

## N-Channel 20-V (D-S) MOSFET

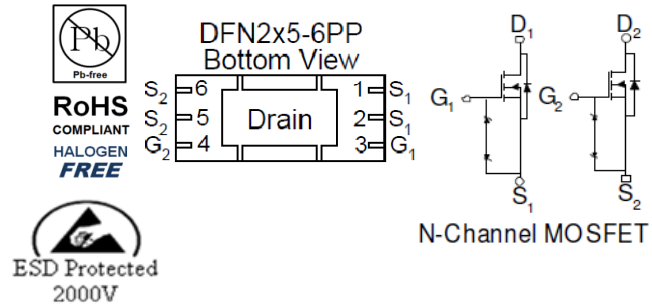
### Key Features:

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

### Typical Applications:

- White LED boost converters
- Automotive Systems
- Industrial DC/DC Conversion Circuits

PRODUCT SUMMARY		
$V_{DS}$ (V)	$r_{DS(on)}$ (m $\Omega$ )	$I_D$ (A)
20	22 @ $V_{GS} = 4.5V$	10.3
	28 @ $V_{GS} = 2.5V$	9.2



ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		$V_{DS}$	20	V
Gate-Source Voltage		$V_{GS}$	$\pm 12$	
Continuous Drain Current <sup>a</sup>	$T_A = 25^\circ\text{C}$	$I_D$	10.3	A
	$T_A = 70^\circ\text{C}$		7.4	
Pulsed Drain Current <sup>b</sup>		$I_{DM}$	40	
Continuous Source Current (Diode Conduction) <sup>a</sup>		$I_S$	2.3	A
Power Dissipation <sup>a</sup>	$T_A = 25^\circ\text{C}$	$P_D$	3.5	W
	$T_A = 70^\circ\text{C}$		1.8	
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	$R_{\theta JA}$	36	$^\circ\text{C}/\text{W}$
	Steady State		76	

### Notes

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

## Electrical Characteristics

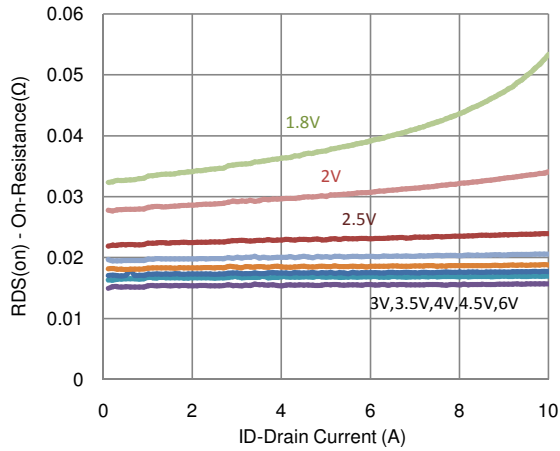
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static</b>						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	0.5			V
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 V, V_{GS} = \pm 12 V$			$\pm 10$	$\mu A$
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 16 V, V_{GS} = 0 V$			1	$\mu A$
		$V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
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>	$r_{DS(on)}$	$V_{GS} = 4.5 V, I_D = 8.8 A$		18	22	m $\Omega$
		$V_{GS} = 3.8 V, I_D = 8.2 A^b$		20	24	
		$V_{GS} = 3.1 V, I_D = 7.6 A^b$		21	26	
		$V_{GS} = 2.5 V, I_D = 7.1 A$		23	28	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 V, I_D = 8.8 A$		20		S
Diode Forward Voltage <sup>a</sup>	$V_{SD}$	$I_S = 1.2 A, V_{GS} = 0 V$		0.7		V
<b>Dynamic <sup>b</sup></b>						
Total Gate Charge	$Q_g$	$V_{DS} = 10 V, V_{GS} = 4.5 V,$ $I_D = 8.8 A$		15		nC
Gate-Source Charge	$Q_{gs}$			4.1		
Gate-Drain Charge	$Q_{gd}$			4.7		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 10 V, R_L = 1.2 \Omega,$ $I_D = 8.8 A,$ $V_{GEN} = 4.5 V, R_{GEN} = 6 \Omega$		390		ns
Rise Time	$t_r$			970		
Turn-Off Delay Time	$t_{d(off)}$			4350		
Fall Time	$t_f$			3200		
Input Capacitance	$C_{ISS}$	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz$		630		pF
Output Capacitance	$C_{OSS}$			105		
Reverse Transfer Capacitance	$C_{RSS}$			100		

