SamHop Microelectronics Corp.

SDP/F830

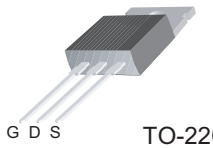
Preliminary

500V N-Channel Planar MOSFET

PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Max
500V	4.5A	1.5 @ VGS=10V,ID=2.25A

FEATURES

- Fast Switching.
- 100% Avalanche Rated.



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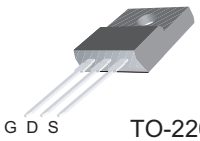

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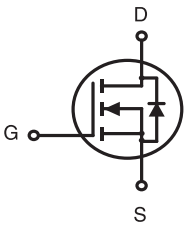


ABSOLUTE MAXIMUM RATINGS (T_A=25°C unless otherwise noted)

Symbol	Parameter		SDP830	SDF830	Units
V_{DSS}	Drain-Source Voltage		500		V
V_{GS}	Gate-Source Voltage		±30		V
I_D	Continuous Drain Curren	T_C=25°C	4.5	4.5 *	A
		T_C=100°C	2.7	2.7 *	A
I_{DM}	Pulsed Drain Current, V_{GS}=10V [a]		18	18 *	A
E_{AS}	Single Pulse Avalanche Energy [b]		230		mJ
dv/dt	Peak Diode Recovery Energy [c]		4.5		V/ns
P_D	Power Dissipation	T_C=25°C	69	28	W
	Linear Derating Factor	T_C>25°C	0.56	0.22	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range		-55 to 150		°C

* Drain current limited by maximum junction temperature

THERMAL CHARACTERISTICS

Symbol	Parameter	SDP830	SDF830	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.8	4.5	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	62.5	°C/W

ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	500			V
$\triangle V_{(BR)DSS}$ /$\triangle T_J$	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I_D=250uA		0.6		V/°C
I_{DSS}	Drain-to-Source Leakage Current	V_{DS}=500V , V_{GS}=0V			20	uA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{DS}=0V , V_{GS}=30V			100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{DS}=0V , V_{GS}=-30V			-100	nA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}=V_{GS} , I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=2.25A [d]			1.5	ohm
g_{FS}	Forward Transconductance	V_{DS}=15V , I_D=2.25A [d]			10	S
DYNAMIC CHARACTERISTICS						
C_{ISS}	Input Capacitance	V_{DS}=25V,V_{GS}=0V f=1.0MHz		490		pF
C_{OSS}	Output Capacitance			66		pF
C_{RSS}	Reverse Transfer Capacitance			5		pF
SWITCHING CHARACTERISTICS						
$t_{D(ON)}$	Turn-On Delay Time	V_{DD}=250V I_D=4.5A R_G=10 ohm,R_D=55.6 ohm V_{GS}=10V [d]		13		ns
t_r	Turn-On Rise Time			22		ns
$t_{D(OFF)}$	Turn-Off Delay Time			28		ns
t_f	Turn-Off Fall Time			20		ns
Q_g	Total Gate Charge	V_{DS}=250V,I_D=4.5A, V_{GS}=10V [d]		11		nC
Q_{gs}	Gate-Source Charge			3		nC
Q_{gd}	Gate-Drain("Miller") Charge			5		nC
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
I_S	Maximum Continuous Source Current(Body Diode)				4.5	A
I_{SM}	Maximum Pulsed Source Current(Body Diode)				18	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}=0V,I_S=2.25A [d]			1.5	V

Notes :

a. Repetitive Rating：Pulse width limited by maximum junction temperature.
b. VDD=50V, starting T_J=25°C,L=23mH, R_G=25Ω, I_{AS}=4.5A
c. I_{SD} ≤ 4.5A, di/dt ≤ 100A/us, V_{DD} ≤ $V_{(BR)DSS}$, T_J ≤ 150°C
d. Pulse Test：Pulse width ≤ 300us, Duty cycle ≤ 2%.

