

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

### Key Features:

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

### Typical Applications:

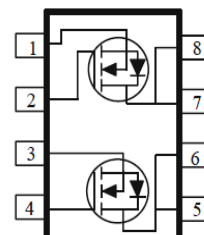
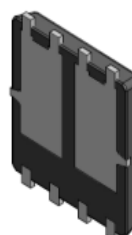
- DC/DC Conversion Circuits
- Motor Drives

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
60	8.4 @ $V_{GS} = 10V$	50 <sup>c</sup>
	9.4 @ $V_{GS} = 4.5V$	50 <sup>c</sup>

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		$V_{DS}$	60	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current	$T_A = 25^\circ\text{C}$	$I_D$	14 <sup>a</sup>	A
	$T_A = 70^\circ\text{C}$		11 <sup>a</sup>	
	$T_C = 25^\circ\text{C}$		50 <sup>c</sup>	
	$T_C = 70^\circ\text{C}$		43 <sup>c</sup>	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	50	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	3.4	
Power Dissipation	$T_A = 25^\circ\text{C}$	$P_D$	2.5 <sup>a</sup>	W
	$T_A = 70^\circ\text{C}$		1.6 <sup>a</sup>	
	$T_C = 25^\circ\text{C}$		36	
	$T_C = 70^\circ\text{C}$		23	
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	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
	Steady State		70	
Maximum Junction-to-Case	Steady State	$R_{\theta JC}$	3.5	

### Notes

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

## Electrical Characteristics

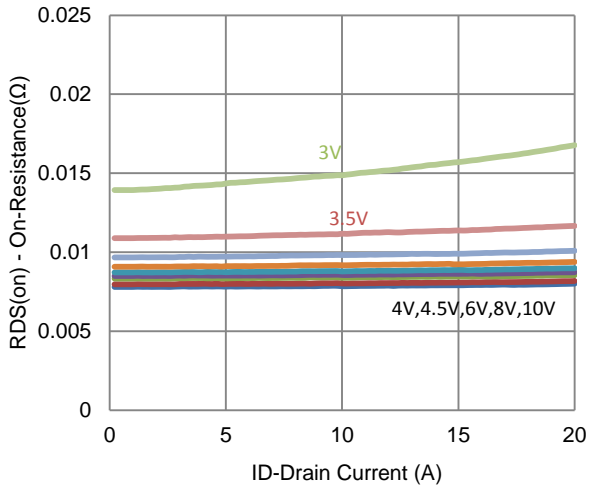
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 48 V, V_{GS} = 0 V$			1	uA
		$V_{DS} = 48 V, V_{GS} = 0 V, T_J = 55^\circ C$			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>	$r_{DS(on)}$	$V_{GS} = 10 V, I_D = 11.2 A$			8.4	mΩ
		$V_{GS} = 4.5 V, I_D = 11 A$			9.4	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 V, I_D = 11.2 A$		14		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 1.7 A, V_{GS} = 0 V$		0.72		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 30 V, V_{GS} = 4.5 V,$ $I_D = 11.2 A$		33		nC
Gate-Source Charge	$Q_{gs}$			8.3		
Gate-Drain Charge	$Q_{gd}$			11		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 30 V, R_L = 2.6 \Omega,$ $I_D = 11.2 A,$ $V_{GEN} = 10 V, R_{GEN} = 6 \Omega$		12		ns
Rise Time	$t_r$			11		
Turn-Off Delay Time	$t_{d(off)}$			100		
Fall Time	$t_f$			24		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 \text{ Mhz}$		5697		pF
Output Capacitance	$C_{oss}$			218		
Reverse Transfer Capacitance	$C_{rss}$			182		

## Notes

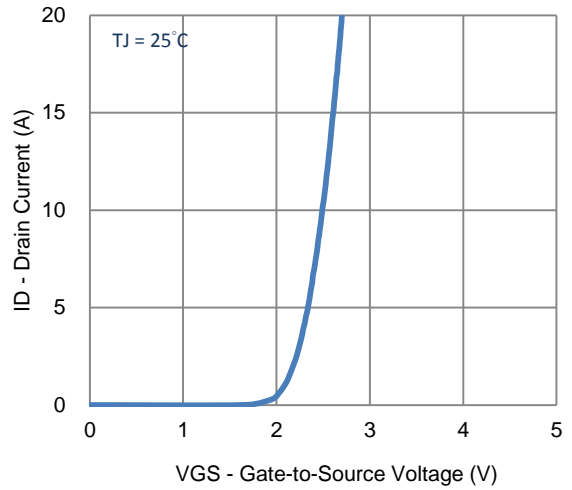
- Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- Guaranteed by design, not subject to production testing.

