

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

DESCRIPTIONS

The SMS6001 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
- ESD Rating: 2KV HBM

APPLICATION

- DC-DC converter circuit
- Load Switch

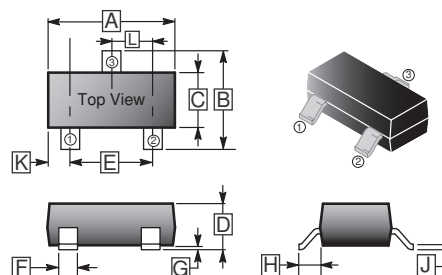
DEVICE MARKING:



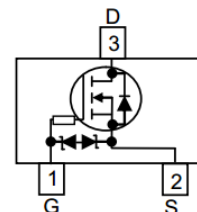
PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7' inch

SOT-23



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.09	0.18
B	2.10	2.65	H	0.35	0.65
C	1.20	1.40	J	0.08	0.20
D	0.89	1.15	K	0.6 REF.	
E	1.78	2.04	L	0.95 BSC.	
F	0.30	0.50			



Pin Configuration (Top View)

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

Parameter	Symbol	Rating		Unit	
		10S	Steady State		
Drain – Source Voltage	V_{DS}	60		V	
Gate – Source Voltage	V_{GS}	± 20		V	
Continuous Drain Current ^{1,4}	I_D	$T_A = 25^\circ\text{C}$	0.5	0.44	A
		$T_A = 70^\circ\text{C}$	0.4	0.35	
Power Dissipation ^{1,4}	P_D	$T_A = 25^\circ\text{C}$	0.69	0.53	W
		$T_A = 70^\circ\text{C}$	0.44	0.34	
Continuous Drain Current ^{2,4}	I_D	$T_A = 25^\circ\text{C}$	0.47	0.42	A
		$T_A = 70^\circ\text{C}$	0.38	0.33	
Power Dissipation ^{2,4}	P_D	$T_A = 25^\circ\text{C}$	0.6	0.47	W
		$T_A = 70^\circ\text{C}$	0.39	0.3	
Pulsed Drain Current ³	I_{DM}	1		A	
Maximum Junction-to-Lead	$R_{\theta JL}$	260		$^\circ\text{C} / \text{W}$	
Operating Junction & Storage Temperature Range	T_J, T_{STG}	-55~150		$^\circ\text{C}$	

Thermal Resistance Ratings

Parameter	Symbol	Rating		Unit	
		Typ.	Max.		
Junction-to-Ambient Thermal Resistance ¹	$R_{\theta JA}$	$T \leq 10S$	140	180	°C / W
		Steady State	176	232	
Junction-to-Ambient Thermal Resistance ²	$R_{\theta JA}$	$T \leq 10S$	165	205	
		Steady State	198	261	
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	Steady State	100	120	

