

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

DESCRIPTION

The SMG5406 utilized advanced processing techniques to achieve the lowest possible on-resistance, extremely efficient and cost-effectiveness device. The SMG5406 is universally used for all commercial-industrial applications.

FEATURES

- Simple Drive Requirement
- Small Package Outline

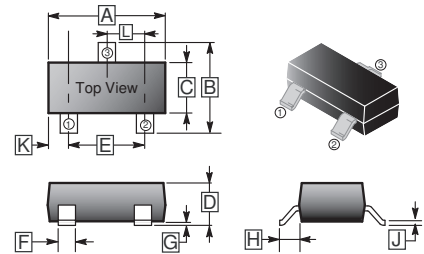
MARKING

5402

PACKAGE INFORMATION

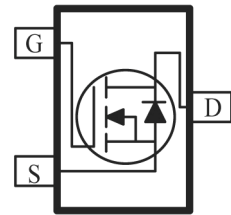
Package	MPQ	Leader Size
SC-59	3K	7 inch

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			

TOP VIEW



ABSOLUTE MAXIMUM RATINGS (T_A=25°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 , V _{GS} @4.5V	I _D	T _A =25°C	4
		T _A =70°C	3
Pulsed Drain Current ^{1,2}	I _{DM}	16	A
Power Dissipation	P _D	1.38	W
Linear Derating Factor		0.01	W / °C
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55~150	°C
Thermal Resistance Rating			
Maximum Junction to Ambient ³	R _{θJA}	90	°C / 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	-	1.5	V	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	
Gate-Body Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 12\text{V}$	
Drain-Source Leakage Current	I_{DSS}	$T_J=25^\circ\text{C}$	-	-	1	μA	$V_{DS}=30\text{V}, V_{GS}=0$
		$T_J=70^\circ\text{C}$	-	-	25		$V_{DS}=24\text{V}, V_{GS}=0$
Drain-Source On-Resistance	$R_{DS(ON)}$		-	-	55	m Ω	$V_{GS}=10\text{V}, I_D=4\text{A}$
			-	-	70		$V_{GS}=4.5\text{V}, I_D=3\text{A}$
			-	-	110		$V_{GS}=2.5\text{V}, I_D=2\text{A}$
Forward Transconductance	g_{fs}	-	3	-	S	$V_{DS}=10\text{V}, I_D=3\text{A}$	
Dynamic							
Total Gate Charge ²	Q_g	-	6	-	nC	$V_{DS}=15\text{V},$ $V_{GS}=4.5\text{V},$ $I_D=3\text{A}$	
Gate-Source Charge	Q_{gs}	-	1	-			
Gate-Drain ("Miller") Charge	Q_{gd}	-	2.8	-			
Turn-on Delay Time ²	$T_{d(on)}$	-	5.8	-	nS	$V_{DS}=15\text{V},$ $V_{GS}=5\text{V},$ $R_G=3.3\Omega,$ $R_D=15\Omega,$ $I_D=1\text{A}$	
Rise Time	T_r	-	9.6	-			
Turn-off Delay Time ²	$T_{d(off)}$	-	14.4	-			
Fall Time	T_f	-	3.9	-			
Input Capacitance	C_{iss}	-	335	-	pF	$V_{GS}=0,$ $V_{DS}=25\text{V},$ $f=1.0\text{MHz}$	
Output Capacitance	C_{oss}	-	50	-			
Reverse Transfer Capacitance	C_{rss}	-	45	-			
Source-Drain Diode							
Diode Forward Voltage ²	V_{SD}	-	-	1.2	V	$I_S=1.2\text{A}, V_{GS}=0$	
Reverse Recovery Time ²	T_{RR}	-	15	-	ns	$I_S=3\text{A}, V_{GS}=0$	
Reverse Recovery Charge	Q_{RR}	-	8	-	nC	$dI/dt=100\text{A}/\mu\text{s}$	

Notes:

