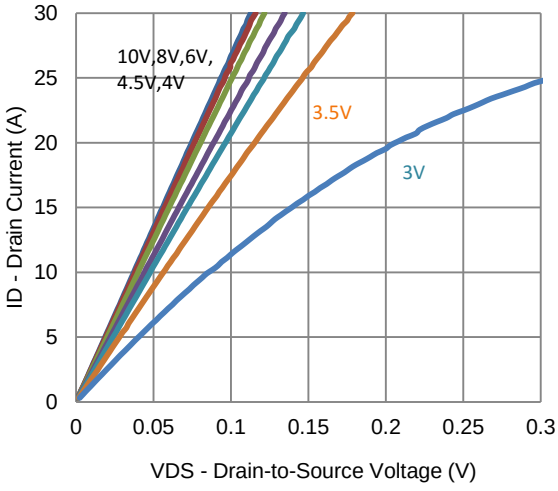
2. Transfer Characteristics



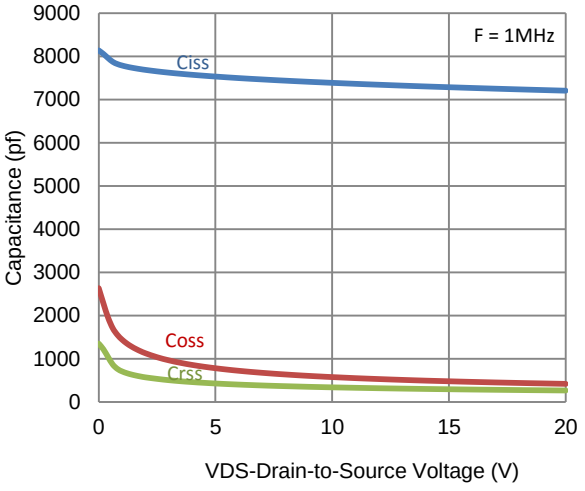
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