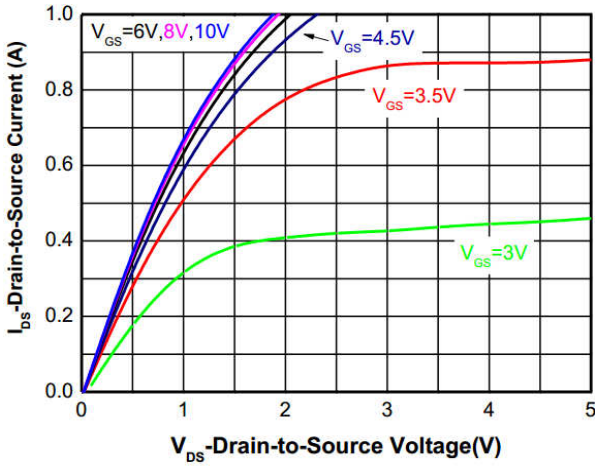
Electrical Characteristics ($T_A=25^\circ C$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Teat Conditions
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	60	-	-	V	$V_{GS}=0, I_D=250\mu A$
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	μA	$V_{DS}=60V, V_{GS}=0$
Gate-Source Leakage	I_{GSS}	-	-	± 5	μA	$V_{DS}=0, V_{GS}=\pm 20V$
Gate-Threshold Voltage	$V_{GS(TH)}$	0.8	1.3	2	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Drain-Source On Resistance ^{2,3}	$R_{DS(ON)}$	-	1.4	2	Ω	$V_{GS}=10V, I_D=0.5A$
		-	1.7	2.6		$V_{GS}=4.5V, I_D=0.2A$
Forward Transconductance	g_{FS}	-	0.42	-	S	$V_{DS}=15V, I_D=0.25A$
Body-Drain Diode Ratings						
Diode Forward On-Voltage	V_{SD}	-	0.9	1.5	V	$I_S=300mA, V_{GS}=0$
Dynamic Characteristics						
Input Capacitance	C_{ISS}	-	23.37	-	pF	$V_{DS}=25V, V_{GS}=0, f=1MHz$
Output Capacitance	C_{OSS}	-	7.33	-		
Reverse Transfer Capacitance	C_{RSS}	-	5.2	-		
Total Gate Charge	$Q_{G(TOT)}$	-	1.2	-	nC	$V_{DD}=30V, V_{GS}=10V, I_D=0.37A$
Threshold Gate Charge	$Q_{G(TH)}$	-	0.15	-		
Gate-to-Source Charge	Q_{GS}	-	0.21	-		
Gate-to-Drain Charge	Q_{GD}	-	0.12	-		
Turn-on Delay Time	$T_{d(ON)}$	-	7.6	-	nS	$V_{DD}=30V, I_D=0.2A, V_{GEN}=10V, R_G=10\Omega.$
Rise Time	T_r	-	5.1	-		
Turn-off Delay Time	$T_{d(OFF)}$	-	24.6	-		
Fall Time	T_f	-	10	-		

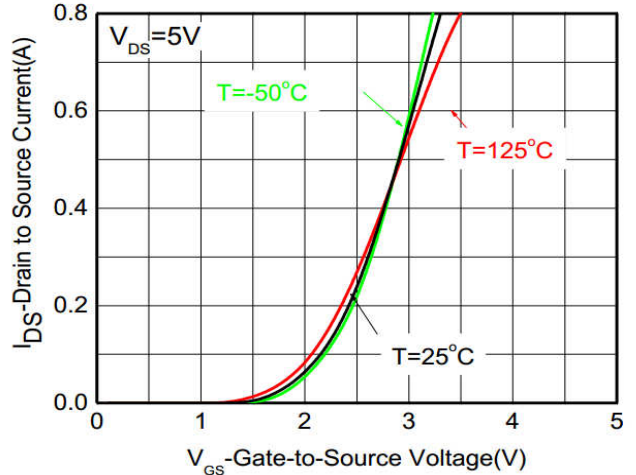
Note:

- Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper.
- Surface mounted on FR4 board using minimum pad size, 1oz copper
- Pulse width < 380 μs
- Repetitive rating, pulse width limited by junction temperature $T_J=150^\circ C$.

