

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

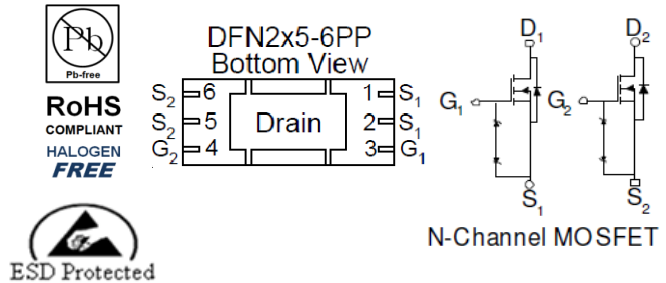
Key Features:

- 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
- Typical ESD protection, HBM Class 1

PRODUCT SUMMARY		
V_{DS} (V)	$r_{DS(on)}$ (m Ω)	I_D (A)
20	9.5 @ $V_{GS} = 4.5V$	16
	13 @ $V_{GS} = 2.5V$	13



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ C$ UNLESS OTHERWISE NOTED)				
Parameter		Symbol	Limit	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	± 8	
Continuous Drain Current ^a	$T_A = 25^\circ C$	I_D	16	A
	$T_A = 70^\circ C$		11.3	
Pulsed Drain Current ^b		I_{DM}	85	
Continuous Source Current (Diode Conduction) ^a		I_S	5.2	A
Power Dissipation ^a	$T_A = 25^\circ C$	P_D	3.5	W
	$T_A = 70^\circ C$		1.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	-55 to 150	$^\circ C$

THERMAL RESISTANCE RATINGS				
Parameter		Symbol	Maximum	Units
Maximum Junction-to-Ambient ^a	$t \leq 10$ sec	$R_{\theta JA}$	36	$^\circ C/W$
	Steady State		76	

Notes

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

Electrical Characteristics

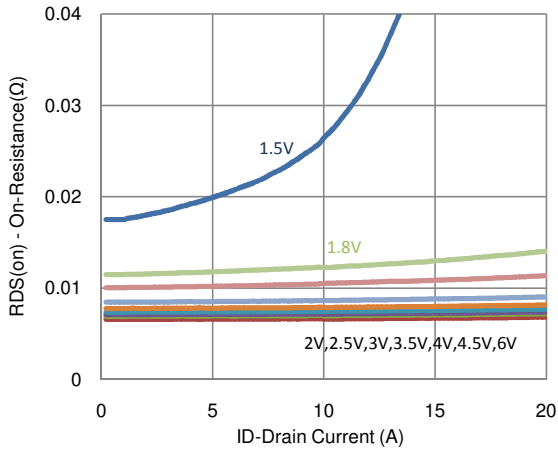
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250 \mu A$	0.4			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 8 V$			± 10	μA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 16 V, V_{GS} = 0 V$			1	μA
		$V_{DS} = 16 V, V_{GS} = 0 V, T_J = 55^\circ C$			25	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} = 5 V, V_{GS} = 4.5 V$	25			A
Drain-Source On-Resistance ^a	$r_{DS(on)}$	$V_{GS} = 4.5 V, I_D = 11 A$		8	9.5	m Ω
		$V_{GS} = 3.8 V, I_D = 10.4 A^b$		9	11	
		$V_{GS} = 3.1 V, I_D = 9.7 A^b$		10	12	
		$V_{GS} = 2.5 V, I_D = 9 A$		11	13	
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15 V, I_D = 11 A$		16		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 2.6 A, V_{GS} = 0 V$		0.67		V
Dynamic ^b						
Total Gate Charge	Q_g	$V_{DS} = 10 V, V_{GS} = 4.5 V,$ $I_D = 11 A$		19		nC
Gate-Source Charge	Q_{gs}			3.4		
Gate-Drain Charge	Q_{gd}			4.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{DS} = 10 V, R_L = 1 \Omega, I_D = 11 A,$ $V_{GEN} = 4.5 V, R_{GEN} = 6 \Omega$		15		ns
Rise Time	t_r			52		
Turn-Off Delay Time	$t_{d(off)}$			82		
Fall Time	t_f			35		
Input Capacitance	C_{ISS}	$V_{DS} = 15 V, V_{GS} = 0 V, f = 1 Mhz$		2109		pF
Output Capacitance	C_{OSS}			204		
Reverse Transfer Capacitance	C_{RSS}			201		