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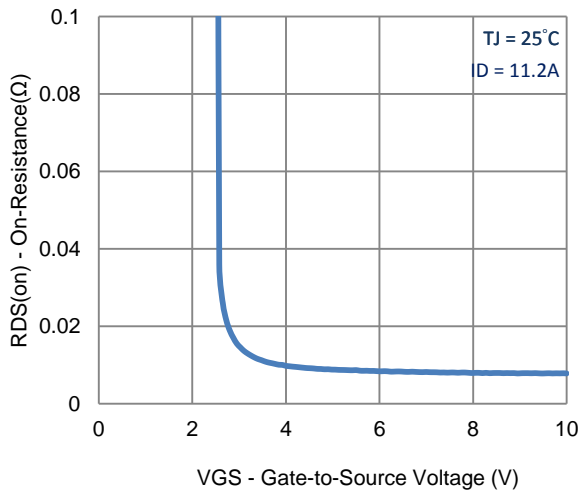
Typical Electrical Characteristics



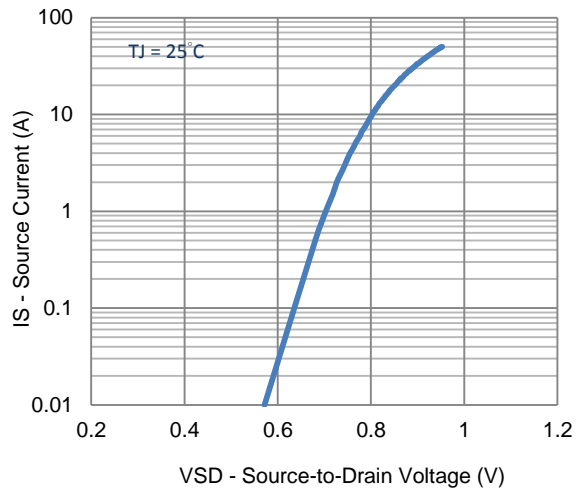
1. On-Resistance vs. Drain Current



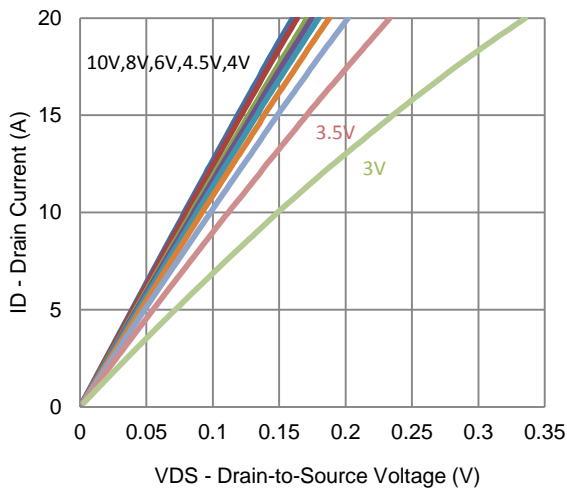
2. Transfer Characteristics



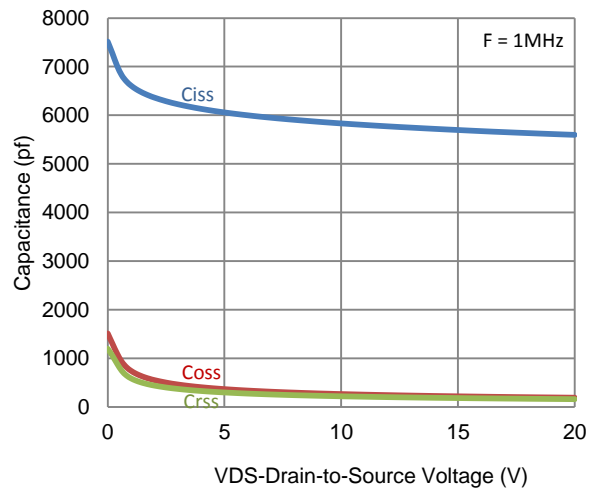
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