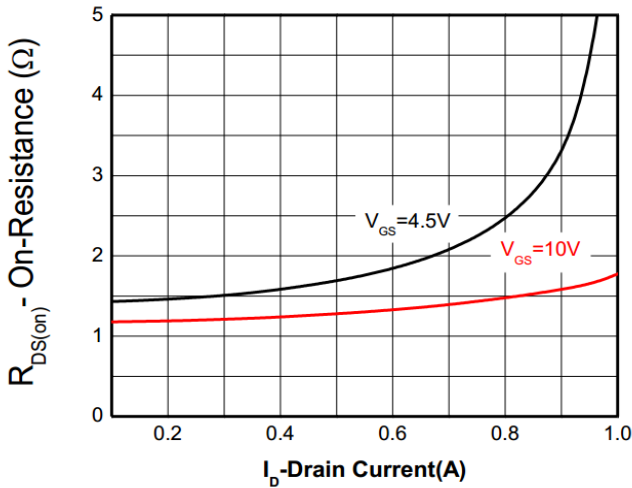
CHARACTERISTIC CURVES



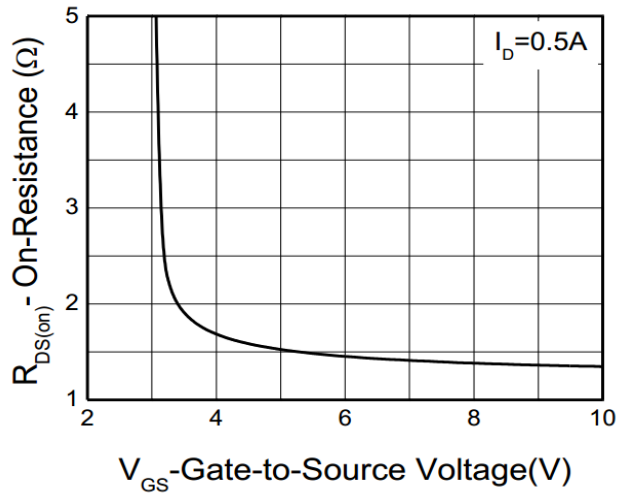
Output characteristics



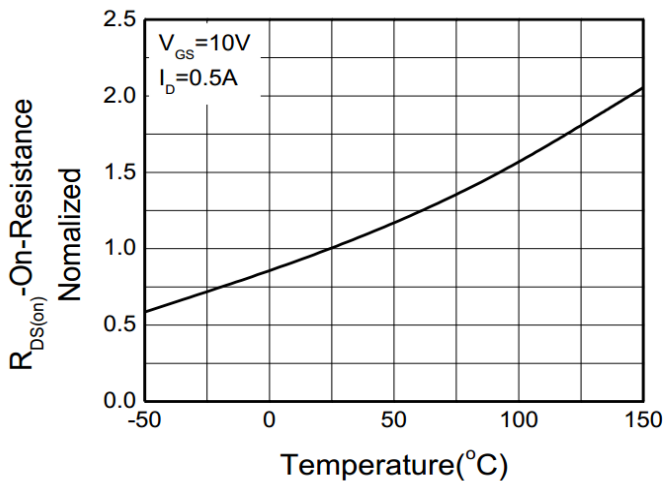
Transfer characteristics



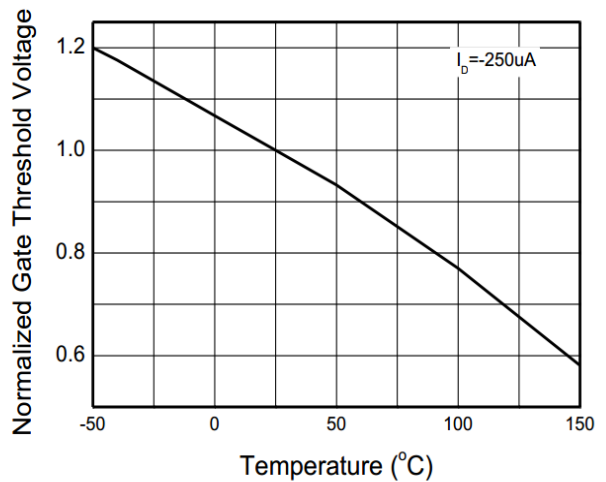
On-Resistance vs. Drain current



On-Resistance vs. Gate-to-Source voltage

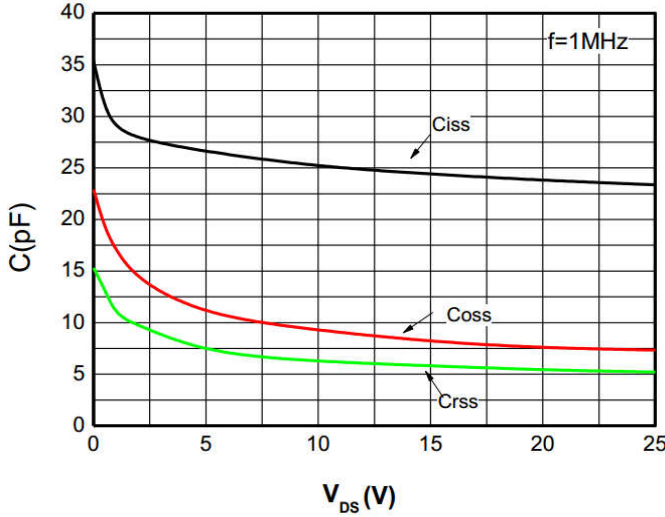


On-Resistance vs. Junction temperature

