

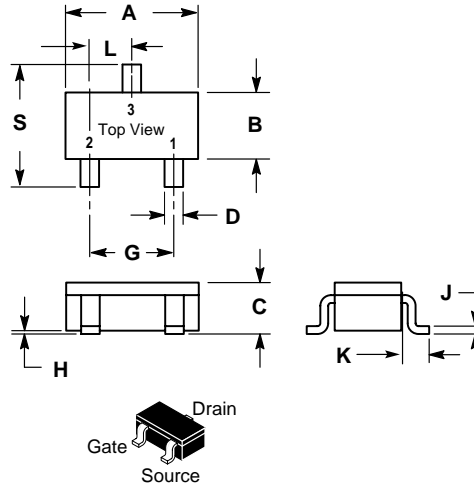
RoHS Compliant Product

## Description

The SMG351AN uses advanced trench technology to provide excellent on-resistance with low gate charge. The device is suitable for use as a load switch or in PWM applications.

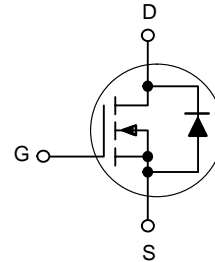
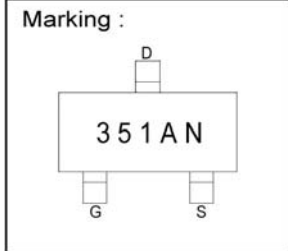
## Features

- \* Lower Gate Charge
- \* Small Package Outline



SC-59		
Dim	Min	Max
A	2.70	3.10
B	1.40	1.60
C	1.00	1.30
D	0.35	0.50
G	1.70	2.10
H	0.00	0.10
J	0.10	0.26
K	0.20	0.60
L	0.85	1.15
S	2.40	2.80

All Dimension in mm



## Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>3</sup>	$I_D @ TA=25^\circ C$	3	A
Pulsed Drain Current <sup>1,2</sup>	$I_{DM}$	10	A
Total Power Dissipation	$P_D @ TA=25^\circ C$	1.38	W
Linear Derating Factor		0.01	W/ $^\circ C$
Operating Junction and Storage Temperature Range	$T_j, T_{stg}$	-55 ~ +150	$^\circ C$

## Thermal Data

Parameter	Symbol	Value	Unit
Thermal Resistance Junction-ambient <sup>3</sup> Max.	$R_{thj-a}$	90	$^\circ C/W$

**Electrical Characteristics (T<sub>j</sub> = 25°C unless otherwise specified)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	-	-	V	V <sub>GS</sub> =0, I <sub>D</sub> =250uA
Breakdown Voltage Temperature Coefficient	$\Delta BV_{DSS} / \Delta T_j$	-	0.1	-	V/°C	Reference to 25°C, I <sub>D</sub> =1mA
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.0	-	2.5	V	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA
Forward Transconductance	g <sub>fs</sub>	-	13	-	S	V <sub>DS</sub> =5V, I <sub>D</sub> =3.0A
Gate-Source Leakage Current	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V
Drain-Source Leakage Current(T <sub>j</sub> =25°C)	I <sub>DSS</sub>	-	-	1	uA	V <sub>DS</sub> =30V, V <sub>GS</sub> =0
Drain-Source Leakage Current(T <sub>j</sub> =55°C)		-	-	10	uA	V <sub>DS</sub> =24V, V <sub>GS</sub> =0
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	-	60	mΩ	V <sub>GS</sub> =10V, I <sub>D</sub> =3.0A
		-	-	100		V <sub>GS</sub> =4.5V, I <sub>D</sub> =2.0A
Total Gate Charge <sup>2</sup>	Q <sub>g</sub>	-	8.5	-	nC	I <sub>D</sub> =3A V <sub>DS</sub> =16V V <sub>GS</sub> =4.5V
Gate-Source Charge	Q <sub>gs</sub>	-	1.5	-		
Gate-Drain ("Miller") Charge	Q <sub>gd</sub>	-	3.2	-		
Turn-on Delay Time <sup>2</sup>	T <sub>d(on)</sub>	-	6	-	ns	V <sub>DS</sub> =15V I <sub>D</sub> =3A V <sub>GS</sub> =10V R <sub>G</sub> =3.3Ω R <sub>D</sub> =3Ω
Rise Time	T <sub>r</sub>	-	20	-		
Turn-off Delay Time	T <sub>d(off)</sub>	-	20	-		
Fall Time	T <sub>f</sub>	-	3	-		
Input Capacitance	C <sub>iss</sub>	-	660	-	pF	V <sub>GS</sub> =0V V <sub>DS</sub> =25V f=1.0MHz
Output Capacitance	C <sub>oss</sub>	-	90	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	70	-		
Gate Resistance	R <sub>g</sub>	-	0.9	-	Ω	V <sub>GS</sub> =15mV, f=1.0MHz

