Elektronische Bauelemente

SMS2020

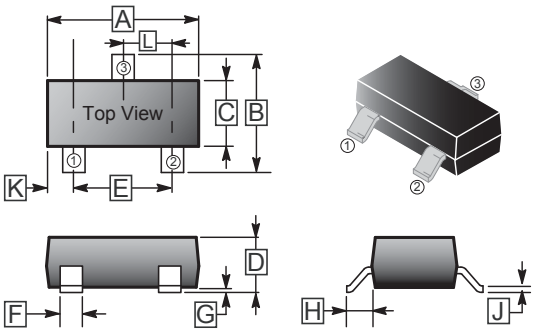
830mA, 20V
N-Channel MOSFET

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.

SOT-23



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			

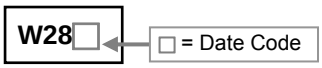
MECHANICAL DATA

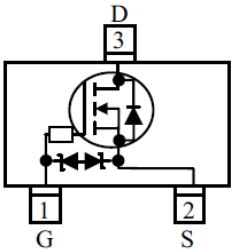
- Trench Technology
- Supper high density cell design
- Excellent ON resistance
- Extremely Low Threshold Voltage

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°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]	T_A= 25°C	I_D	0.9	0.83	A
	T_A= 70°C		0.72	0.66	
Power Dissipation [1]	T_A= 25°C	P_D	0.38	0.32	W
	T_A= 70°C		0.24	0.2	
Continuous Drain Current [2]	T_A= 25°C	I_D	0.79	0.71	A
	T_A= 70°C		0.63	0.57	
Power Dissipation [2]	T_A= 25°C	P_D	0.29	0.24	W
	T_A= 70°C		0.19	0.15	
Pulsed Drain Current [3]		I_{DM}	1.4		A
Maximum Junction-to-Lead		$R_{\theta JL}$	260		°C / W
Operating Junction & Storage Temperature Range		T_J, T_{STG}	150, -55~150		°C

THERMAL RESISTANCE RATINGS

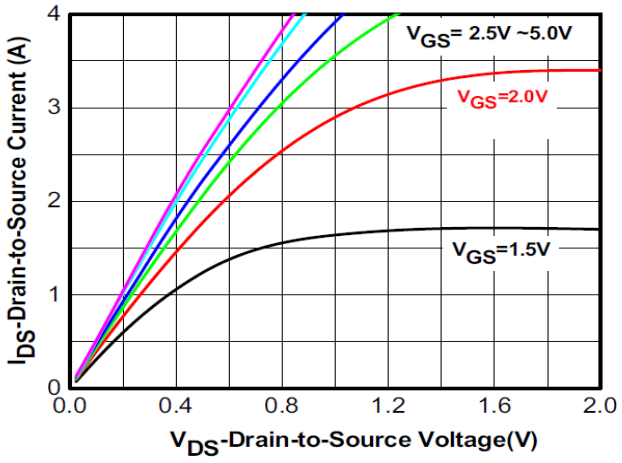
Parameter		Symbol	Rating		Unit
			Typ.	Max.	
Single Operation					
Junction-to-Ambient Thermal Resistance [1]	T≦10S	$R_{\theta JA}$	270	325	°C / W
	Steady State		320	385	
Junction-to-Ambient Thermal Resistance [2]	T≦10S	$R_{\theta JA}$	360	420	
	Steady State		425	520	
Junction-to-Case Thermal Resistance	Steady State	$R_{\theta JC}$	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, tp=10μs, Duty Cycle=1%
4. Repetitive rating, pulse width limited by junction temperature T_J=150°C.

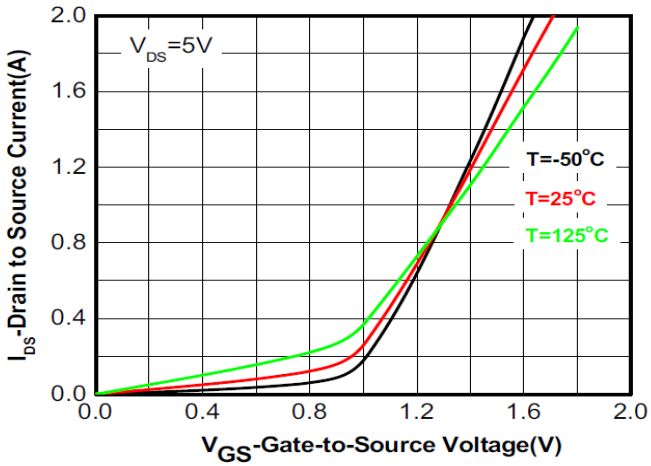
ELECTRICAL CHARACTERISTICS (T_A=25°C unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Teat 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	-		