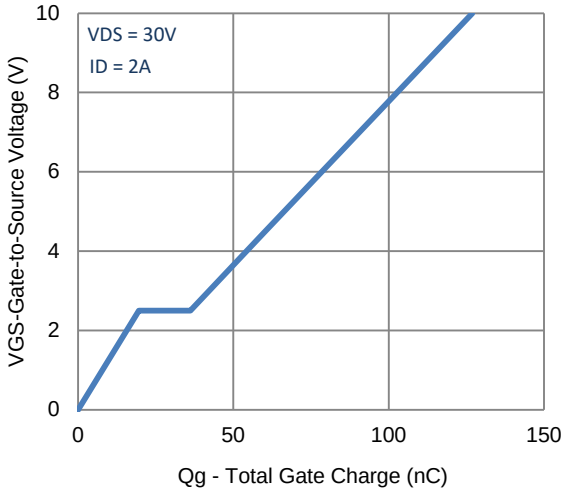


5. Output Characteristics

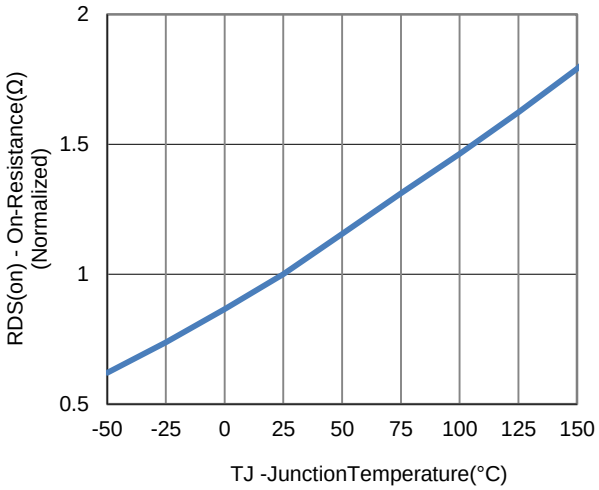


6. Capacitance

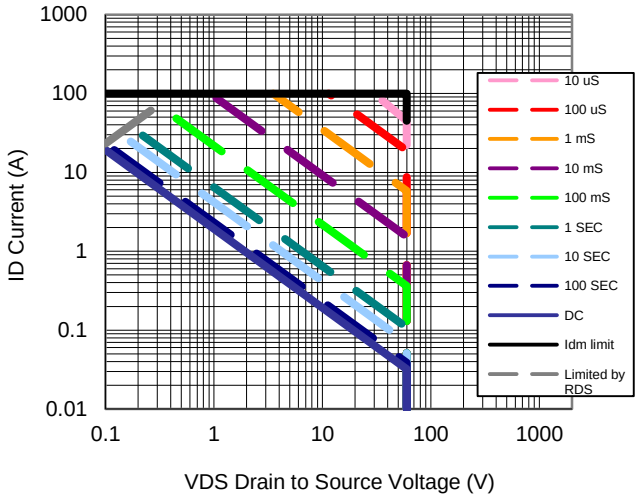
Typical Electrical Characteristics



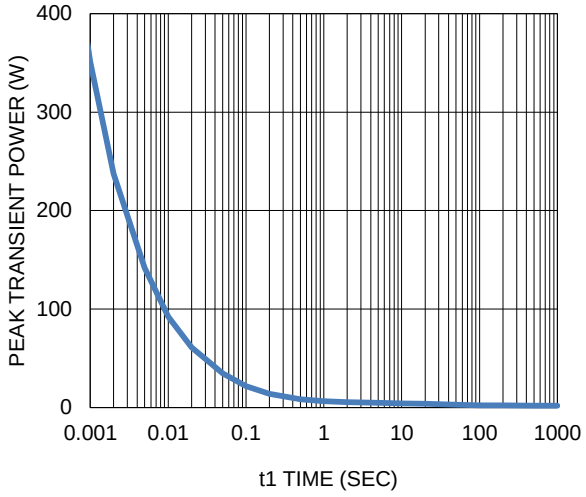
7. Gate Charge



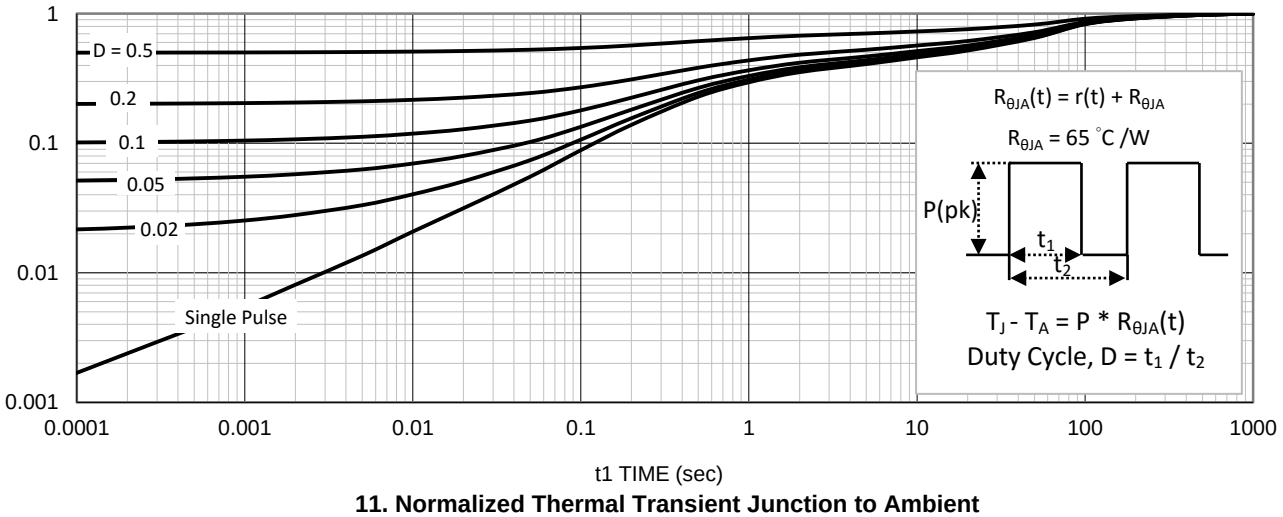
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

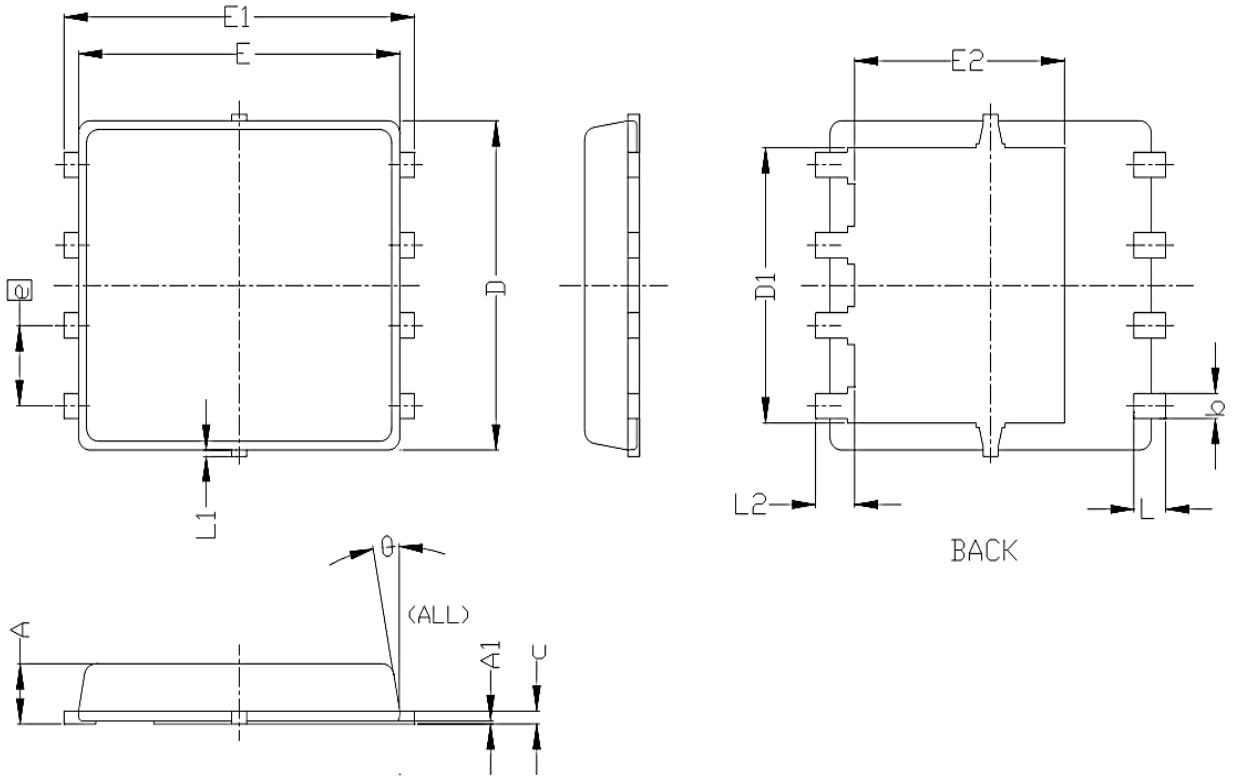


10. Single Pulse Maximum Power Dissipation



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°