

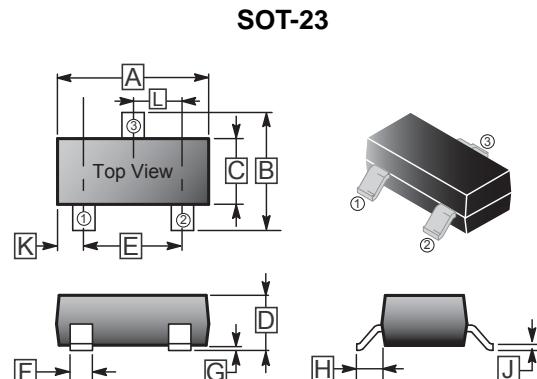
RoHS Compliant Product
A Suffix of "C" specifies halogen & lead-free

DESCRIPTIONS

The SMS2020 is N-Channel enhancement MOS Field Effect Transistor. Uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in DC-DC conversion, load switch and level shift.

MECHANICAL DATA

- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.04	G	-	0.18
B	2.10	2.80	H	0.40	0.60
C	1.20	1.60	J	0.08	0.20
D	0.89	1.40	K	0.6	REF.
E	1.78	2.04	L	0.85	1.15
F	0.30	0.50			

APPLICATION

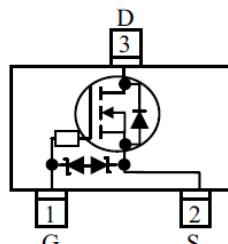
- DC-DC converter circuit
- Load Switch

DEVICE MARKING:



PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7 inch



MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating		Unit
		10S	Steady State	
Drain – Source Voltage	V_{DS}	20		V
Gate – Source Voltage	V_{GS}	± 6		V
Continuous Drain Current ¹	I_D	0.9	0.83	A
		0.72	0.66	
Power Dissipation ¹	P_D	0.38	0.32	W
		0.24	0.2	
Continuous Drain Current ²	I_D	0.79	0.71	A
		0.63	0.57	
Power Dissipation ²	P_D	0.29	0.24	W
		0.19	0.15	
Pulsed Drain Current ³	I_{DM}	1.4		A
Maximum Junction-to-Lead	$R_{\theta JL}$	260		$^\circ\text{C} / \text{W}$
Operating Junction & Storage Temperature Range	T_J, T_{STG}	150, -55~150		$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Rating		Unit
		Typ.	Max.	
Single Operation				
Junction-to-Ambient Thermal Resistance ¹	T ≤ 10S	R _{θJA}	270	325
	Steady State		320	385
Junction-to-Ambient Thermal Resistance ²	T ≤ 10S	R _{θJA}	360	420
	Steady State		425	520
Junction-to-Case Thermal Resistance	Steady State	R _{θJC}	260	300

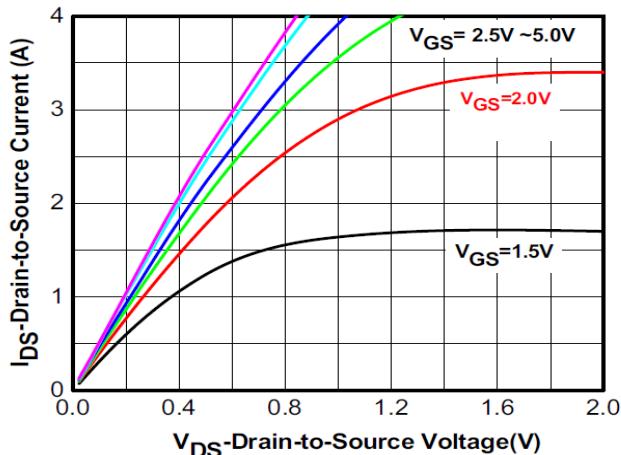
Note:

1. Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper.
2. Surface mounted on FR4 board using minimum pad size, 1oz copper
3. Repetitive rating, pulse width limited by junction temperature, t_p=10μs, Duty Cycle=1%
4. Repetitive rating, pulse width limited by junction temperature T_J=150°C.

