N-CHANNEL ENHANCEMENT MODE FIELD MOSFET

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_A = 25°C
600V	160Ω @ V_{GS} = 10V	70mA

Features and Benefits

- Low Input Capacitance
- High BVDss rating for power application
- Low Input/Output Leakage
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

Description and Applications

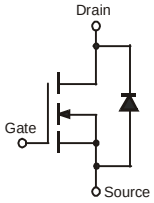
This new generation uses advanced planar technology MOSFET, provide excellent high Voltage and fast switching, making it ideal for small-Signal and level shift applications.

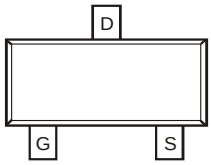
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions

Mechanical Data

- Case: SC59 / SOT23
- Case Material: Molded Plastic "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin annealed over Copper leadframe Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

SOT23 SC59





Top View Equivalent Circuit Top View

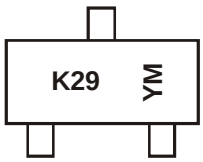
Ordering Information (Note 3)

Part Number	Case	Packaging
BSS127SSN-7	SC59	3000/Tape & Reel
BSS127S-7	SOT23	3000/Tape & Reel

Notes: 1. No purposefully added lead.
2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com.
3. For packaging details, go to our website at http://www.diodes.com.

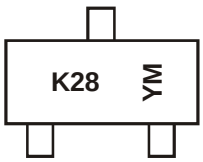
Marking Information

SOT23



K29 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: W = 2009)
M = Month (ex: 9 = September)

SC59



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Date Code Key

Year	2009	2010	2011	2012	2013	2014	2015
Code	W	X	Y	Z	A	B	C

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	600	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 4) V_{GS} = 10V	Steady State	T_A = 25℃ T_A = 70℃	I_D	50 40	mA
Continuous Drain Current (Note 5) V_{GS} = 10V	Steady State	T_A = 25℃ T_A = 70℃	I_D	70 55	mA
Continuous Drain Current (Note 4) V_{GS} = 4.5V	Steady State	T_A = 25℃ T_A = 70℃	I_D	45 35	mA
Continuous Drain Current (Note 5) V_{GS} = 4.5V	Steady State	T_A = 25℃ T_A = 70℃	I_D	65 50	mA
Pulsed Drain Current @ T_{SP} = 25℃ (Notes 6)			I_{DM}	0.16	A

Thermal Characteristics

Characteristic	Symbol	Value	Units
Power Dissipation, @T_A = 25℃ (Note 4)	P_D	0.61	W
Thermal Resistance, Junction to Ambient @T_A = 25℃ (Note 4)	$R_{\theta JA}$	204	°C/W
Power Dissipation, @T_{SP} = 25℃ (Note 5)	P_D	1.25	W
Thermal Resistance, Junction to Ambient @T_{SP} = 25℃ (Note 5)	$R_{\theta JSA}$	100	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Electrical Characteristics @T_A = 25℃ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	600	-	-	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = 25℃	I_{DSS}	-	-	0.1	μA	V_{DS} = 600V, V_{GS} = 0V
Gate-Body Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	3	-	4.5	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS\ (ON)}$	-	80	160	Ω	V_{GS} = 10V, I_D = 16mA
		-	95	190		V_{GS} = 5.0V, I_D = 16mA
Forward Transfer Admittance	$\|Y_{fs}\|$	-	76	-	mS	V_{DS} = 10V, I_D = 16mA
Diode Forward Voltage	V_{SD}	-	-	1.5	V	V_{GS} = 0V, I_S = 16mA
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	21.8	-	pF	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	2.2	-		
Reverse Transfer Capacitance	C_{rss}	-	0.3	-		
Total Gate Charge	Q_g	-	1.08	-	nC	V_{GS} = 10V, V_{DD} = 300V, I_D = 0.01A
Gate-Source Charge	Q_{gs}	-	0.08	-		
Gate-Drain Charge	Q_{gd}	-	0.50	-		
Turn-On Delay Time	$t_{D(on)}$	-	5.0	-	ns	V_{DD} = 300V, V_{GS} = 10V, R_{GEN} = 6Ω, I_D = 10mA
Turn-On Rise Time	t_r	-	7.2	-	ns	
Turn-Off Delay Time	$t_{D(off)}$	-	28.7	-	ns	
Turn-Off Fall Time	t_f	-	168	-	ns	
Reverse Recovery Time	T_{rr}	-	131	-	ns	V_R =300 V, I_F =0.016 A, di/dt = 100A/μs
Reverse Recovery Charge	Q_{rr}	-	32	-	nC	