Notes

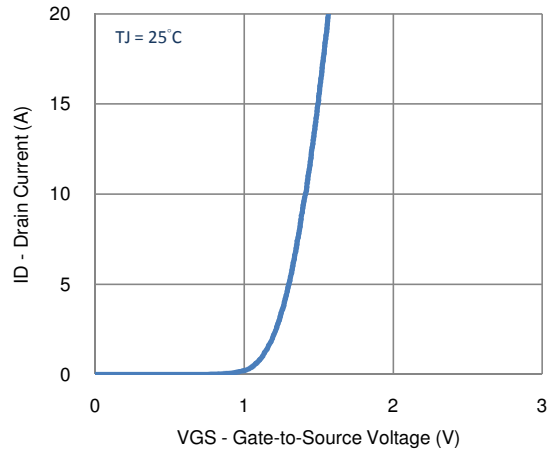
- a. Pulse test: PW \leq 300us duty cycle \leq 2%.
- b. Guaranteed by design, not subject to production testing.

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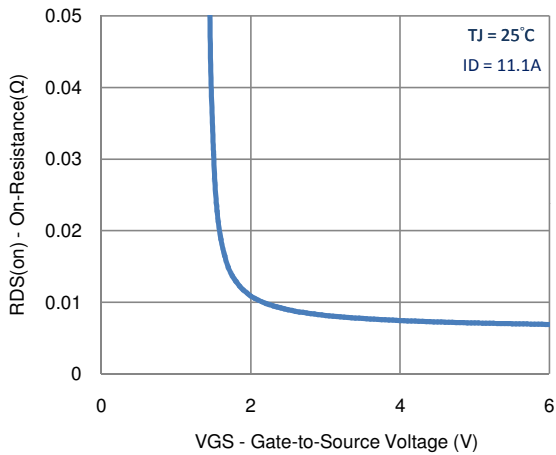
Typical Electrical Characteristics



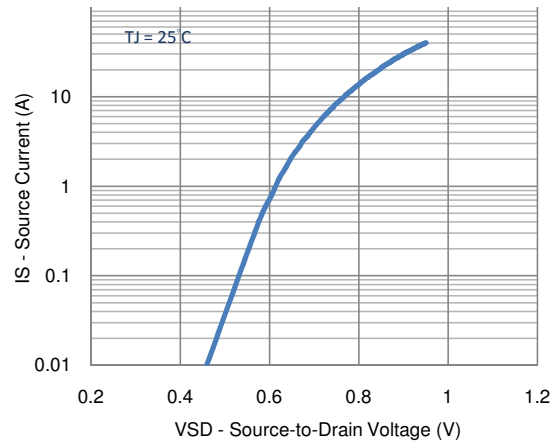
1. On-Resistance vs. Drain Current



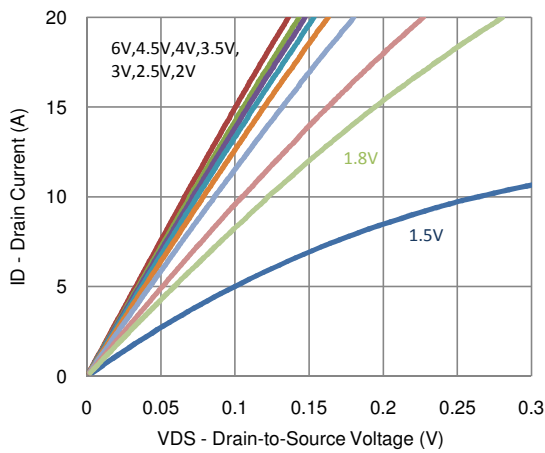
2. Transfer Characteristics



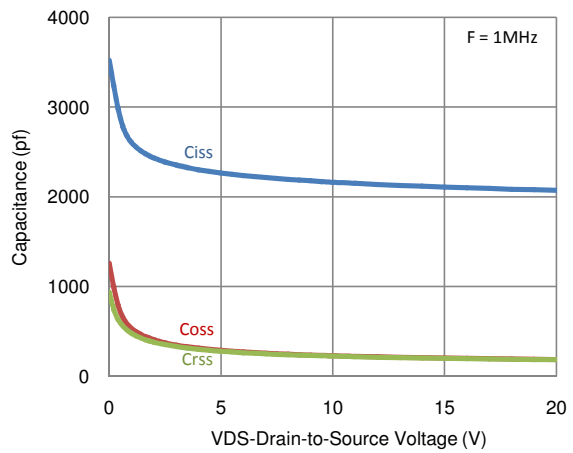
3. On-Resistance vs. Gate-to-Source Voltage