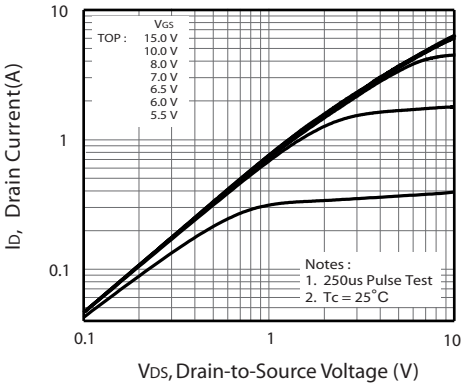


Figure 1. Output Characteristics

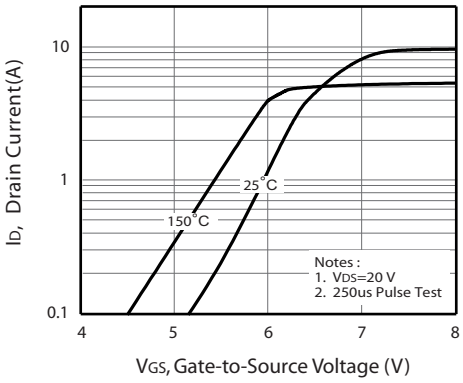


Figure 2. Transfer Characteristics

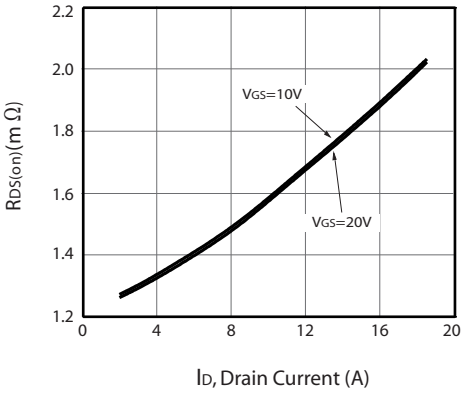
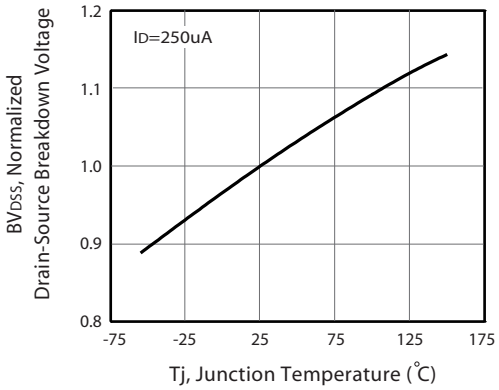