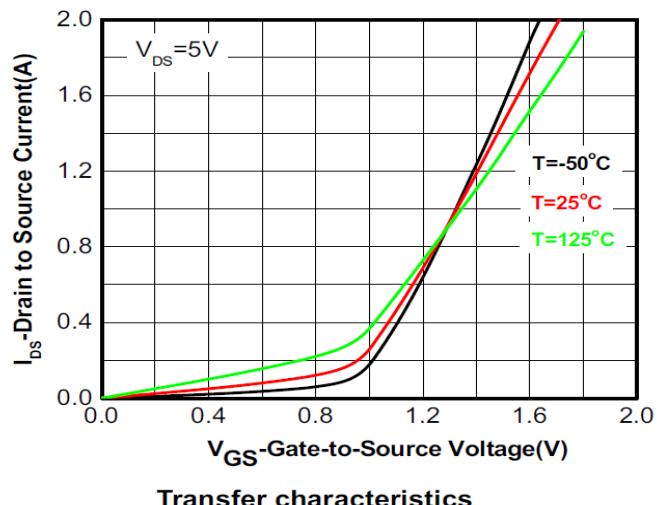
ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Static						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	20	-	-	V	V _{GS} =0, I _D =250μA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μA	V _{DS} =16V, V _{GS} =0
Gate-Source Leakage	I _{GSS}	-	-	±5	μA	V _{DS} =0, V _{GS} = ±5V
Gate-Threshold Voltage	V _{GS(TH)}	0.45	0.58	0.85	V	V _{DS} =V _{GS} , I _D =250μA
Drain-Source On Resistance	R _{DS(ON)}	-	220	310	mΩ	V _{GS} =4.5V, I _D =0.55A
		-	260	360		V _{GS} =2.5V, I _D =0.45A
		-	320	460		V _{GS} =1.8V, I _D =0.35A
Forward Transconductance	g _{FS}	-	2	-	S	V _{DS} =5V, I _D = 0.55A
Body-Drain Diode Ratings						
Diode Forward On-Voltage	V _{SD}	0.5	0.7	1.5	V	I _S =350mA, V _{GS} =0
Dynamic Characteristics						
Input Capacitance	C _{ISS}	-	50	-	pF	V _{DS} =10V, V _{GS} =0, f=100KHz
Output Capacitance	C _{OSS}	-	13	-		
Reverse Transfer Capacitance	C _{RSS}	-	8	-		
Total Gate Charge	Q _{G(TOT)}	-	1.15	-	nC	V _{DS} =10V, V _{GS} =4.5V, I _D =0.55A
Threshold Gate Charge	Q _{G(TH)}	-	0.06	-		
Gate-to-Source Charge	Q _{GS}	-	0.15	-		
Gate-to-Drain Charge	Q _{GD}	-	0.23	-		
Turn-on Delay Time	T _{d(ON)}	-	22	-	nS	V _{DD} =10V, I _D =0.55A, V _{GS} =4.5V, R _G =6Ω.
Rise Time	T _r	-	80	-		
Turn-off Delay Time	T _{d(OFF)}	-	700	-		
Fall Time	T _f	-	380	-		

