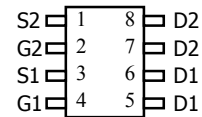


Dual N-Channel Enhancement Mode Field Effect Transistor

Description

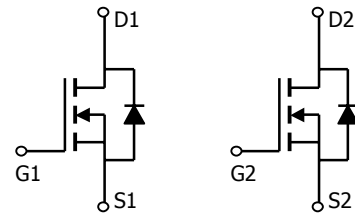
The SM4800 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. The two MOSFETs make a compact and efficient switch and synchronous rectifier combination for use in buck converters.






SOIC-8

General Features

- V_{DS} (V) = 30V
- I_D = 6.9A
- $R_{DS(ON)} < 27m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 32m\Omega$ ($V_{GS} = 4.5V$)
- $R_{DS(ON)} < 50m\Omega$ ($V_{GS} = 2.5V$)



◆ Ordering Information

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
SM4800PRL	SM4800SRG	SOP-8	S2	G2	S1	G1	D1	D1	D2	D2	Tape Reel
<p style="text-align: center;">SM4800 X X X</p> <p>(1)Package Type </p> <p>(2)Packing Type </p> <p>(3)Lead Free </p>			<p>(1) P: SOP-8</p> <p>(2) R: Tape Reel</p> <p>(3) G: Halogen Free; L: Lead Free</p>								

◆ Absolute Maximum Ratings ($T_A=25^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ^A	I_D	$T_A=25^\circ\text{C}$	6.9
		$T_A=70^\circ\text{C}$	5.8
Pulsed Drain Current ^B	I_{DM}	40	A
Power Dissipation	P_D	$T_A=25^\circ\text{C}$	2
		$T_A=70^\circ\text{C}$	1.44
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	$^\circ\text{C}$

a: Fused current that based on wire numbers and diameter

b: Repetitive Rating: Pulse width limited by the maximum junction temperature

c: 1-in² 2oz Cu PCB board

◆ Electrical Characteristics ($T_A=25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=24\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1	μA
					5	
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 12\text{V}$			100	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	0.7	1	1.4	V
$I_{D(ON)}$	On state drain current	$V_{GS}=4.5\text{V}, V_{DS}=5\text{V}$	25			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=6.9\text{A}$ $T_J=125^\circ\text{C}$		22.6	27	$\text{m}\Omega$
				33	40	
		$V_{GS}=4.5\text{V}, I_D=6.0\text{A}$		27	32	$\text{m}\Omega$
		$V_{GS}=2.5\text{V}, I_D=5\text{A}$		42	50	$\text{m}\Omega$
g_{FS}	Forward Transconductance	$V_{DS}=5\text{V}, I_D=5\text{A}$	12	16		S
V_{SD}	Diode Forward Voltage	$I_S=1\text{A}$		0.71	1	V
I_S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C_{ISS}	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=15\text{V}, f=1\text{MHz}$		858		pF
C_{OSS}	Output Capacitance			110		pF
C_{RSS}	Reverse Transfer Capacitance			80		pF
R_g	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$		1.24		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=4.5\text{V}, V_{DS}=15\text{V}, I_D=6.9\text{A}$		9.6		nC
Q_{gs}	Gate Source Charge			1.65		nC
Q_{gd}	Gate Drain Charge			3		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}, V_{DS}=15\text{V}, R_L=2.2\Omega,$ $R_{GEN}=6\Omega$		5.7		ns
t_r	Turn-On Rise Time			13		ns
$t_{D(off)}$	Turn-Off Delay Time			37		ns
t_f	Turn-Off Fall Time			4.2		ns
t_{rr}	Body Diode Reverse Recovery time	$I_F=5\text{A}, dI/dt=100\text{A}/\mu\text{s}$		15.5		ns
Q_{rr}	Body Diode Reverse Recovery charge	$I_F=5\text{A}, dI/dt=100\text{A}/\mu\text{s}$		7.9		nC