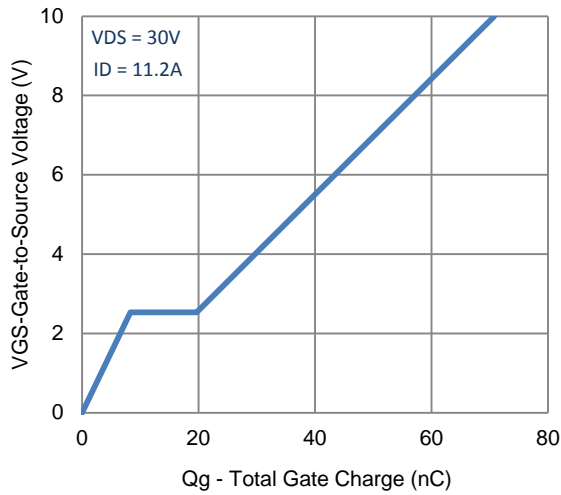


5. Output Characteristics

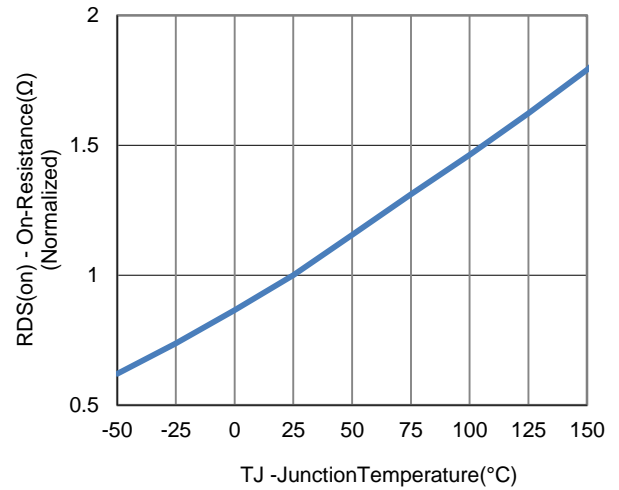


6. Capacitance

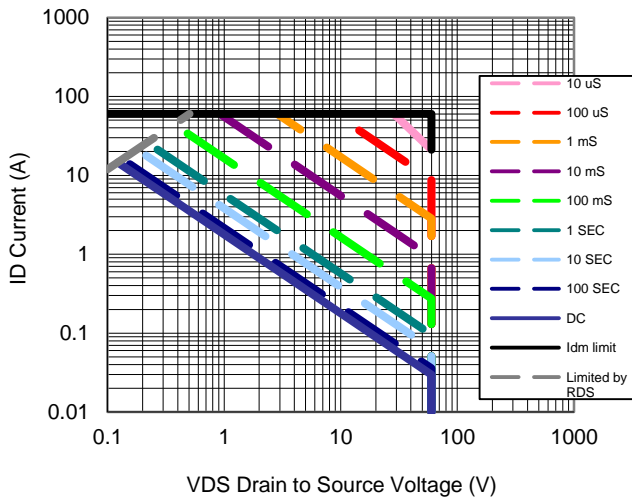
Typical Electrical Characteristics



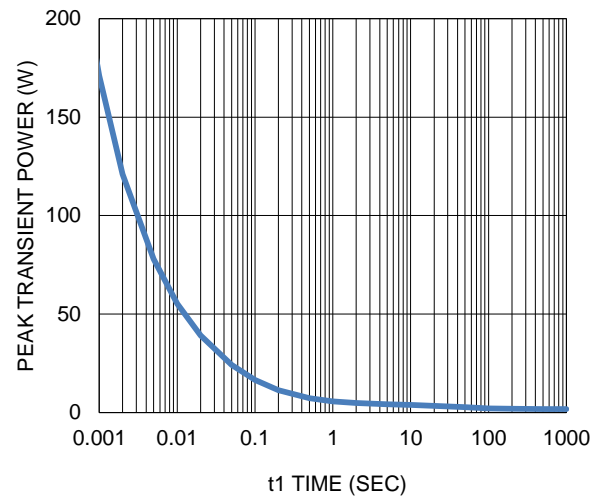
7. Gate Charge



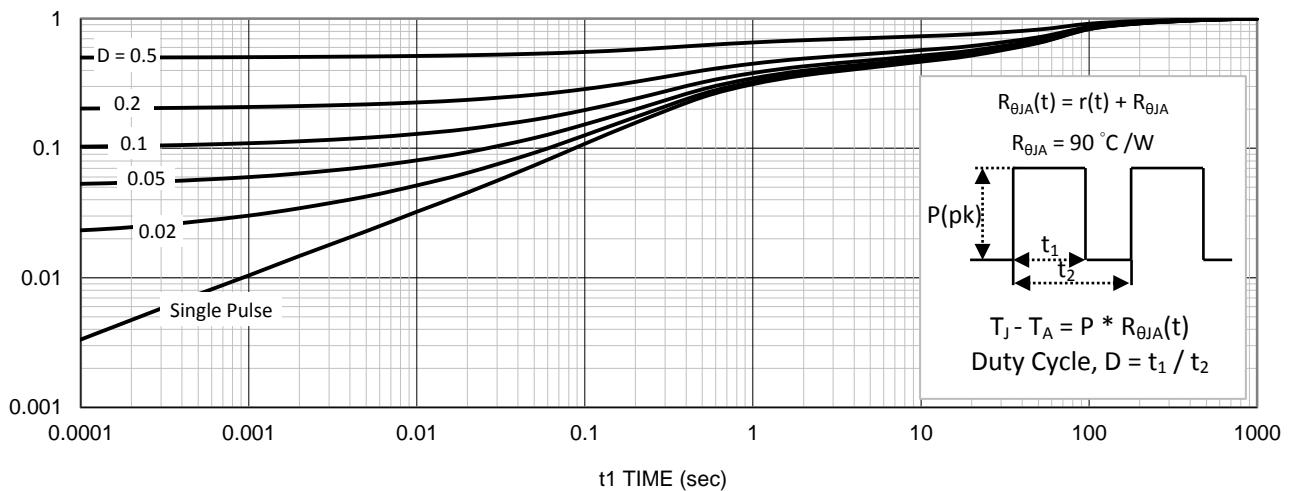
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