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

CHARACTERISTIC CURVES

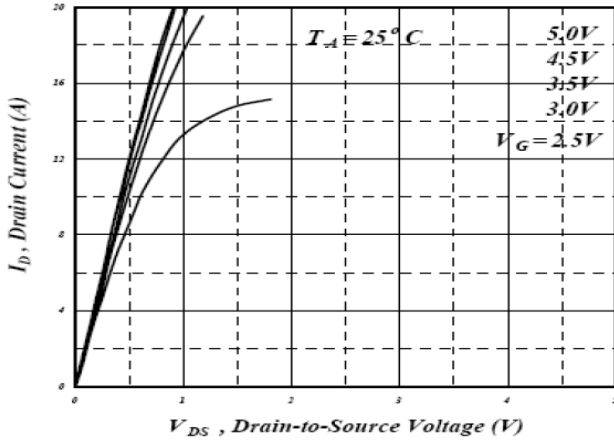


Fig 1. Typical Output Characteristics

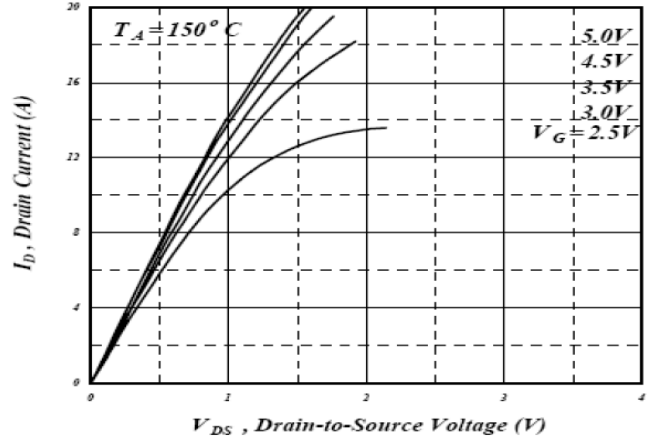


Fig 2. Typical Output Characteristics

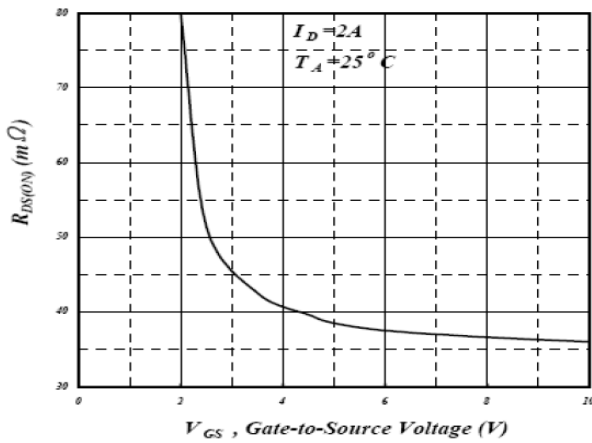


Fig 3. On-Resistance v.s. Gate Voltage

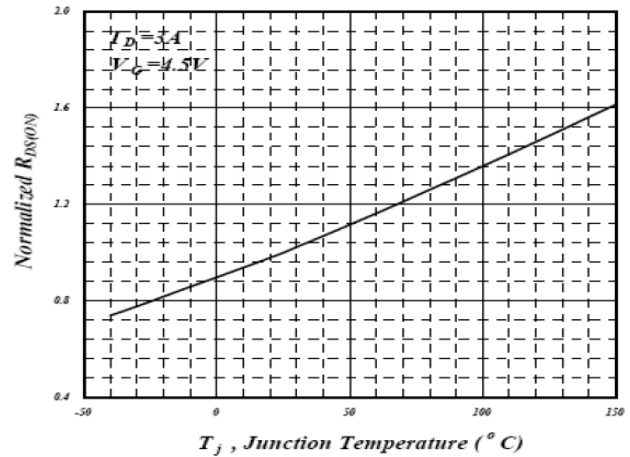


