

RoHS Compliant Product
 A suffix of "-C" specifies halogen and lead-free

DESCRIPTION

The SMG5403 uses advanced trench technology to provide excellent on-resistance with low gate change. The device is suitable for use as a load switch or in PWM applications.

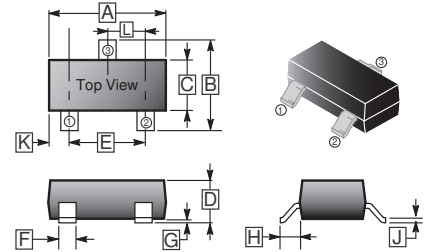
FEATURES

- Lower Gate Threshold Voltage
- Small Package Outline

MARKING

5403

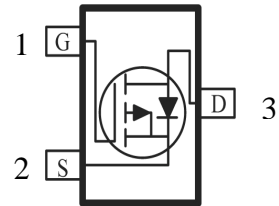
SC-59



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0.10	REF.
B	2.25	3.00	H	0.40	REF.
C	1.30	1.70	J	0.10	0.20
D	1.00	1.40	K	0.45	0.55
E	1.70	2.30	L	0.85	1.15
F	0.35	0.50			

PACKAGE INFORMATION

Package	MPQ	Leader Size
SC-59	3K	7 inch



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

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	± 12	V
Continuous Drain Current ³	I_D	$T_A=25^\circ\text{C}$	-2.6
		$T_A=70^\circ\text{C}$	-2.2
Pulsed Drain Current ¹	I_{DM}	-10	A
Power Dissipation	P_D	1.38	W
Linear Derating Factor		0.01	W / $^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~150	$^\circ\text{C}$
Thermal Resistance Rating			
Maximum Junction to Ambient ³	$R_{\theta JA}$	90	$^\circ\text{C} / \text{W}$

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions	
Static							
Drain-Source Breakdown Voltage	BV_{DSS}	-30	-	-	V	$V_{GS}=0, I_D = -250\mu\text{A}$	
Gate-Threshold Voltage	$V_{GS(th)}$	-0.5	-	-1.4	V	$V_{DS}=V_{GS}, I_D = -250\mu\text{A}$	
Forward Transconductance	g_{FS}	-	5	-	S	$V_{DS} = -5V, I_D = -2.5A$	
Gate-Body Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 12V$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	-1	μA	$V_{DS} = -30V, V_{GS}=0$
		$T_J=70^\circ\text{C}$	-	-	-25		$V_{DS} = -24V, V_{GS}=0$
Drain-Source On-Resistance ²	$R_{DS(ON)}$	-	-	115	m Ω	$V_{GS} = -10V, I_D = -2.6A$	
		-	-	150		$V_{GS} = -4.5V, I_D = -2A$	
		-	-	200		$V_{GS} = -2.5V, I_D = -1A$	
Total Gate Charge ²	Q_g	-	4.5	-	nC	$V_{DS} = -15V,$ $V_{GS} = -4.5V,$ $I_D = -2.5A$	
Gate-Source Charge	Q_{gs}	-	0.8	-			
Gate-Drain Charge	Q_{gd}	-	1.34	-			
Turn-on Delay Time ²	$T_{d(on)}$	-	5.4	-	nS	$V_{DS} = -15V,$ $V_{GS} = -10V,$ $R_G=3.3\Omega,$ $R_D=4.6\Omega,$ $I_D = -1A$	
Rise Time	T_r	-	4.6	-			
Turn-off Delay Time	$T_{d(off)}$	-	31	-			
Fall Time	T_f	-	8	-			
Input Capacitance	C_{iss}	-	415	-	pF	$V_{GS}=0$ $V_{DS} = -25V,$ $f=1.0\text{MHz}$	
Output Capacitance	C_{oss}	-	55	-			
Reverse Transfer Capacitance	C_{rss}	-	42	-			
Source-Drain Diode							
Diode Forward Voltage ²	V_{SD}	-	-	-1.2	V	$I_S = -1.2A, V_{GS}=0$	
Reverse Recovery Time	T_{rr}	-	16.2	-	nS	$I_S = -2.5A, V_{GS}=0$	
Reverse Recovery Charge	Q_{rr}	-	9	-	nC	$di/dt=100A/\mu\text{S}$	

Notes:

1. Pulse width limited by Max. junction temperature.
2. Pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Surface mounted on 1 in² copper pad of FR4 board; 270°C / W when mounted on Min. copper pad.