Note: Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

d: Guaranteed by design: not subject to production testing

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =24V, V _{GS} =0V T _J =55°C			1 5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±12V			100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =250μA	0.7	1	1.4	V
I _{D(ON)}	On state drain current	V _{GS} =4.5V, V _{DS} =5V	25			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =6.9A T _J =125°C		22.6 33	27 40	mΩ
		V _{GS} =4.5V, I _D =6.0A		27	32	
		V _{GS} =2.5V, I _D =5A		42	50	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =5A	12	16		S
V _{SD}	Diode Forward Voltage	I _S =1A		0.71	1	V
I _S	Maximum Body-Diode Continuous Current				3	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		858		pF
C _{oss}	Output Capacitance			110		pF
C _{rss}	Reverse Transfer Capacitance			80		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.24		Ω
SWITCHING PARAMETERS						
Q _g	Total Gate Charge	V _{GS} =4.5V, V _{DS} =15V, I _D =6.9A		9.6		nC
Q _{gs}	Gate Source Charge			1.65		nC
Q _{gd}	Gate Drain Charge			3		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =10V, V _{DS} =15V, R _L =2.2Ω, R _{GEN} =6Ω		5.7		ns
t _r	Turn-On Rise Time			13		ns
t _{D(off)}	Turn-Off DelayTime			37		ns
t _f	Turn-Off Fall Time			4.2		ns
t _{rr}	Body Diode Reverse Recovery time	I _F =5A, dI/dt=100A/μs		15.5		ns
Q _{rr}	Body Diode Reverse Recovery charge	I _F =5A, dI/dt=100A/μs		7.9		nC

A: The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the t_s ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using 80μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