4. Drain-to-Source Forward Voltage

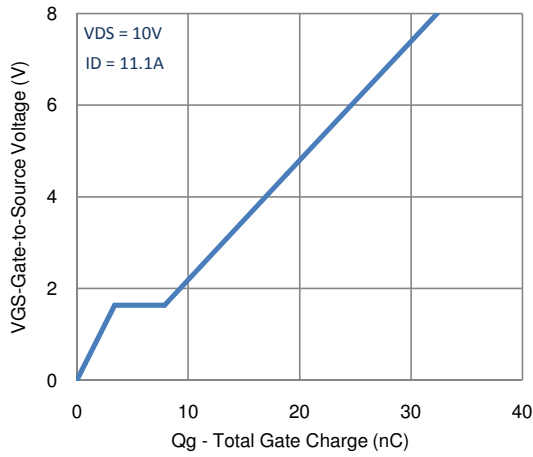


5. Output Characteristics

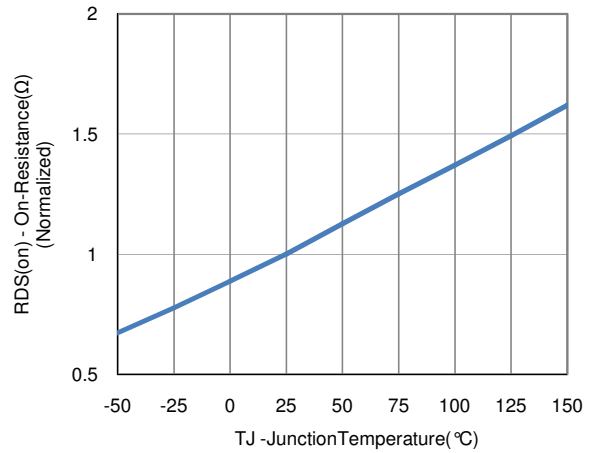


6. Capacitance

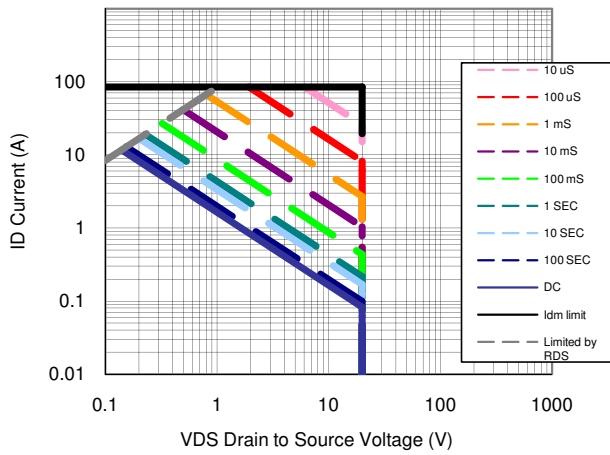
Typical Electrical Characteristics



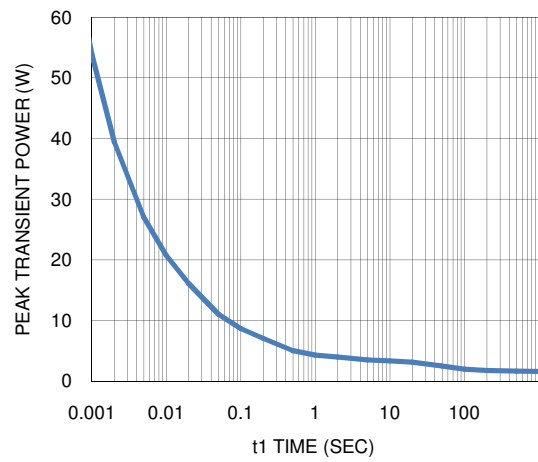
7. Gate Charge



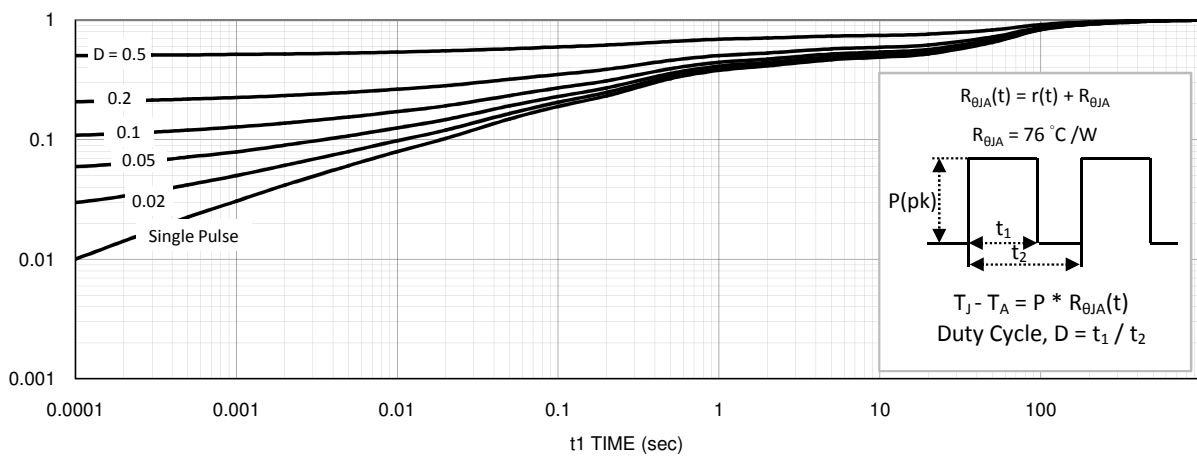
8. Normalized On-Resistance Vs Junction Temperature