Figure 3. On-Resistance vs. Drain Current and Gate Voltage



with Temperature

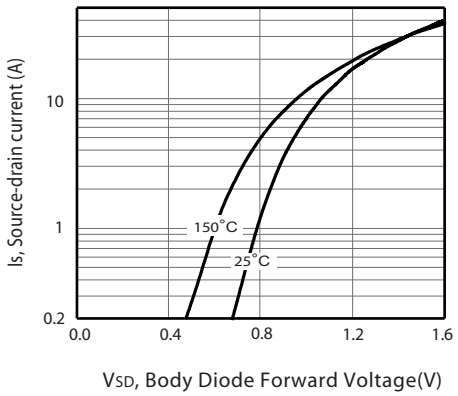


Figure 5. Body Diode Forward Voltage Variation with Source Current

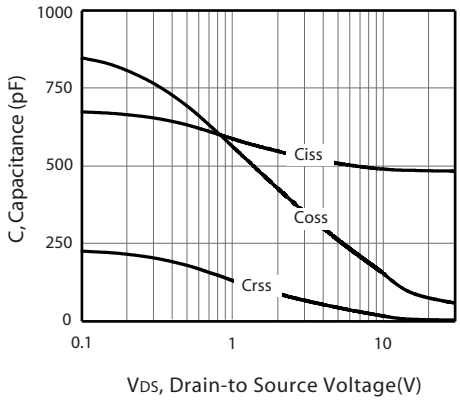


Figure 6. Capacitance

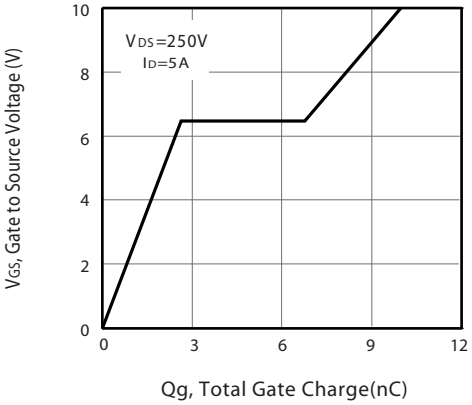


Figure 7. Gate Charge

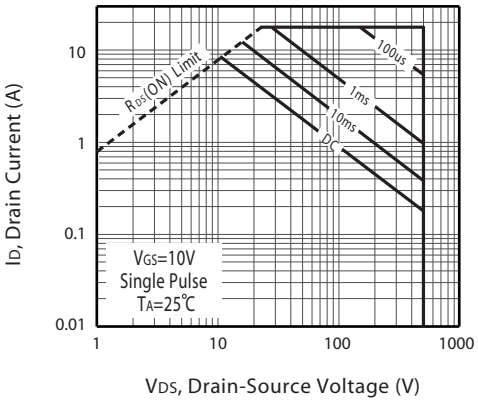
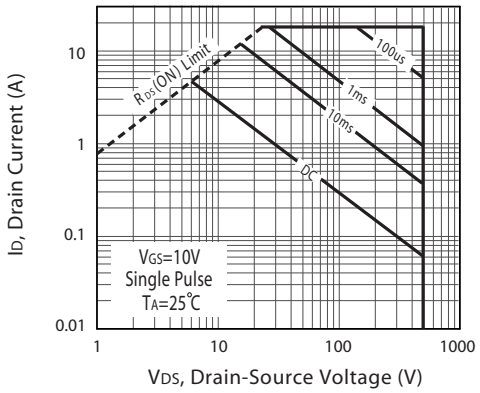


Figure 8. Maximum Safe Operating Area for SDP830



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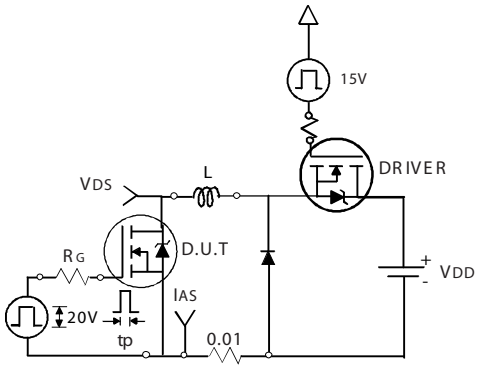
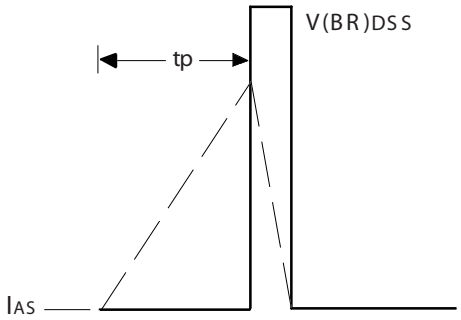


Unclamped Inductive Test Circuit

Figure 9a.



Unclamped Inductive Waveforms

Figure 9b.

