

## N-Channel 30-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

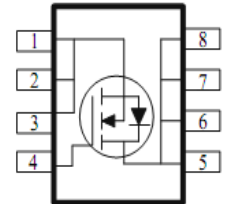
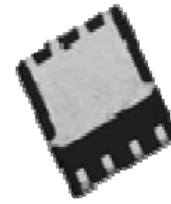
### PRODUCT SUMMARY

$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
30	1.9 @ $V_{GS} = 10V$	112 <sup>c</sup>
	2.4 @ $V_{GS} = 4.5V$	

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		$V_{DS}$	30	V
Gate-Source Voltage		$V_{GS}$	$\pm 20$	
Continuous Drain Current	$T_A = 25^\circ\text{C}$	$I_D$	42 <sup>a</sup>	A
	$T_A = 70^\circ\text{C}$		34 <sup>a</sup>	
	$T_C = 25^\circ\text{C}$		112 <sup>c</sup>	
	$T_C = 70^\circ\text{C}$		112 <sup>c</sup>	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	150	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	7.2	
Power Dissipation	$T_A = 25^\circ\text{C}$	$P_D$	5 <sup>a</sup>	W
	$T_A = 70^\circ\text{C}$		3.2 <sup>a</sup>	
	$T_C = 25^\circ\text{C}$		83	
	$T_C = 70^\circ\text{C}$		53	
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	$R_{\theta JA}$	25	$^\circ\text{C/W}$
	Steady State		65	
Maximum Junction-to-Case (Drain)	Steady State	$R_{\theta JC}$	1.5	