Fig 4. Normalized On-Resistance v.s. Junction Temperature

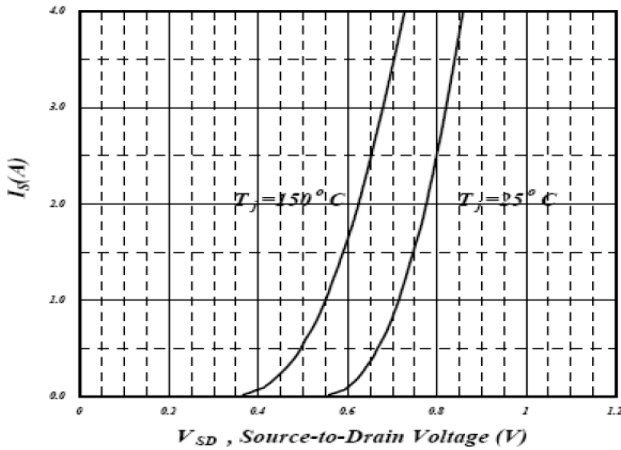


Fig 5. Forward Characteristic of Reverse Diode

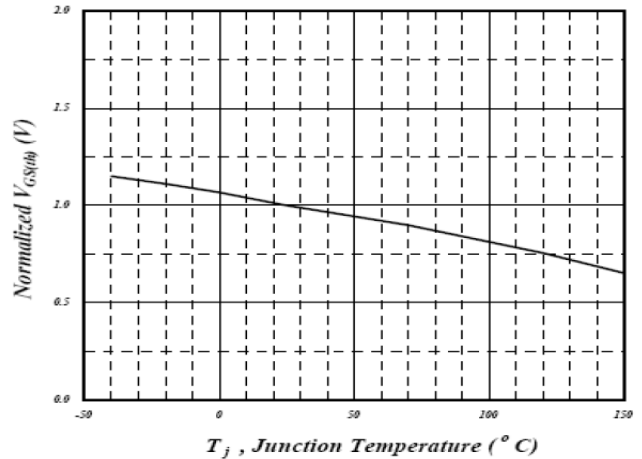


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

CHARACTERISTIC CURVES

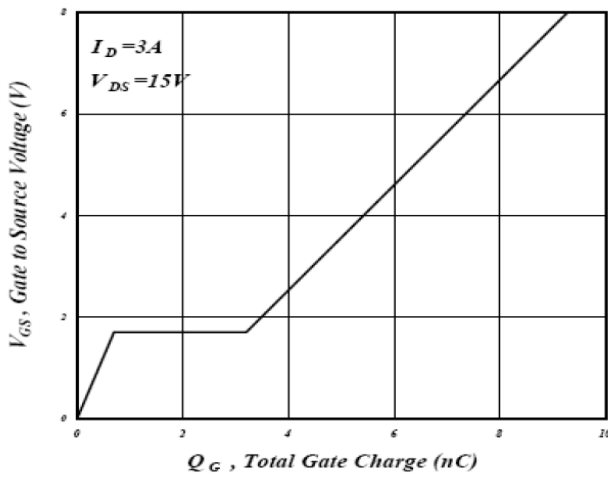


Fig 7. Gate Charge Characteristics

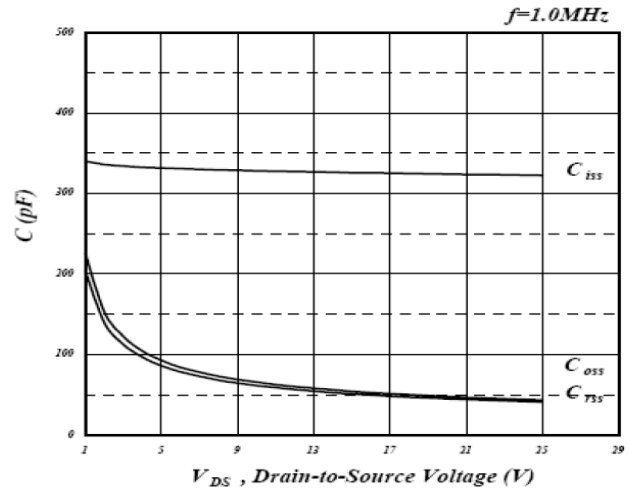