**Source-Drain Diode**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Forward On Voltage <sup>2</sup>	V <sub>SD</sub>	-	-	1.2	V	I <sub>S</sub> =1.2A, V <sub>GS</sub> =0V
Reverse Recovery Time <sup>2</sup>	T <sub>rr</sub>	-	14	-	ns	I <sub>S</sub> =3A, V <sub>GS</sub> =0V di/dt=100A/μs
Reverse Recovery Charge	Q <sub>rr</sub>	-	7	-	nC	

Notes: 1. Pulse width limited by Max. junction temperature.

2. Pulse width ≤ 300us, duty cycle ≤ 2%.

3. Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board; 270°C/W when mounted on Min. copper pad.

### Characteristics Curve

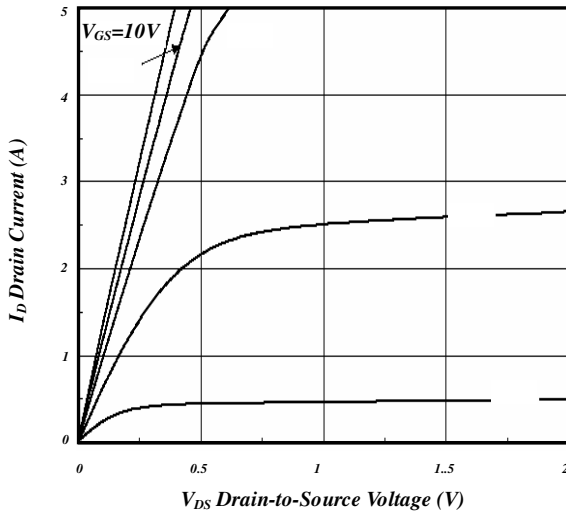


Fig 1. Typical Output Characteristics

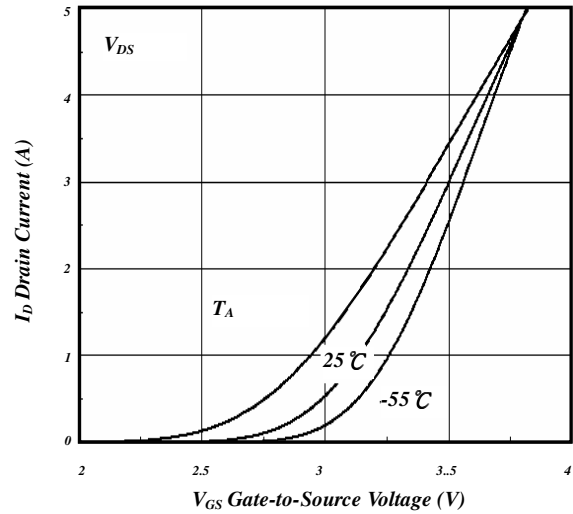


Fig 2. Typical Output Characteristics

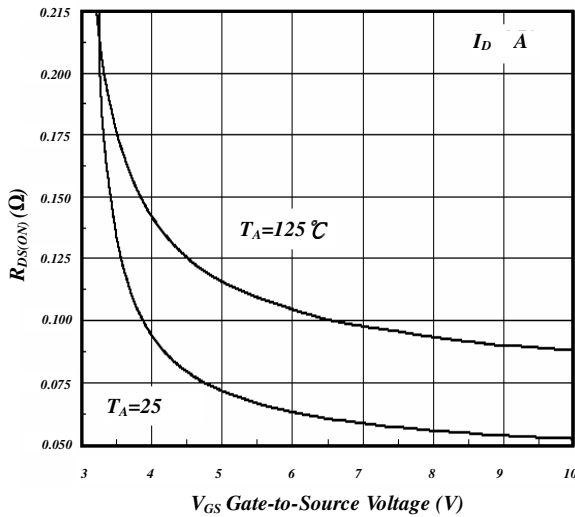


Fig 3. On-Resistance v.s. Gate Voltage

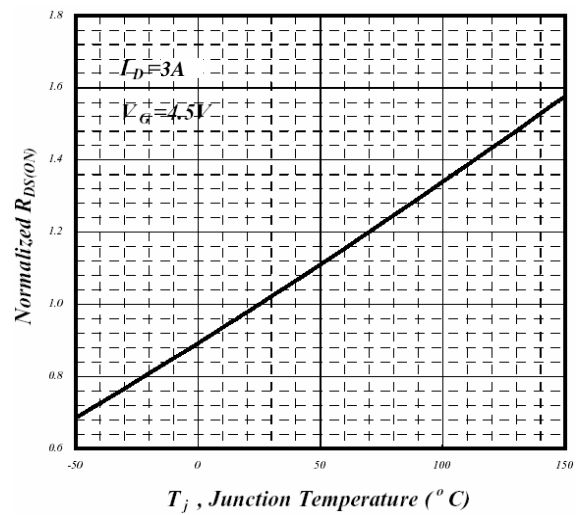


Fig 4. Normalized On-Resistance v.s. Junction Temperature

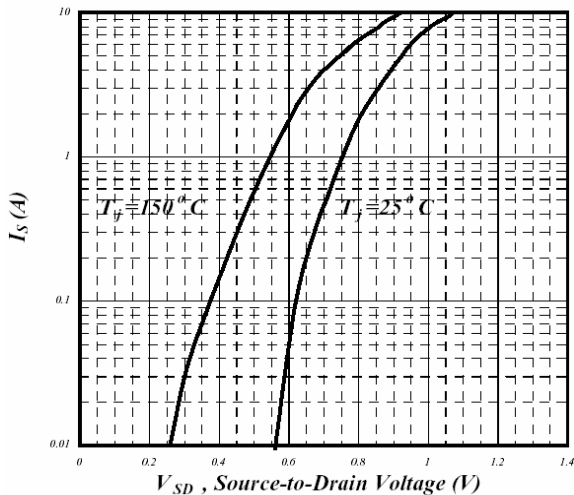


Fig 5. Forward Characteristics of Reverse Diode

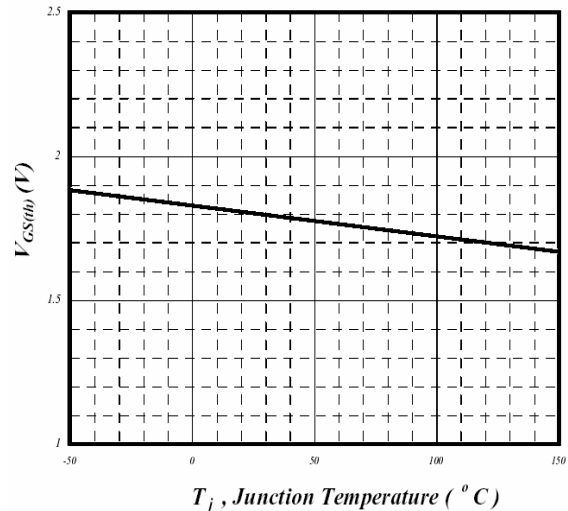
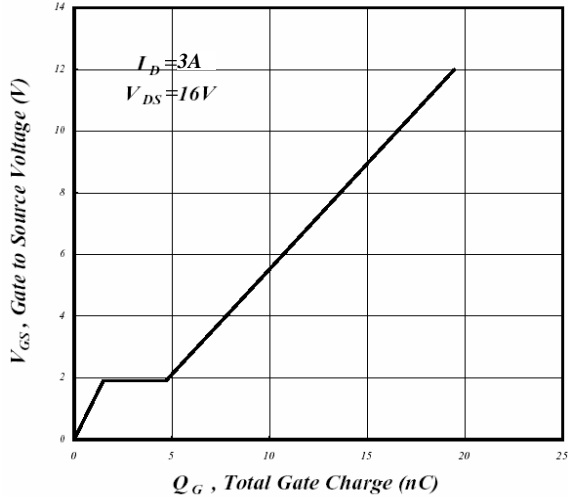
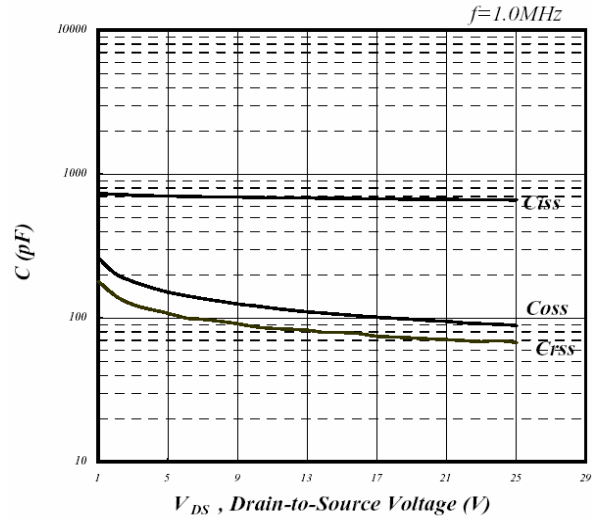