Notes:
4. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
5. Device mounted on 1" x 1" FR-4 PCB with high coverage 2 oz. Copper, single sided.
6. Repetitive rating, pulse width limited by junction temperature, 10μs pulse, duty cycle = 1%.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

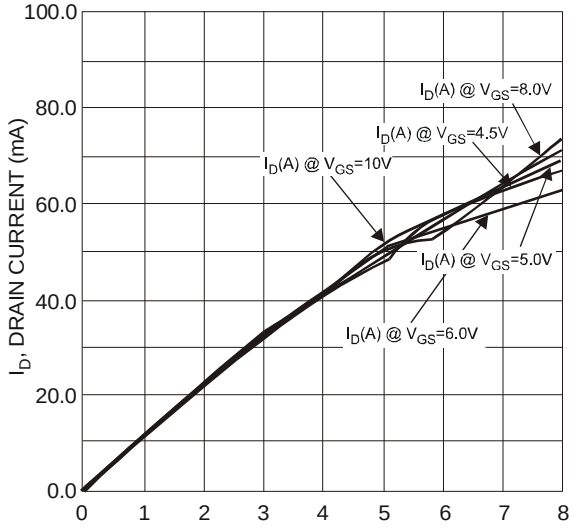


Fig. 1 Typical Output Characteristics

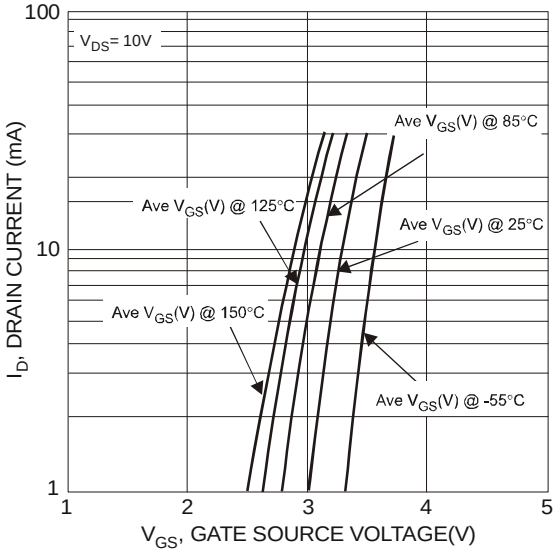


Fig. 2 Typical Transfer Characteristics