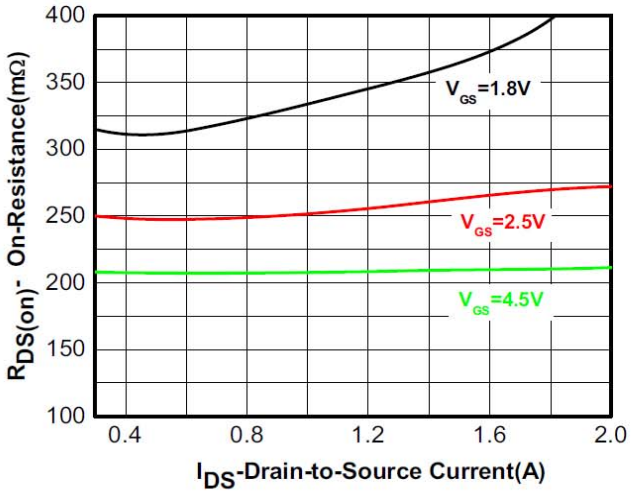
CHARACTERISTIC CURVES



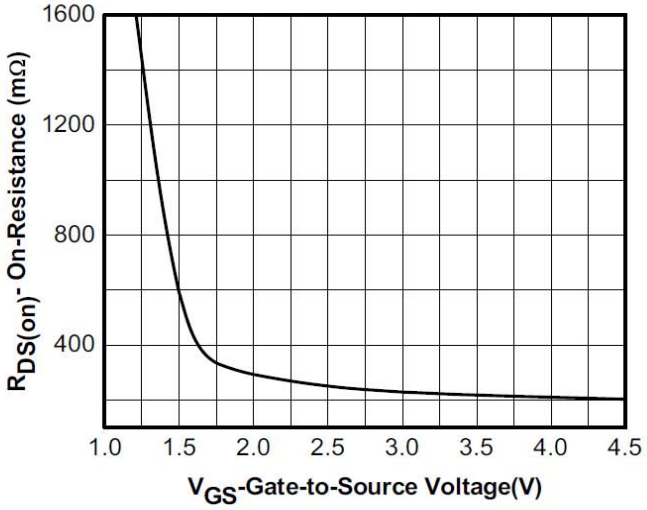
Output characteristics



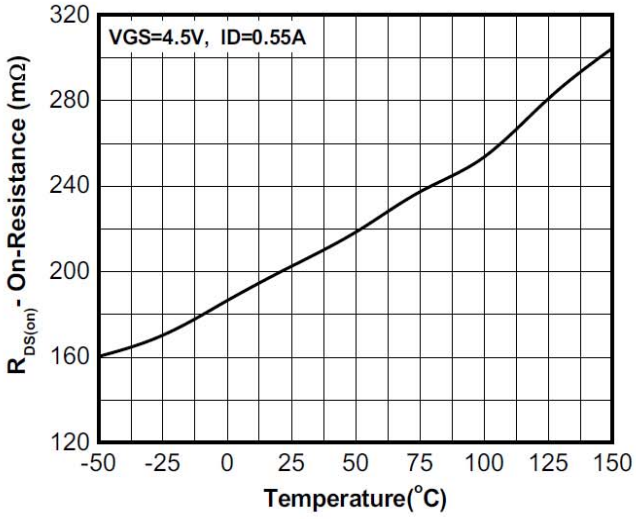
Transfer characteristics



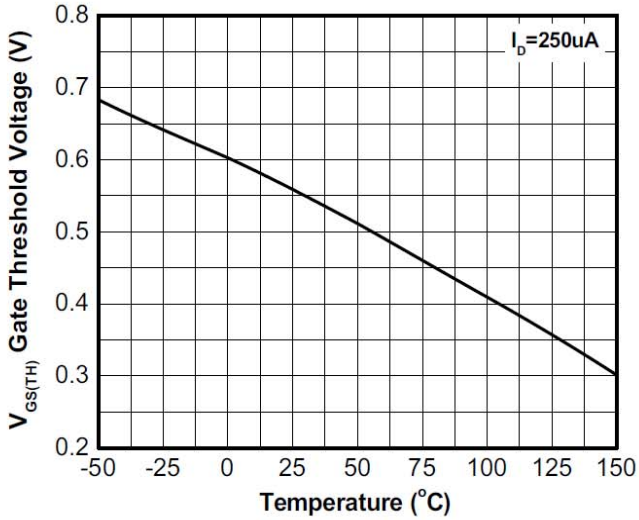
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage