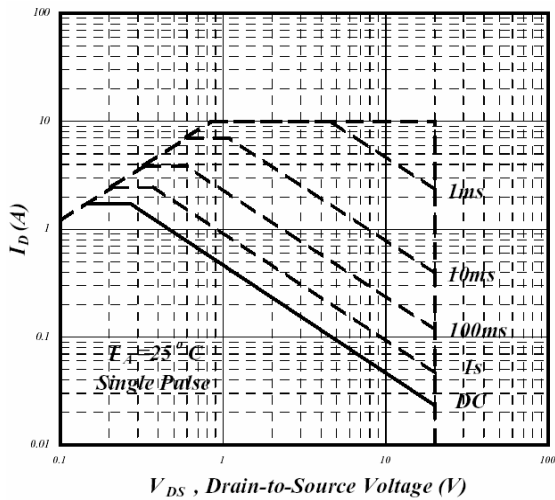
Fig 6. Gate Threshold Voltage v.s. Junction Temperature



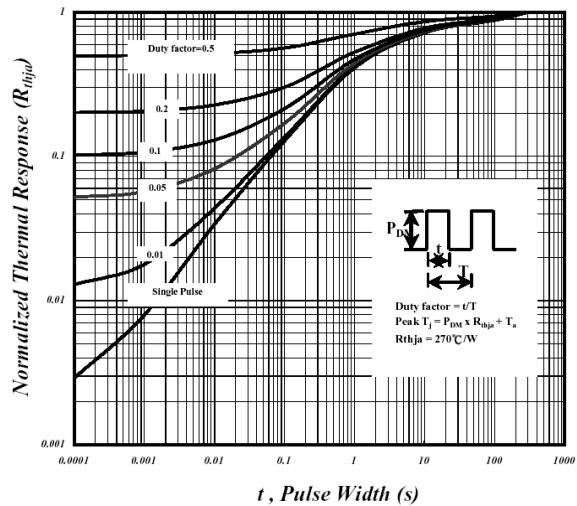
**Fig 7. Gate Charge Characteristics**



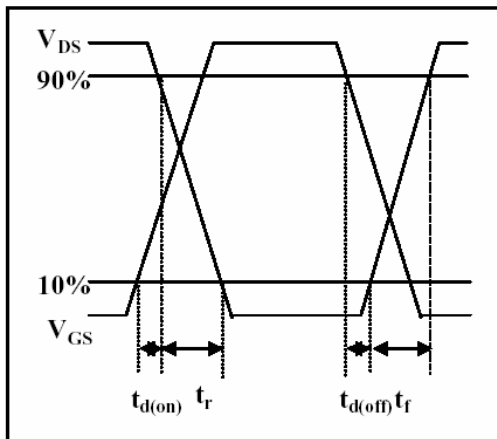
**Fig 8. Typical Capacitance Characteristics**



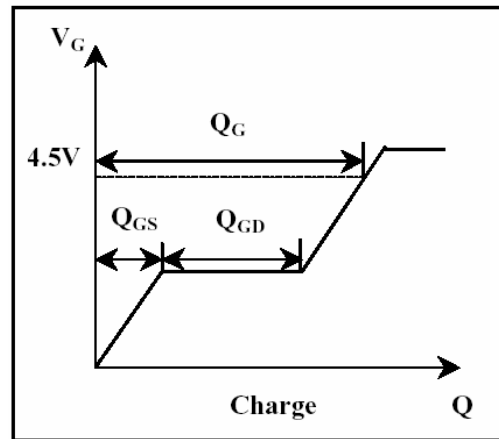
**Fig 9. Maximum Safe Operating Area**



**Fig 10. Effective Transient Thermal Impedance**



**Fig 11. Switching Time Waveform**



**Fig 12. Gate Charge Waveform**