9. Safe Operating Area

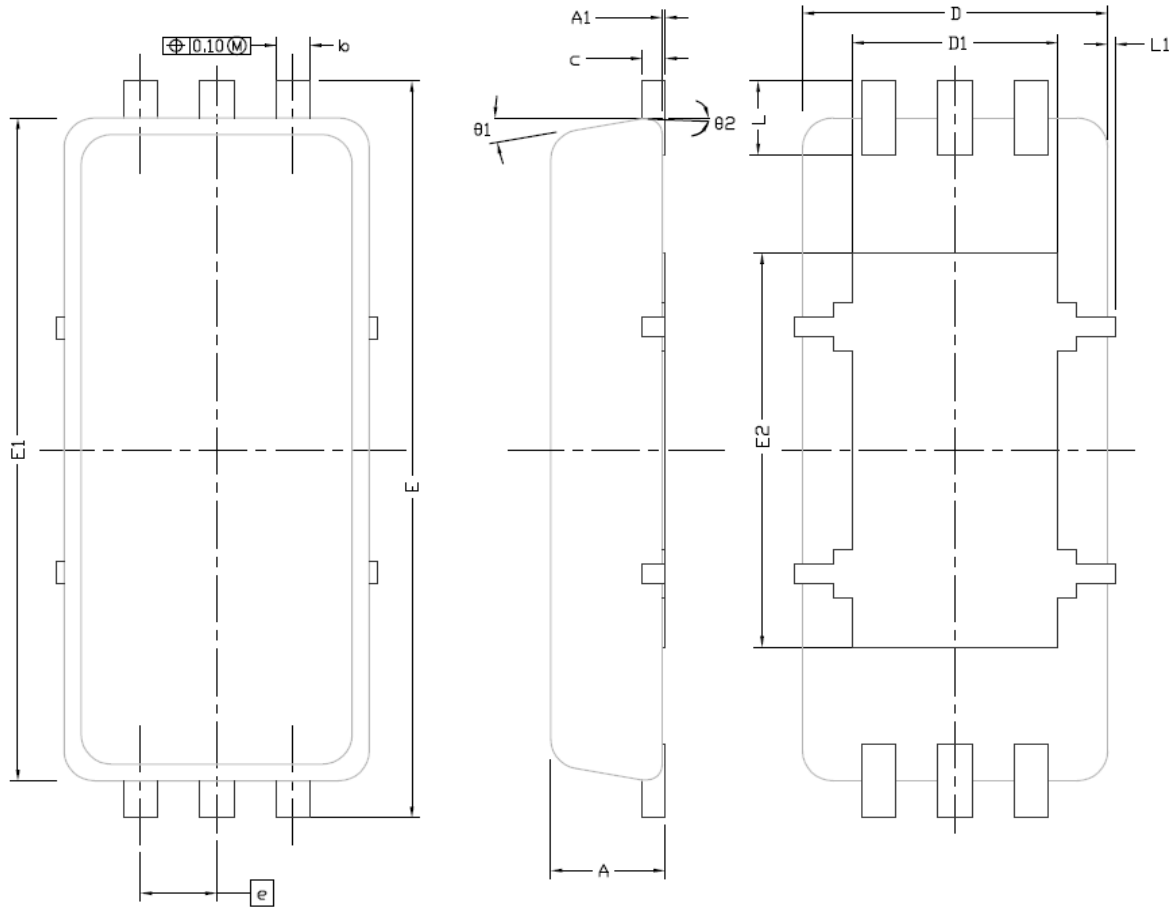


10. Single Pulse Maximum Power Dissipation



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	0.005	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	0.600	0.016	0.0197	0.0236
L1	0	---	0.100	0	---	0.004
theta1	0°	10°	12°	0°	10°	12°
theta2	3° 3SC			3° BSC		