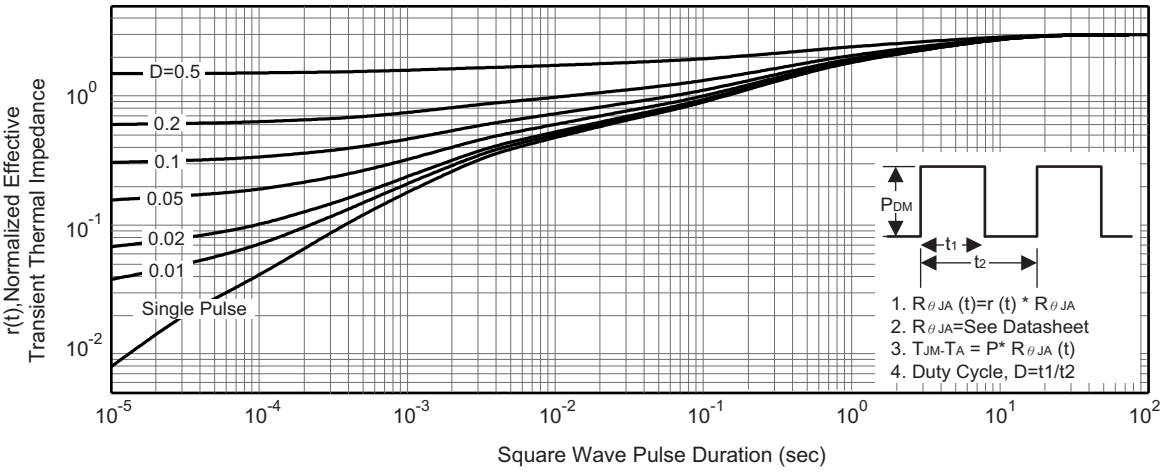


Figure 10. Normalized Thermal Transient Impedance Curve for SDP830

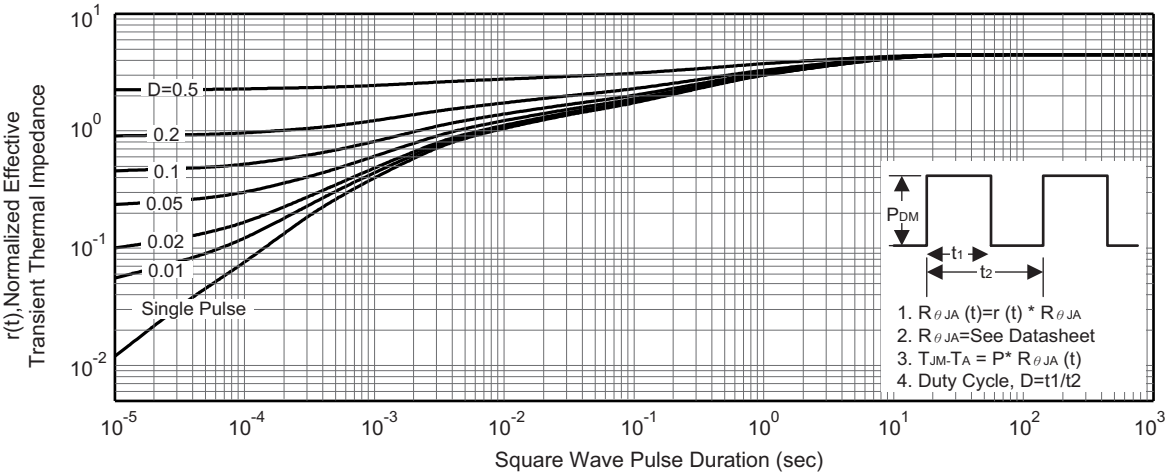


Figure 10. Normalized Thermal Transient Impedance Curve for SDF830

PACKAGE OUTLINE DIMENSIONS

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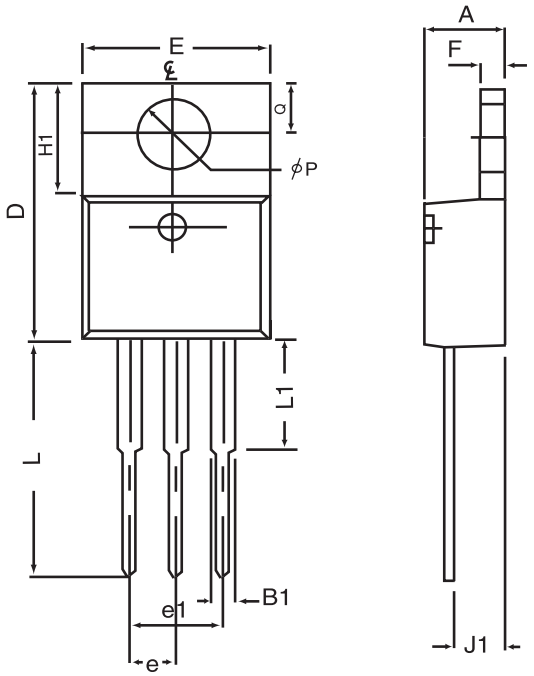

SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00	6.35	0.120	0.250
φP	3.50	3.94	0.138	0.155
Q	2.54	3.05	0.100	0.120

PACKAGE OUTLINE DIMENSIONS

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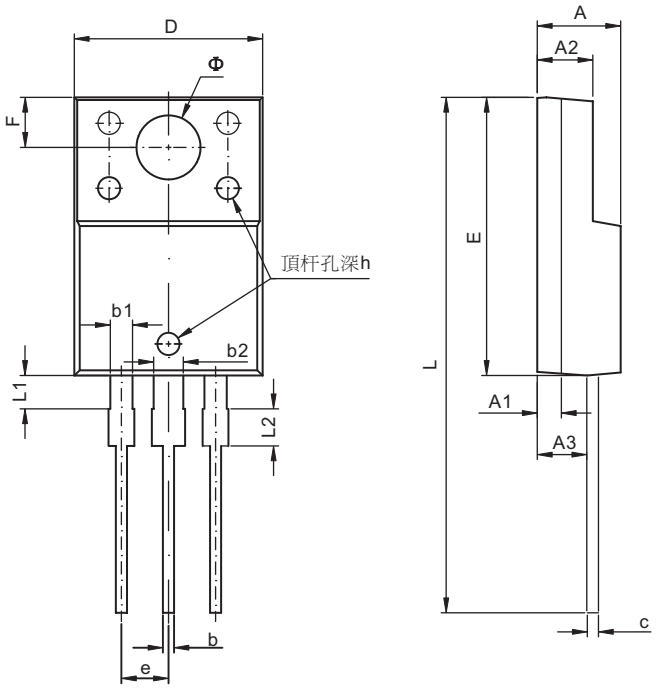

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.185
A1	1.300 REF		0.051 REF	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP		0.100 TYP	
F	2.700 REF		0.106 REF	
Φ	3.500 REF		0.138 REF	
h	0.000	0.300	0.000	0.012
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083

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