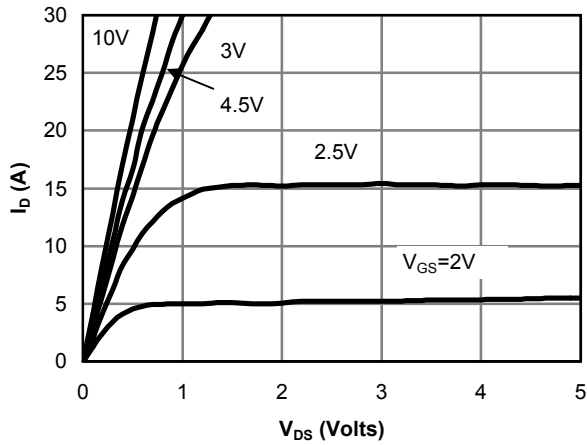


Fig 1: On-Region Characteristics

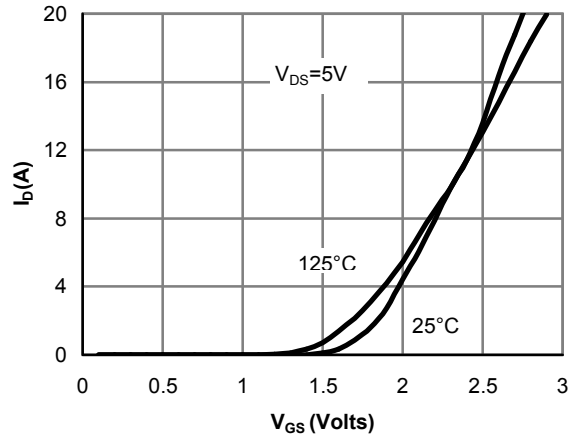


Figure 2: Transfer Characteristics

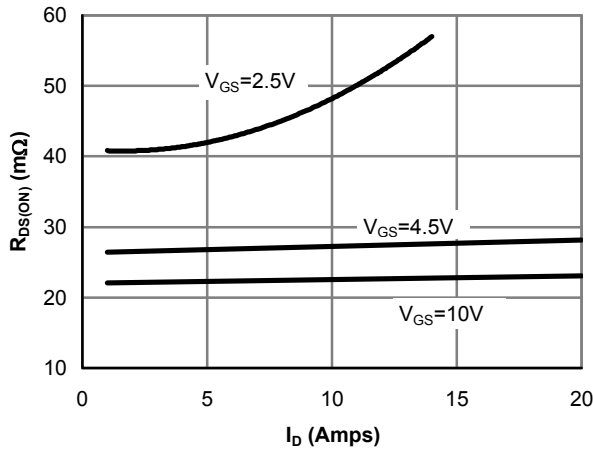


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

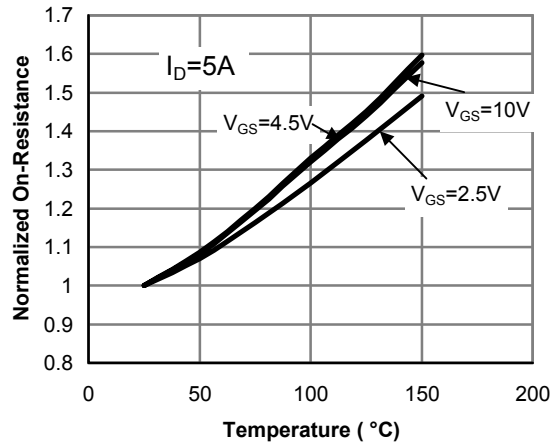


Figure 4: On-Resistance vs. Junction Temperature

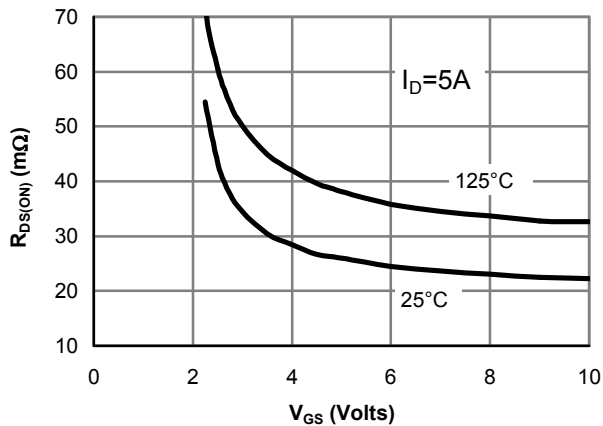


Figure 5: On-Resistance vs. Gate-Source Voltage

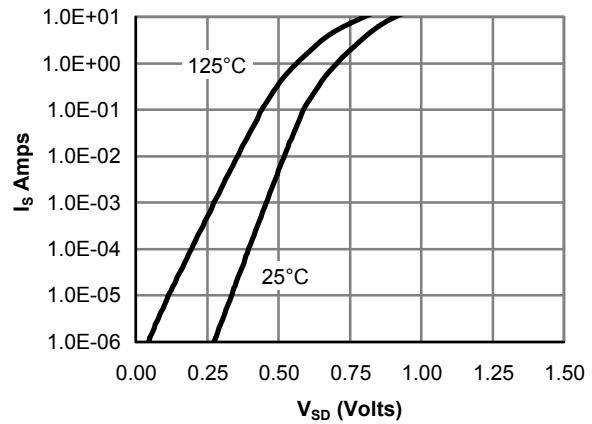


Figure 6: Body diode characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

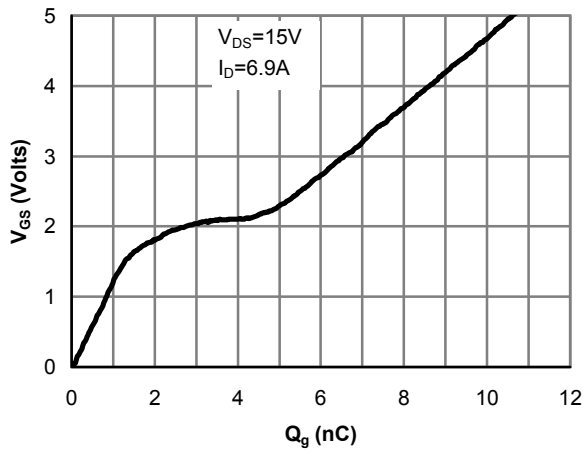


Figure 7: Gate-Charge characteristics

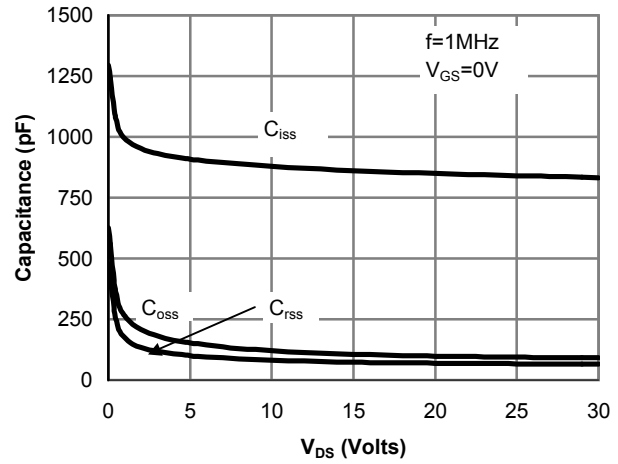


Figure 8: Capacitance Characteristics

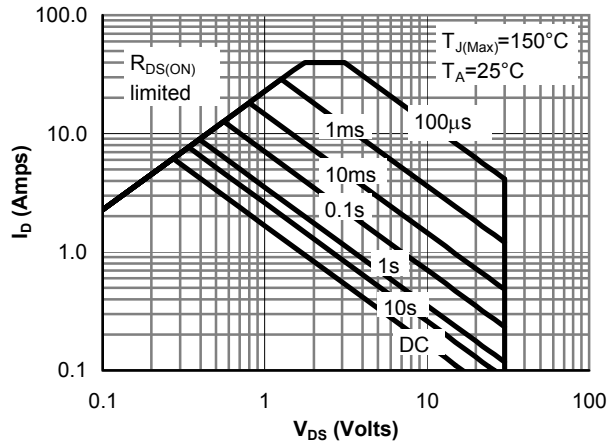


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

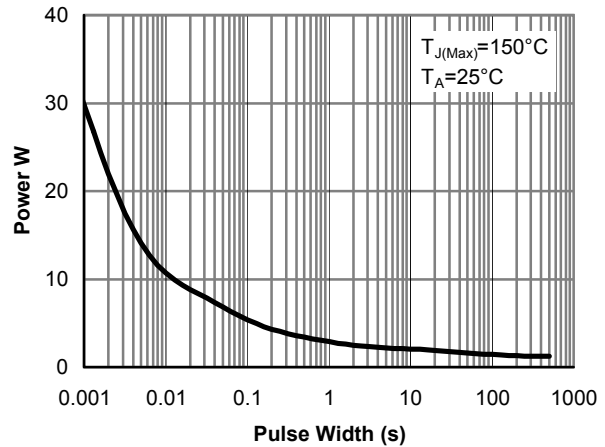