CHARACTERISTIC CURVES

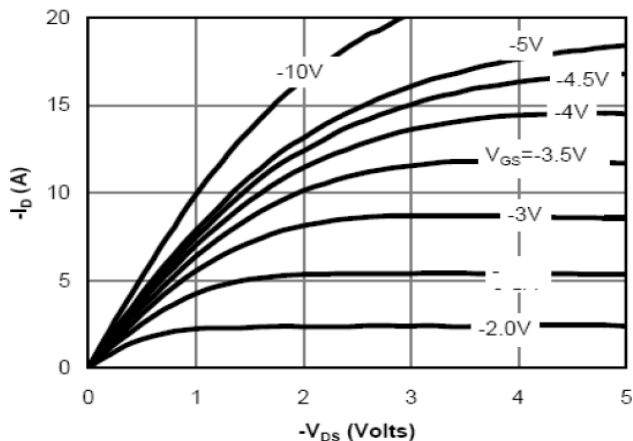


Fig 1: On-Region Characteristics

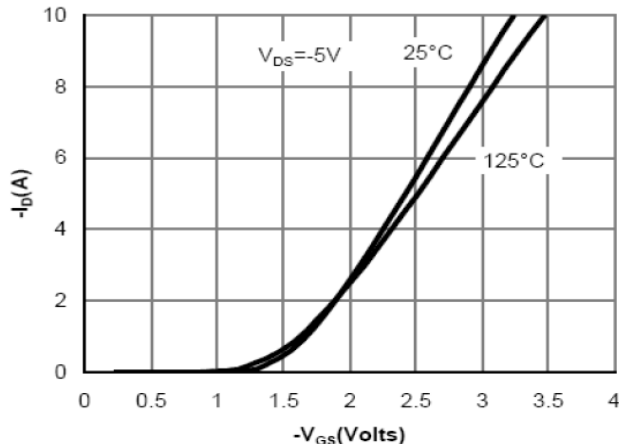


Figure 2: Transfer Characteristics

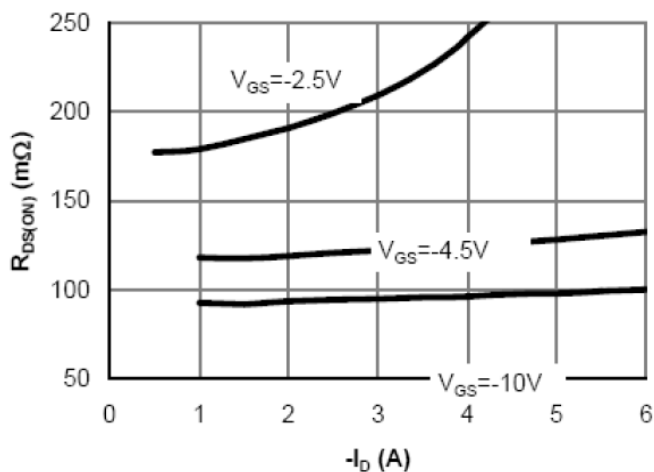


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

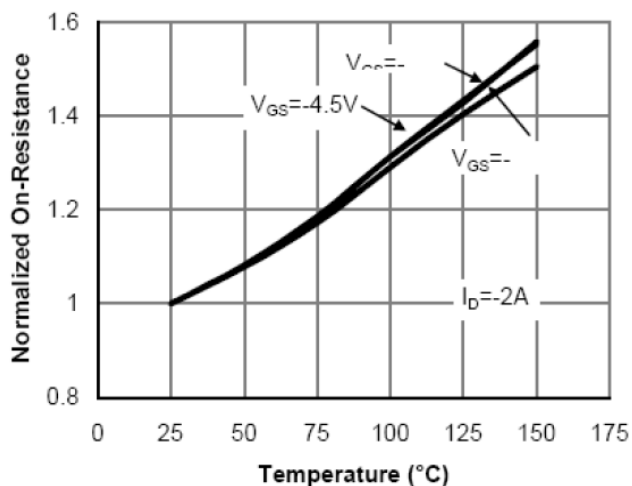


Figure 4: On-Resistance vs. Junction Temperature