## Notes

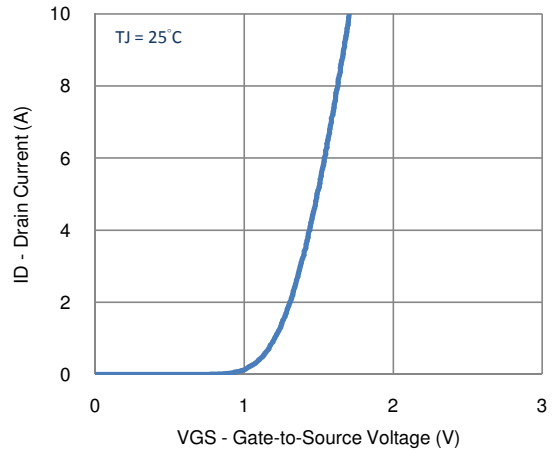
- a. Pulse test: PW  $\leq$  300us duty cycle  $\leq$  2%.
- b. Guaranteed by design, not subject to production testing.

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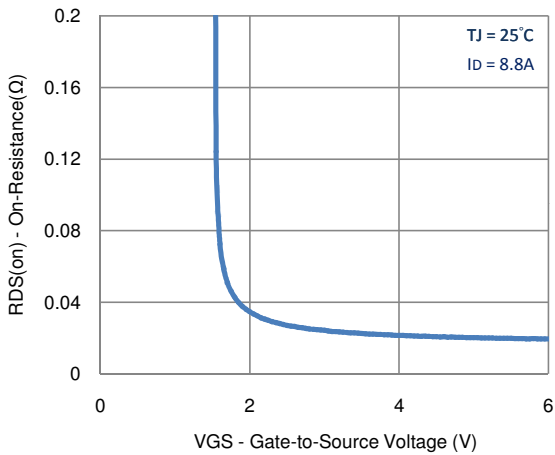
Typical Electrical Characteristics



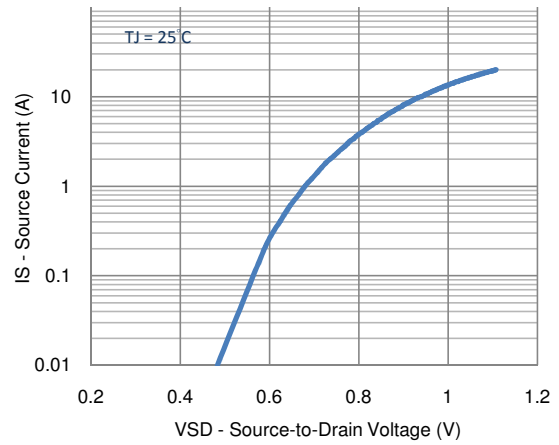
1. On-Resistance vs. Drain Current



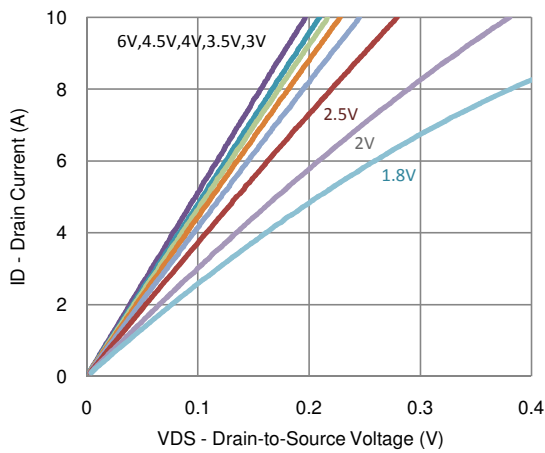
2. Transfer Characteristics



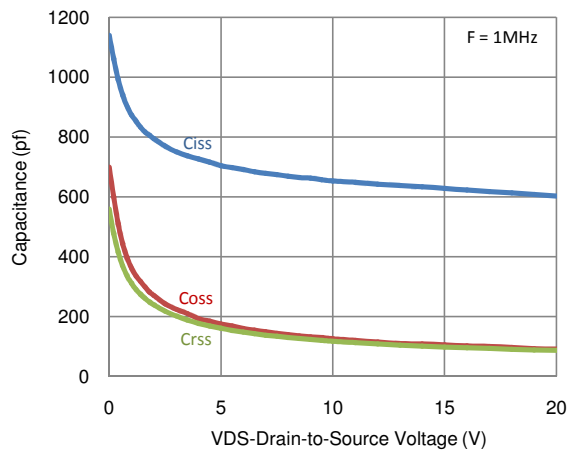
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