### Notes

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

## Electrical Characteristics

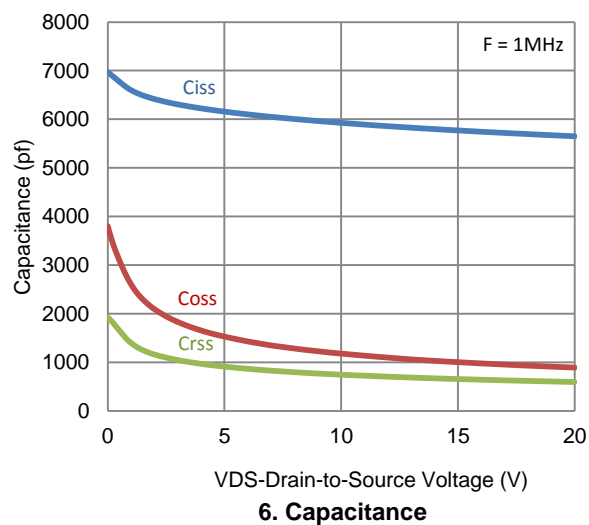
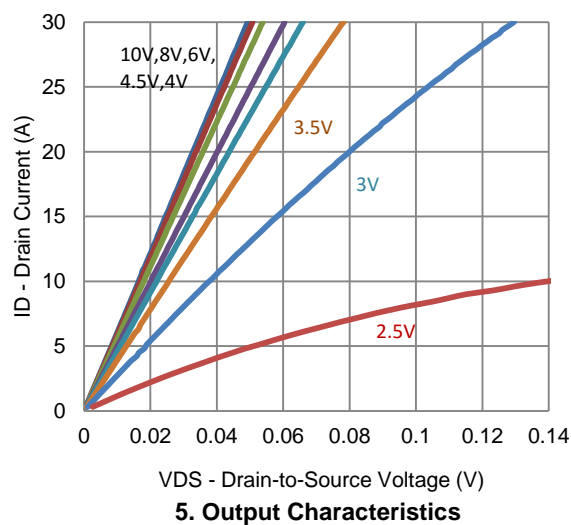
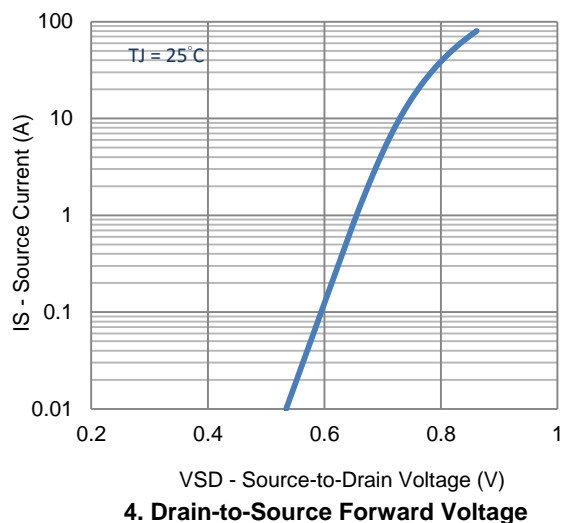
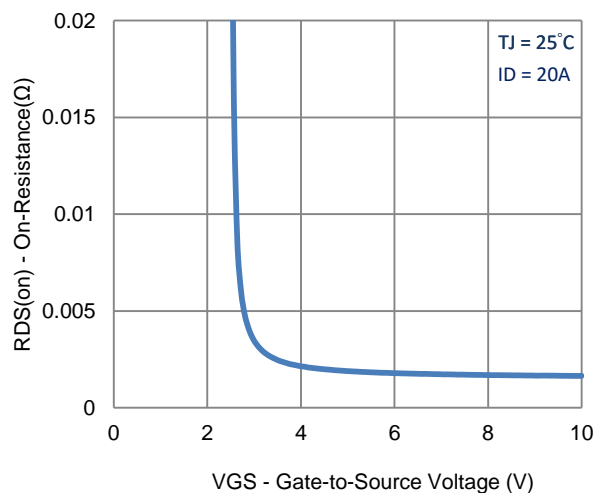
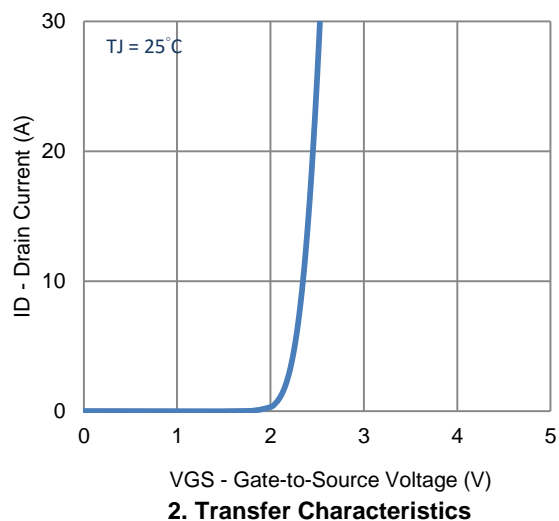
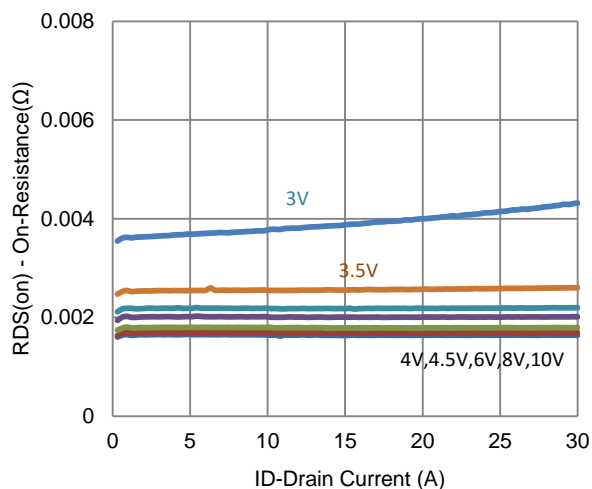
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250 \mu A$	1			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V$ , $V_{GS} = \pm 20 V$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 24 V$ , $V_{GS} = 0 V$			1	uA
		$V_{DS} = 24 V$ , $V_{GS} = 0 V$ , $T_J = 55^\circ C$			10	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} = 5 V$ , $V_{GS} = 10 V$	60			A
Drain-Source On-Resistance <sup>a</sup>	$r_{DS(on)}$	$V_{GS} = 10 V$ , $I_D = 20 A$			1.9	mΩ
		$V_{GS} = 4.5 V$ , $I_D = 16 A$			2.4	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 V$ , $I_D = 20 A$		11		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 3.6 A$ , $V_{GS} = 0 V$		0.7		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 15 V$ , $V_{GS} = 4.5 V$ , $I_D = 20 A$		55		nC
Gate-Source Charge	$Q_{gs}$			15		
Gate-Drain Charge	$Q_{gd}$			19		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 15 V$ , $R_L = 0.8 \Omega$ , $I_D = 20 A$ , $V_{GEN} = 10 V$ , $R_{GEN} = 6 \Omega$		15		ns
Rise Time	$t_r$			21		
Turn-Off Delay Time	$t_{d(off)}$			167		
Fall Time	$t_f$			74		
Input Capacitance	$C_{iss}$	$V_{DS} = 15 V$ , $V_{GS} = 0 V$ , $f = 1 Mhz$		5770		pF
Output Capacitance	$C_{oss}$			1003		
Reverse Transfer Capacitance	$C_{rss}$			655		