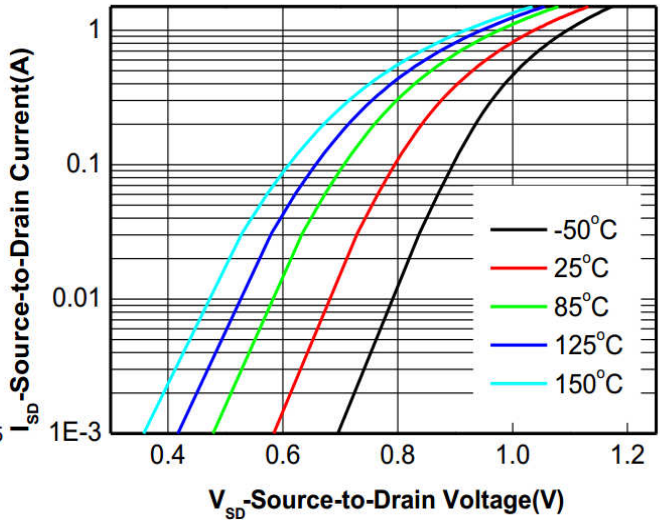


Threshold voltage vs. Temperature

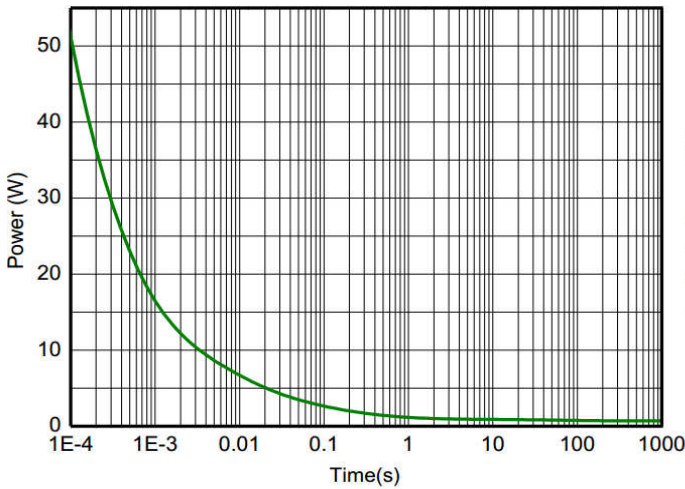
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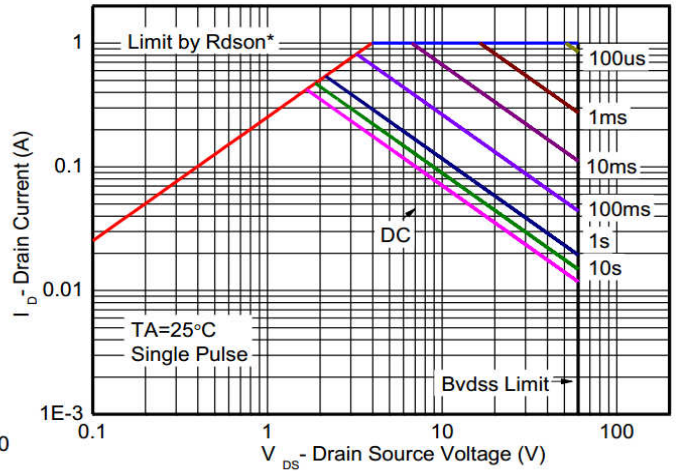
Capacitance



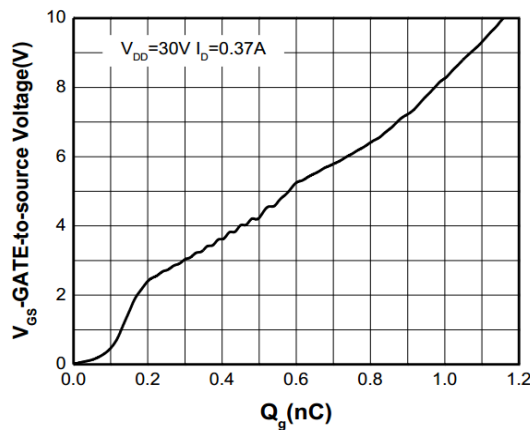
Body diode forward voltage



Single pulse power



Safe operating power



Gate Charge Characteristics