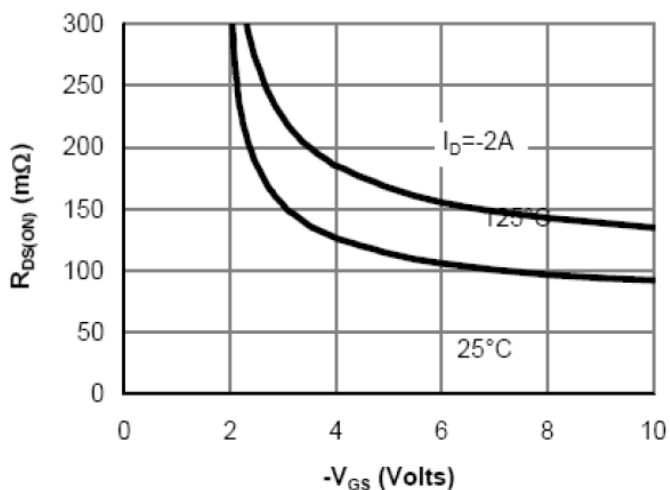


Figure 5: On-Resistance vs. Gate-Source Voltage

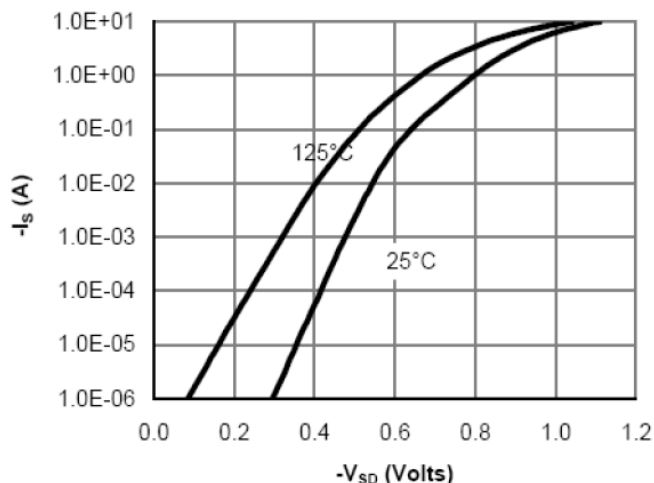


Figure 6: Body-Diode Characteristics

CHARACTERISTIC CURVES

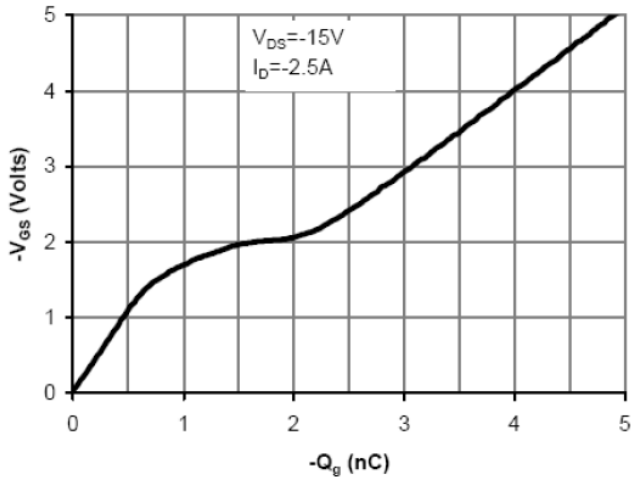


Figure 7: Gate-Charge Characteristics

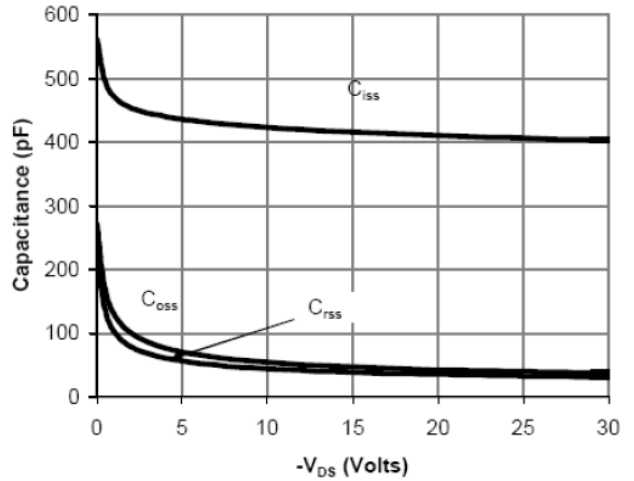