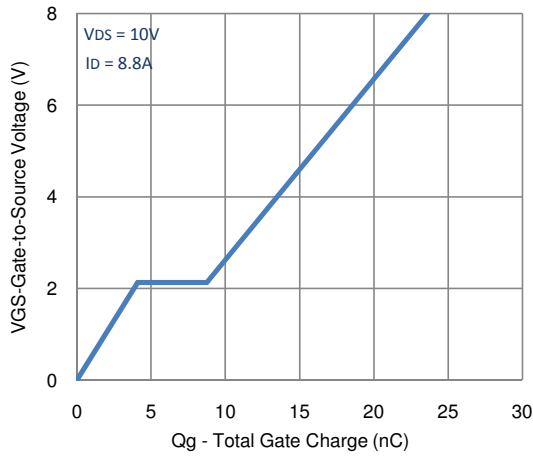


5. Output Characteristics

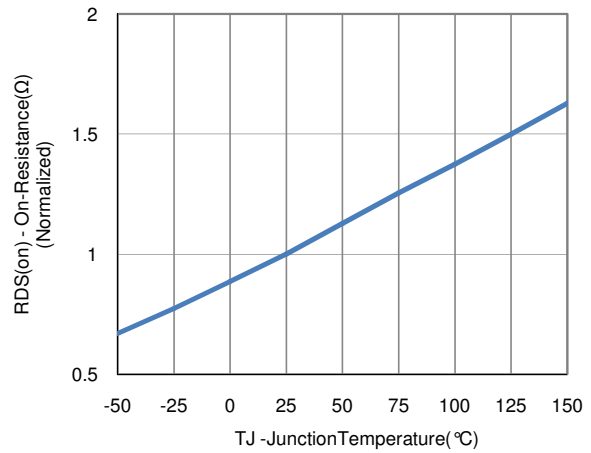


6. Capacitance

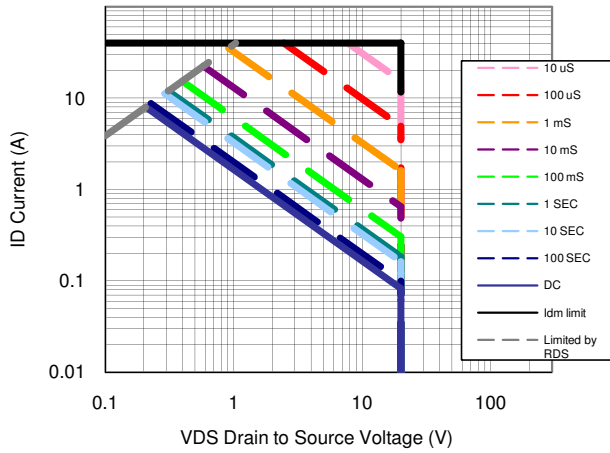
Typical Electrical Characteristics



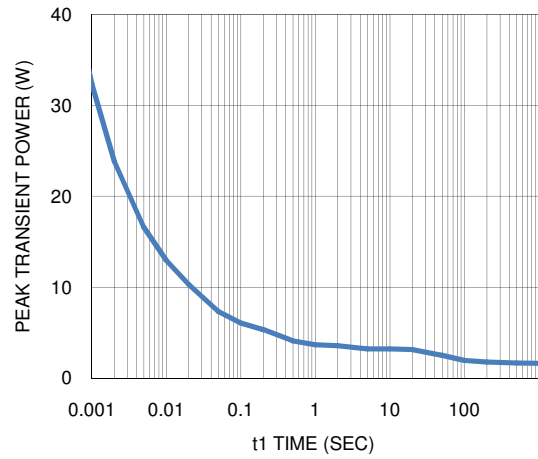
7. Gate Charge



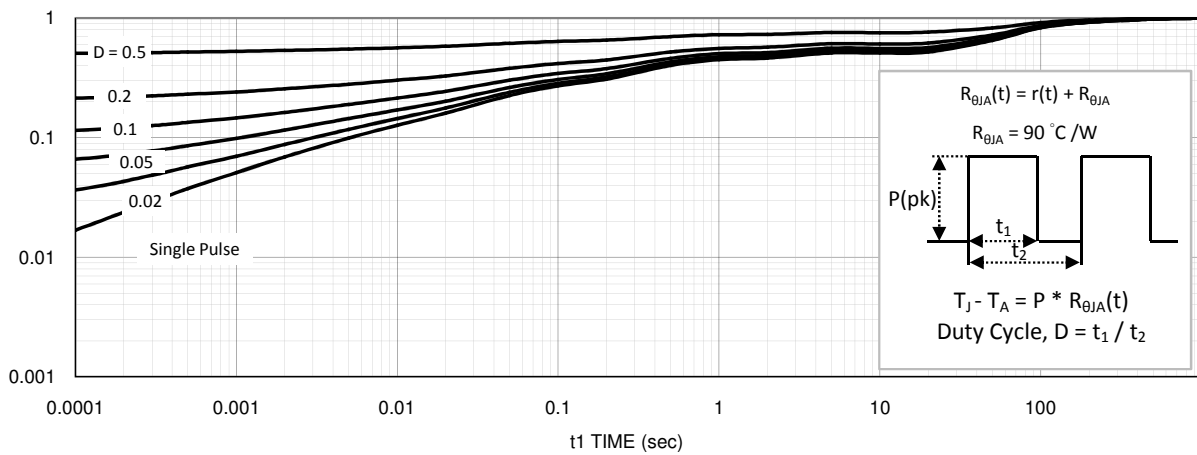
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