## Notes

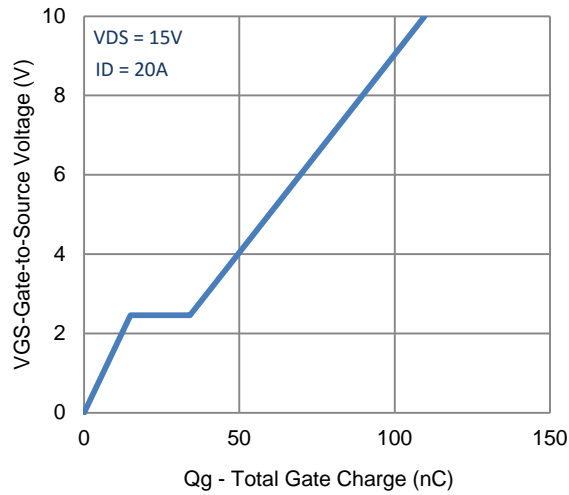
- a. Pulse test:  $PW \leq 300 \mu s$  duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.

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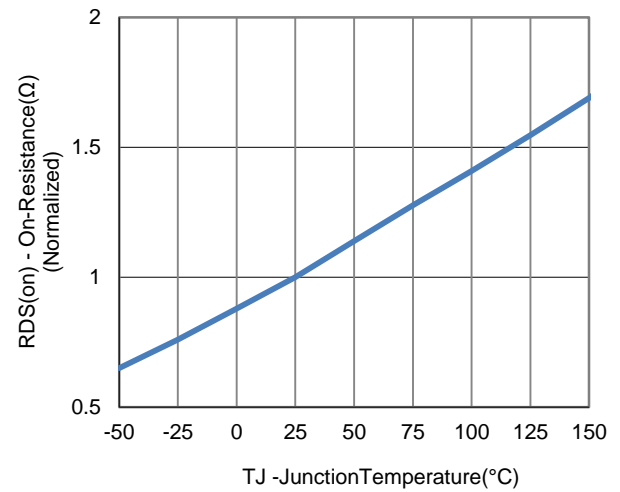
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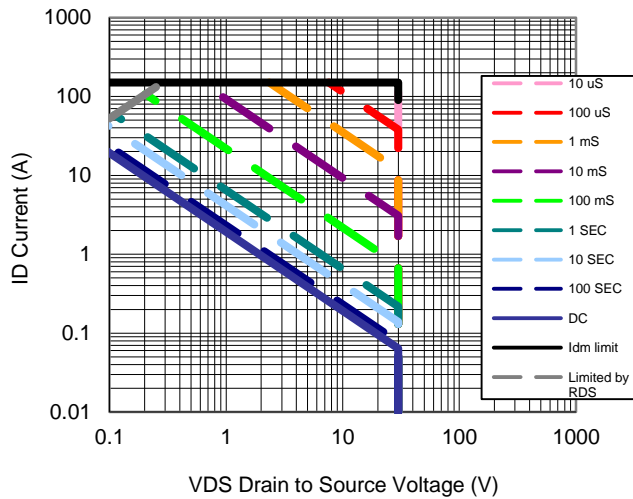
## Typical Electrical Characteristics