Figure 8: Capacitance Characteristics

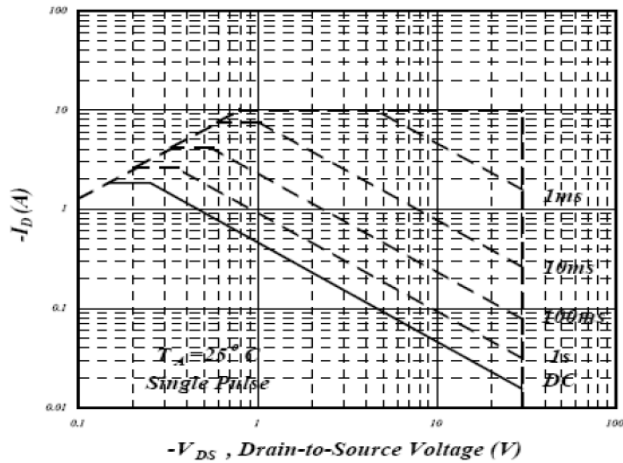


Figure 9. Maximum Safe Operating Area

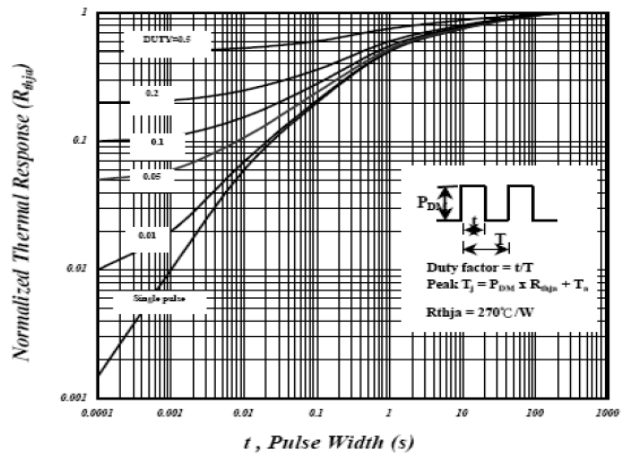


Figure 10. Effective Transient Thermal Impedance

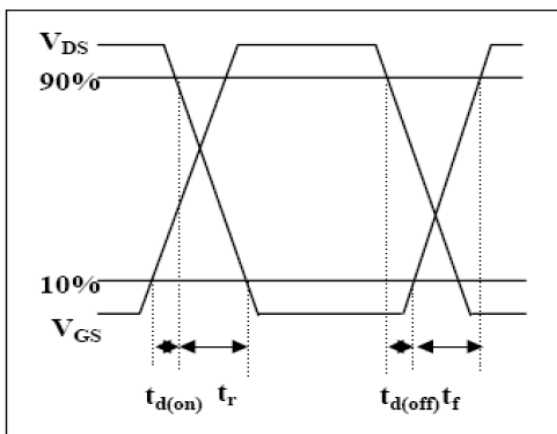


Figure 11. Switching Time Waveform

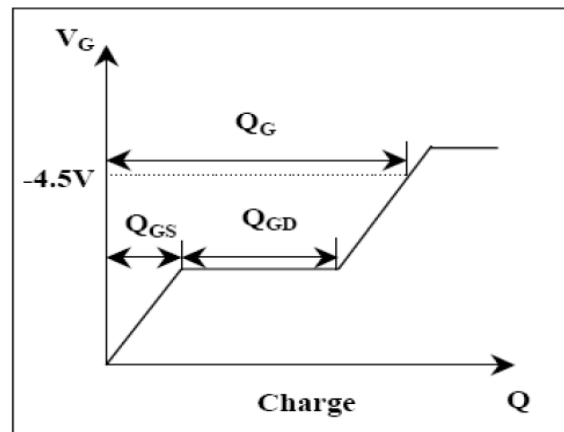


Figure 12. Gate Charge Waveform