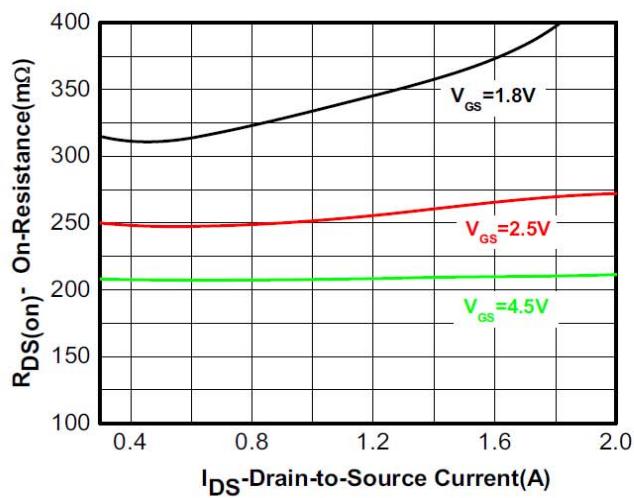
CHARACTERISTIC CURVES



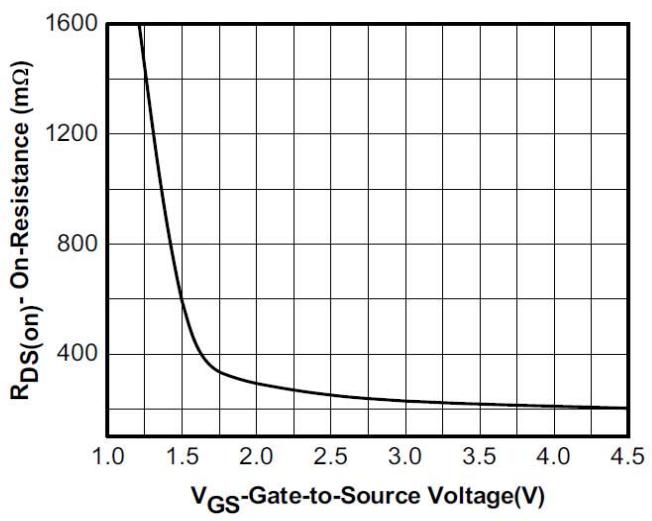
Output characteristics



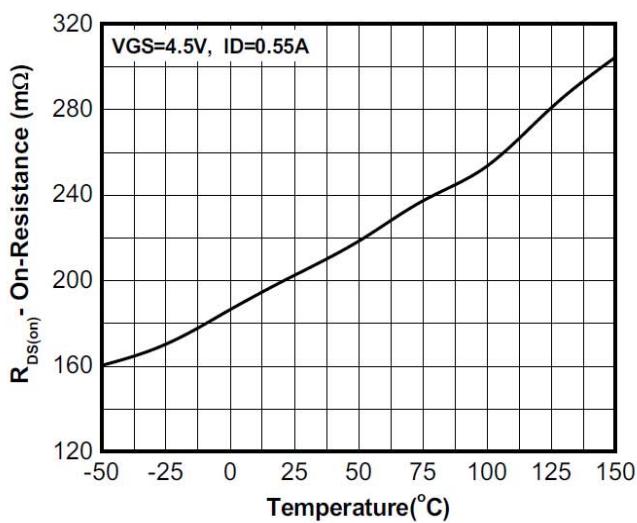
Transfer characteristics



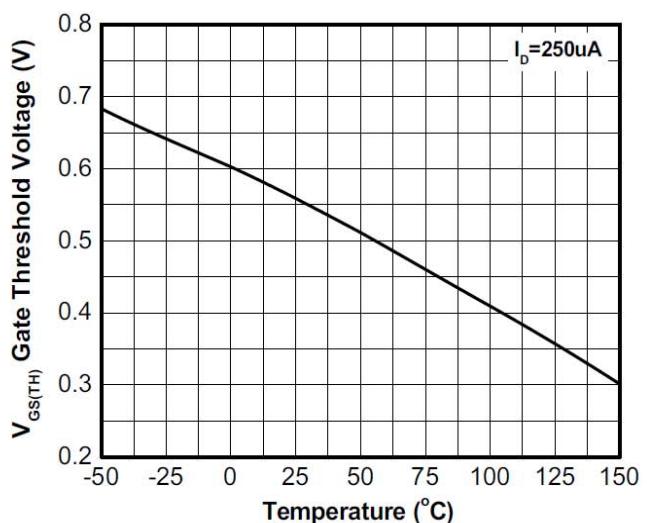
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage