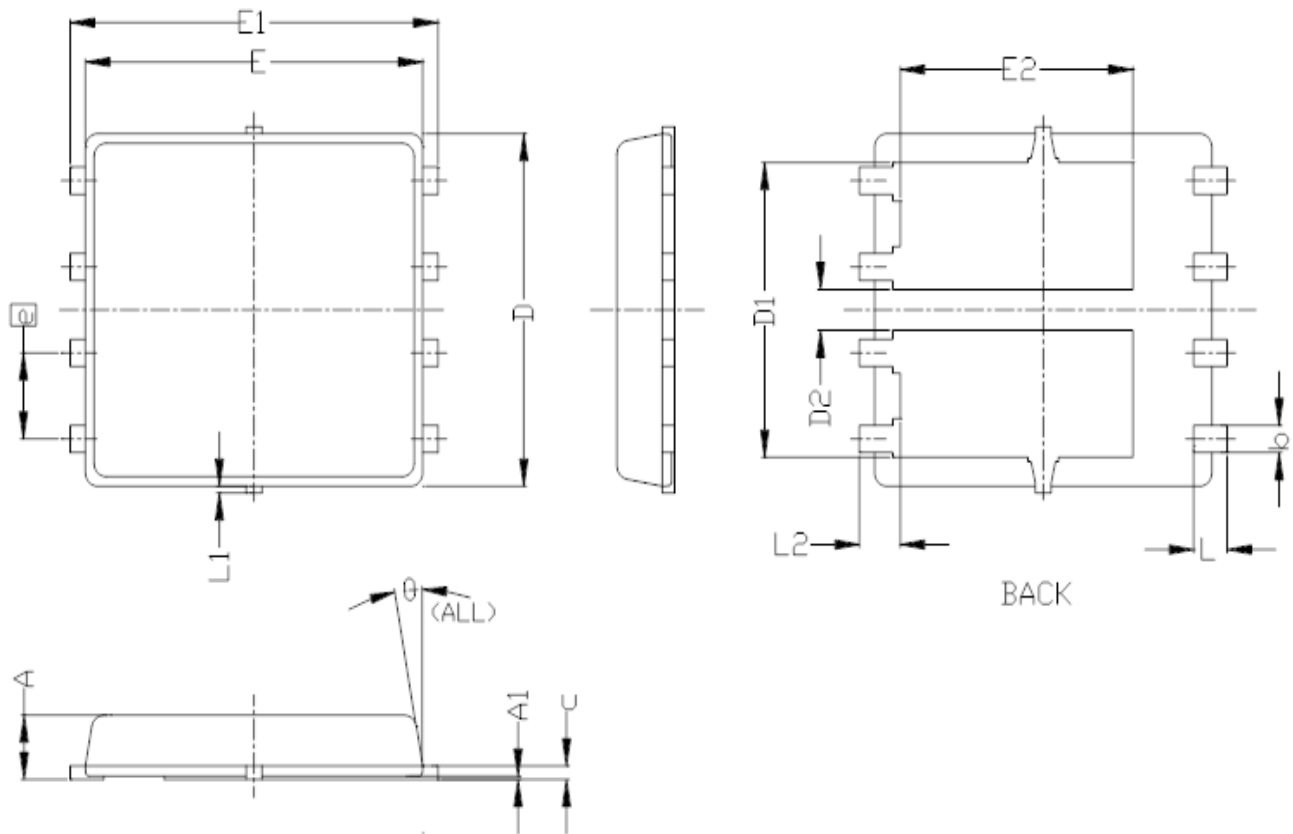


10. Single Pulse Maximum Power Dissipation



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°