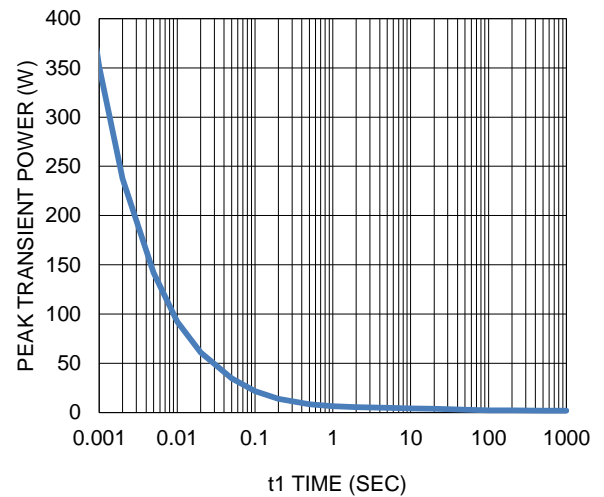
7. Gate Charge



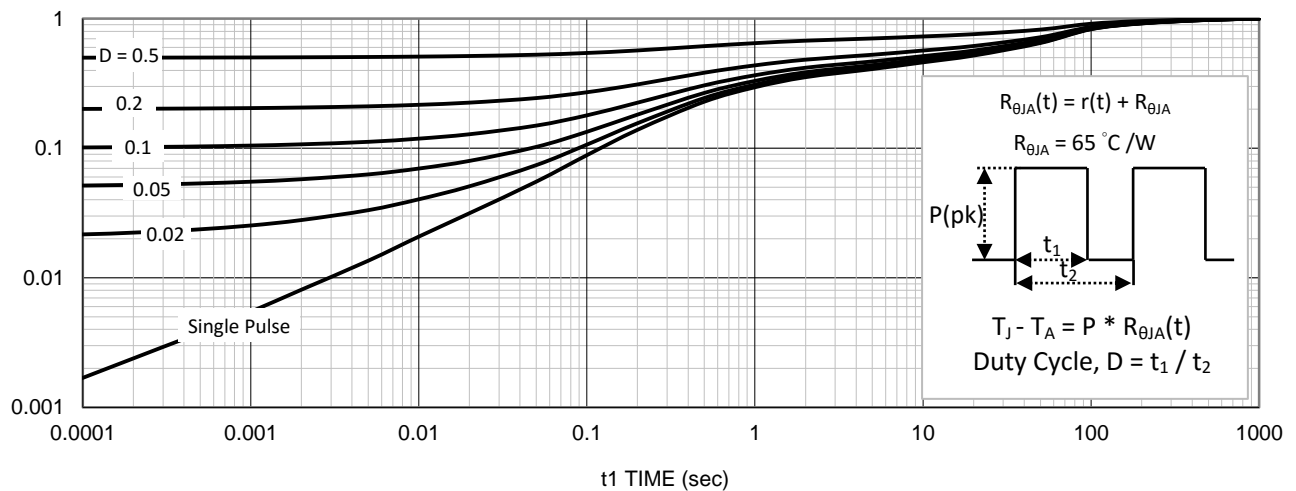
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

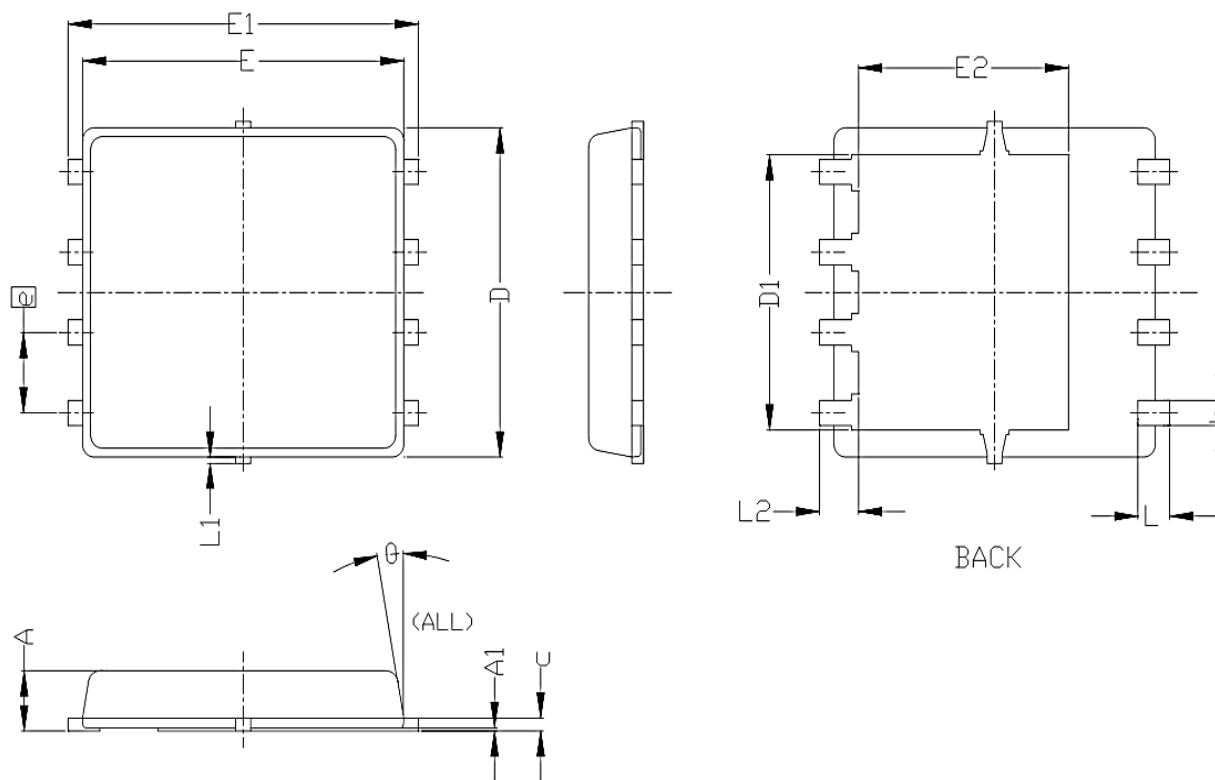


10. Single Pulse Maximum Power Dissipation



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°