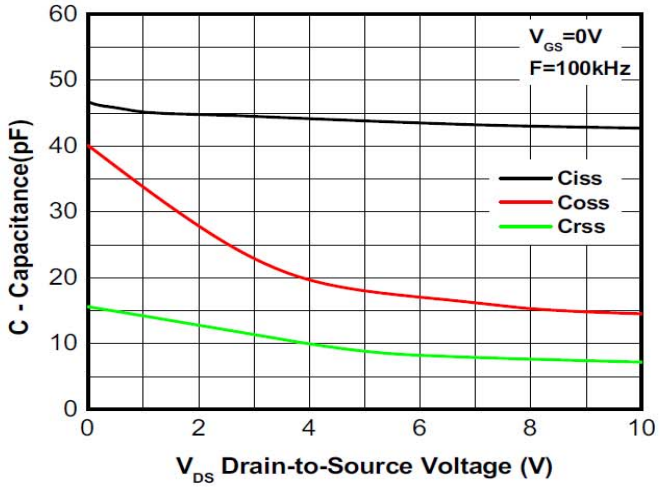


On-Resistance vs. Junction temperature

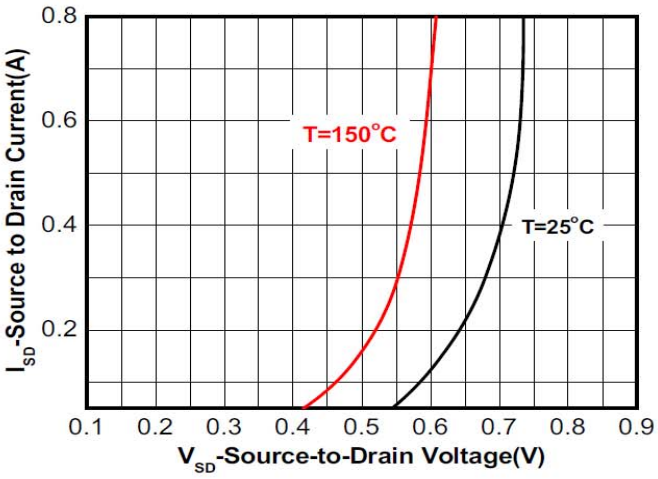


Threshold voltage vs. Temperature

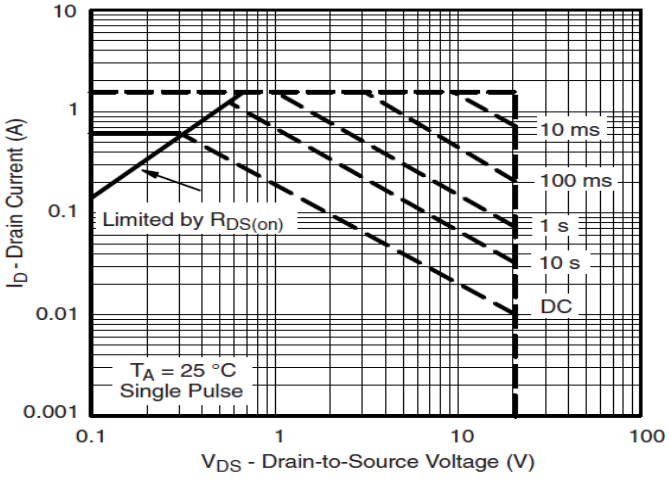
CHARACTERISTIC CURVES



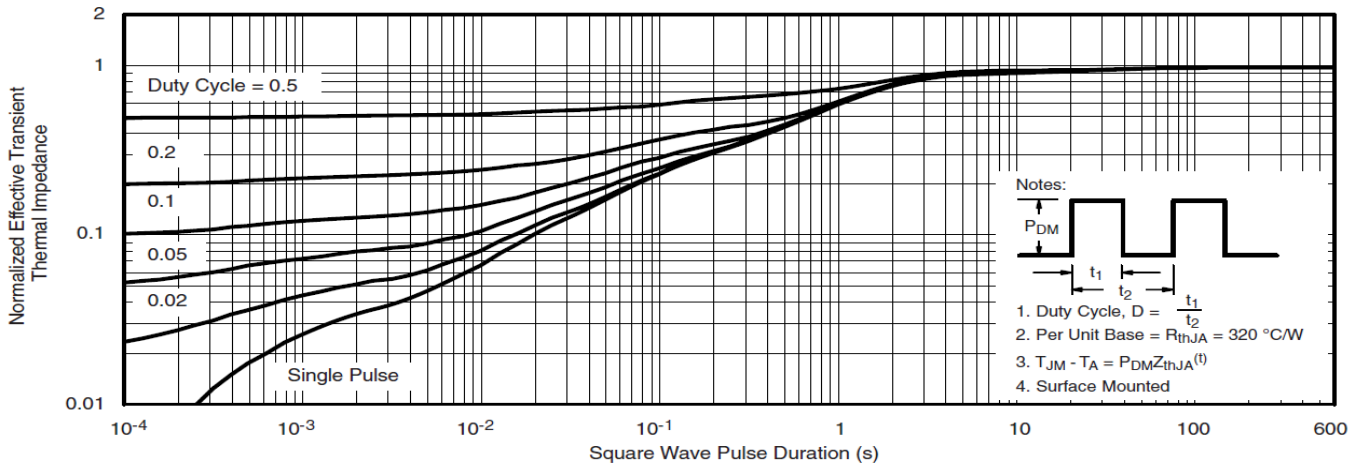
Capacitance



Body diode forward voltage



Safe operating power



Transient thermal response (Junction-to-Ambient)