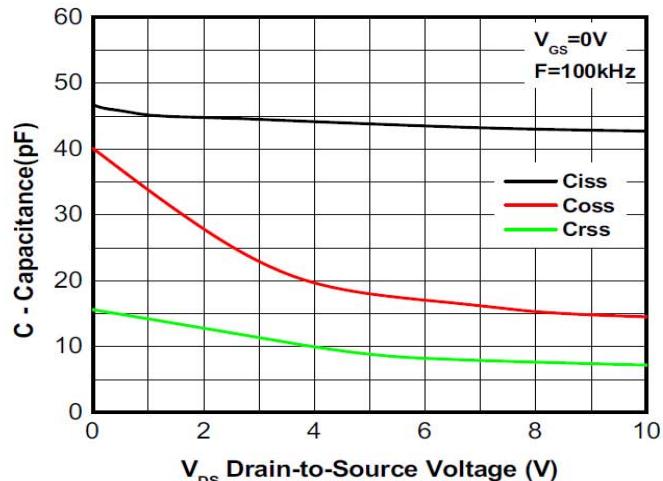


On-Resistance vs. Junction temperature

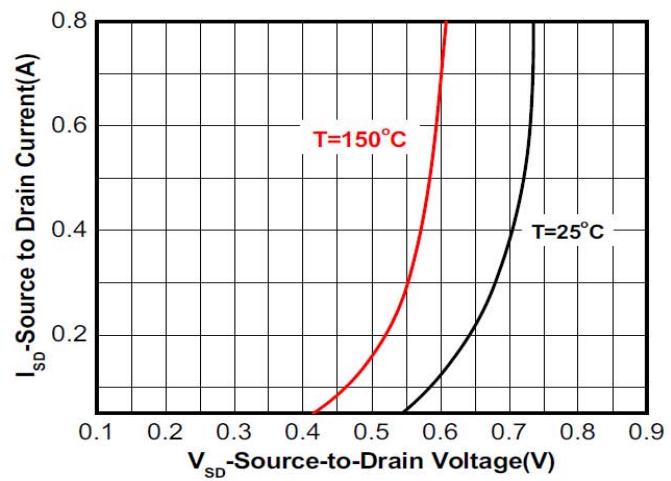


Threshold voltage vs. Temperature

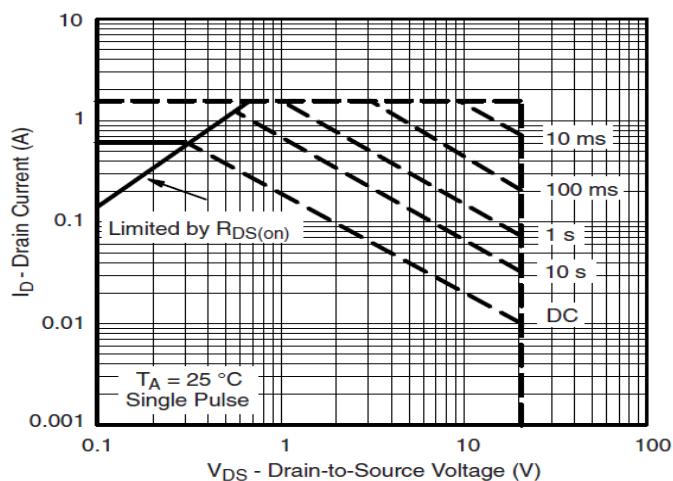
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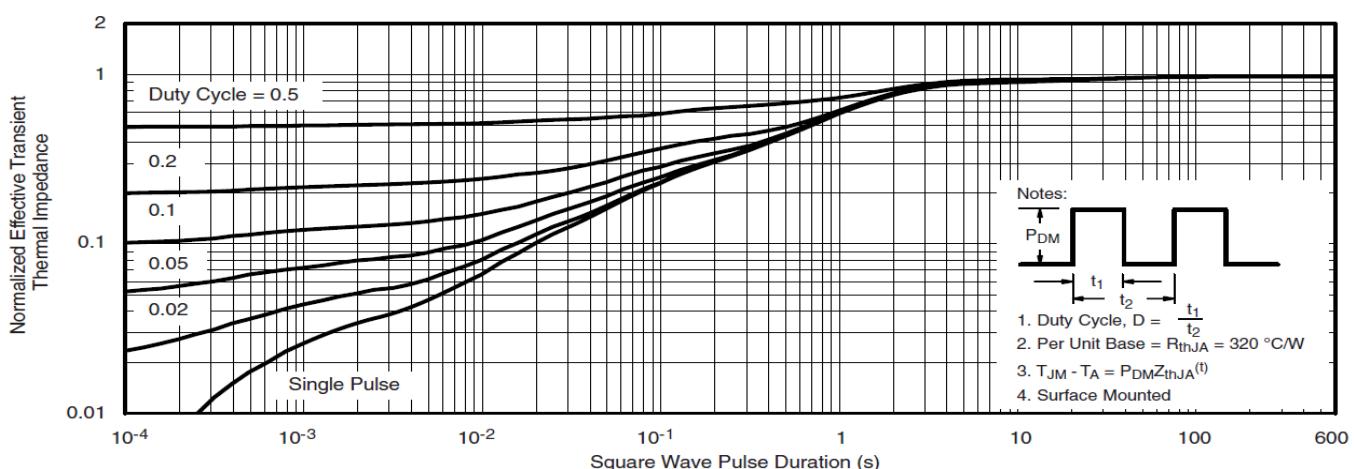
Capacitance



Body diode forward voltage



Safe operating power



Transient thermal response (Junction-to-Ambient)