Fig 8. Typical Capacitance Characteristics

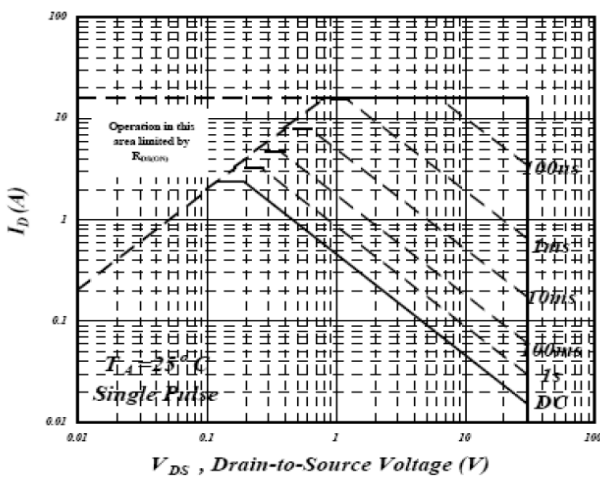


Fig 9. Maximum Safe Operating Area

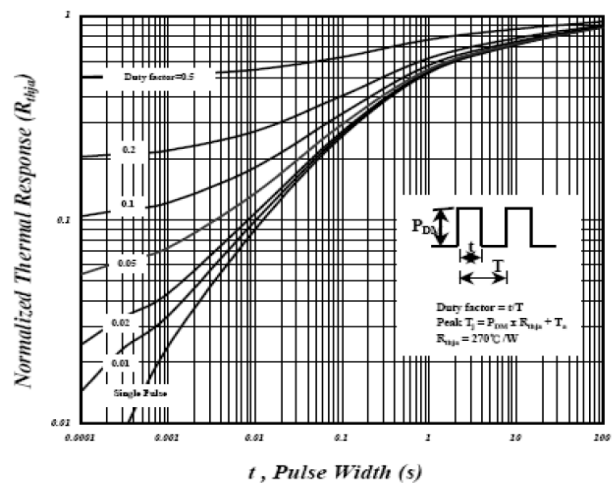


Fig 10. Effective Transient Thermal Impedance

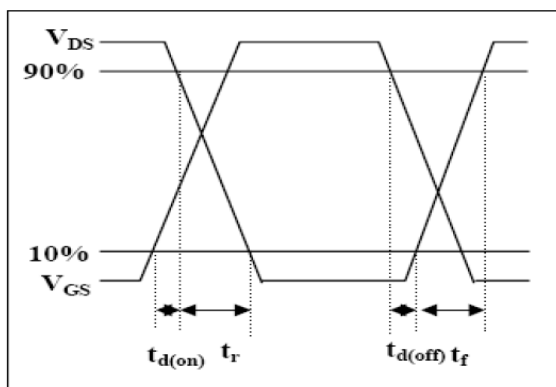


Fig 11. Switching Time Waveform

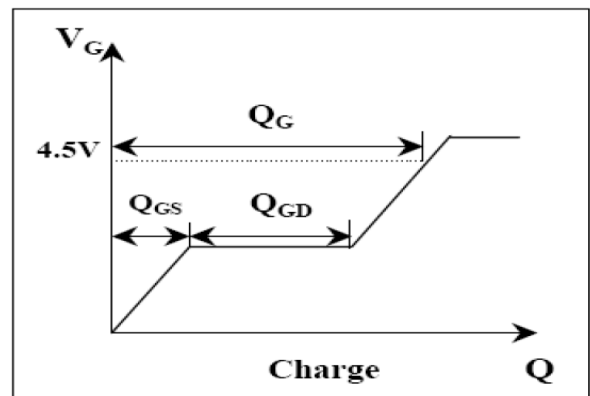


Fig 12. Gate Charge Circuit