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

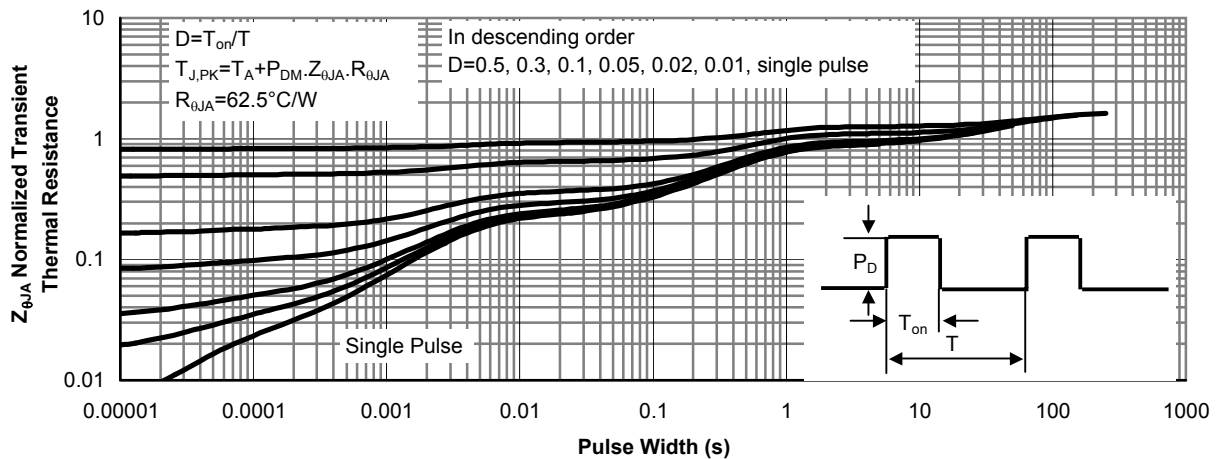
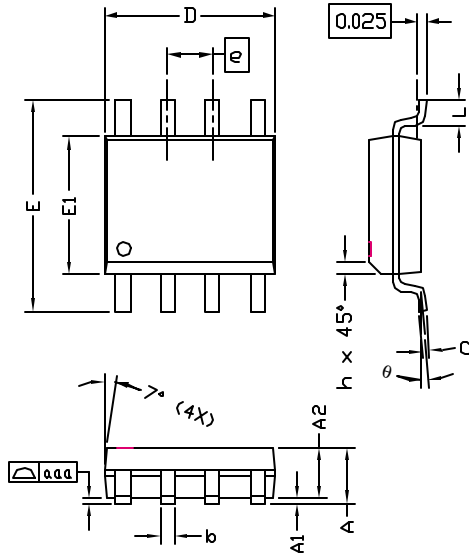


Figure 11: Normalized Maximum Transient Thermal Impedance

SO-8 Package Data



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.45	1.50	1.55	0.057	0.059	0.061
A1	0.00	—	0.10	0.000	—	0.004
A2	—	1.45	—	—	0.057	—
b	0.33	—	0.51	0.013	—	0.020
c	0.19	—	0.25	0.007	—	0.010
D	4.80	—	5.00	0.189	—	0.197
E1	3.80	—	4.00	0.150	—	0.157
e	1.27 BSC			0.050 BSC		
E	5.80	—	6.20	0.228	—	0.244
h	0.25	—	0.50	0.010	—	0.020
L	0.40	—	1.27	0.016	—	0.050
aaa	—	—	0.10	—	—	0.004
θ	0°	—	8°	0°	—	8°

NOTE:

1. LEAD FINISH: 150 MICROINCHES (3.8 μ m) MIN. THICKNESS OF Tin/Lead (SOLDER) PLATED ON LEAD
2. TOLERANCE ± 0.100 mm (4 mil) UNLESS OTHERWISE SPECIFIED
3. COPLANARITY : 0.1000 mm
4. DIMENSION L IS MEASURED IN GAGE PLANE