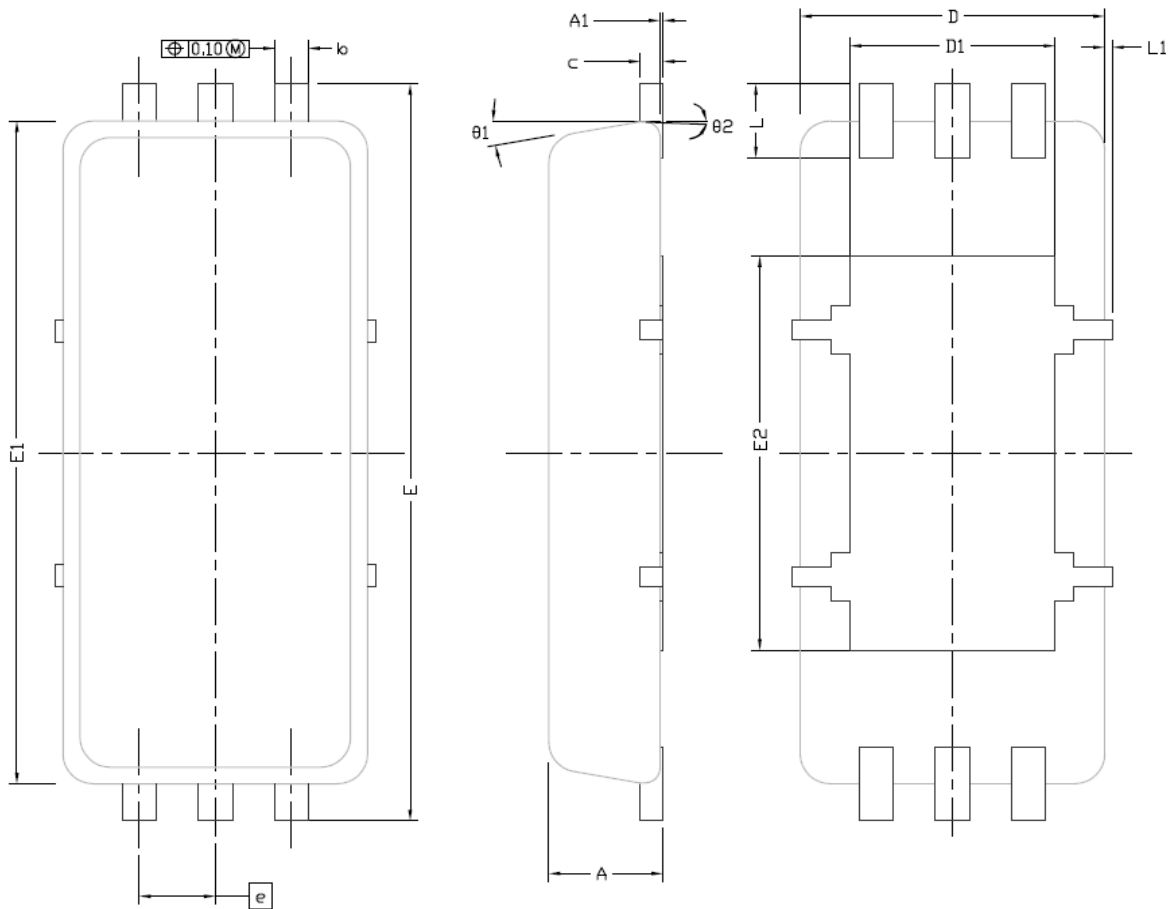


10. Single Pulse Maximum Power Dissipation



11. Normalized Thermal Transient Junction to Ambient

Package Information



DIM.	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.70	0.75	0.80	0.028	0.030	0.0315
A1	0.00	---	0.05	0.000	---	0.002
b	0.20	0.225	0.30	0.008	0.009	0.012
c	0.10	0.152	0.20	0.004	0.006	0.008
D	2.00 BSC			0.079 BSC		
D1	1.30	1.35	1.55	0.051	0.053	0.061
E	5.00 BSC			0.197 BSC		
E1	4.50 BSC			0.177 BSC		
E2	2.60	2.67	2.95	0.102	0.105	0.116
e	0.50 BSC			0.020 BSC		
L	0.40	0.50	0.500	0.016	0.0197	0.0236
L1	0	---	0.100	0	---	0.004
$\theta_1$	0°	10°	12°	0°	10°	12°
$\theta_2$	3° BSC			3° BSC		