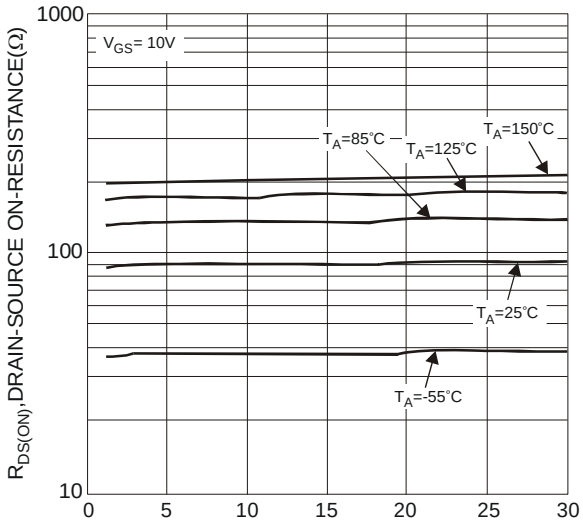


Fig. 3 Typical On-Resistance vs. Drain Current and Temperature

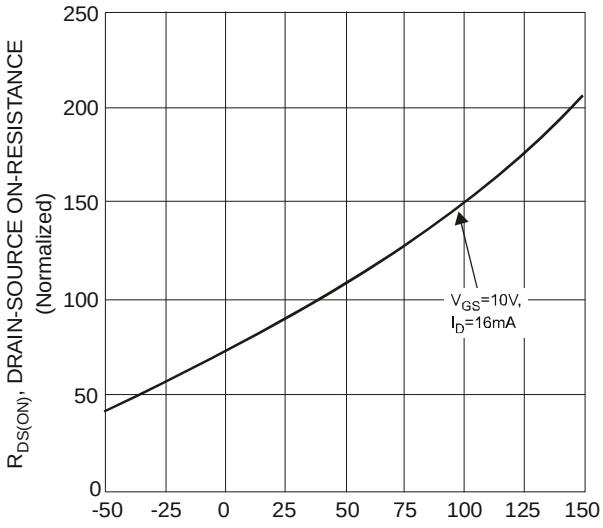


Fig. 4 On-Resistance Variation with Temperature

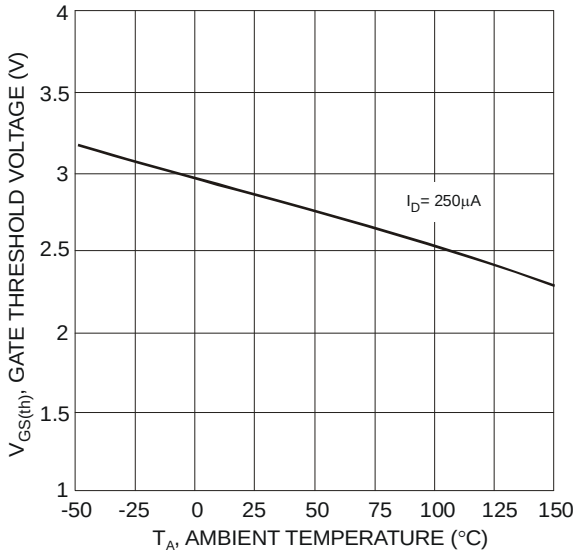


Fig. 5 Gate Threshold Variation vs. Ambient Temperature

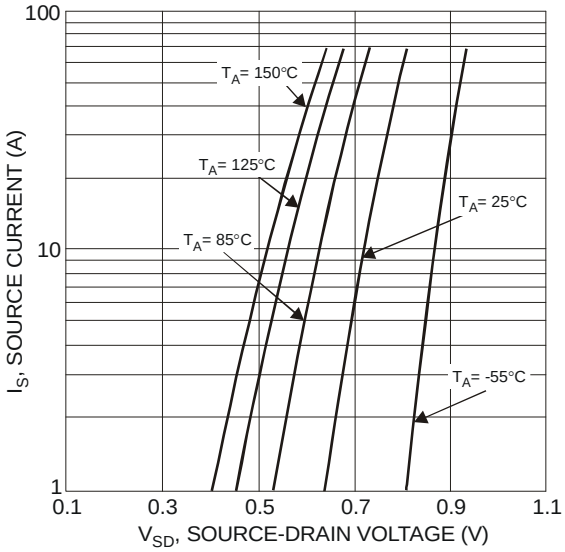


Fig. 6 Diode Forward Voltage vs. Current

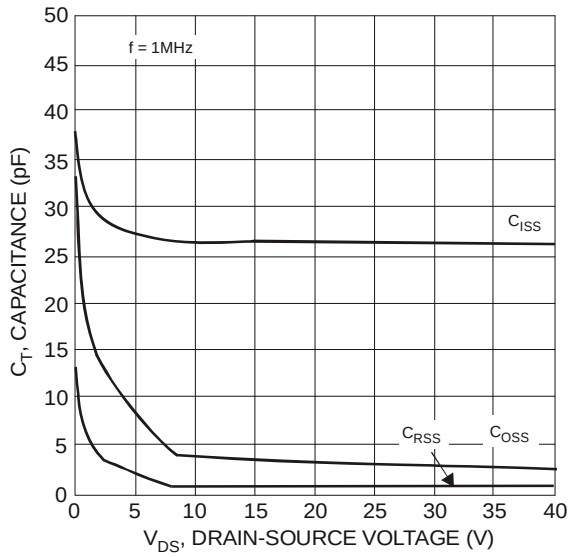


Fig. 7 Typical Junction Capacitance

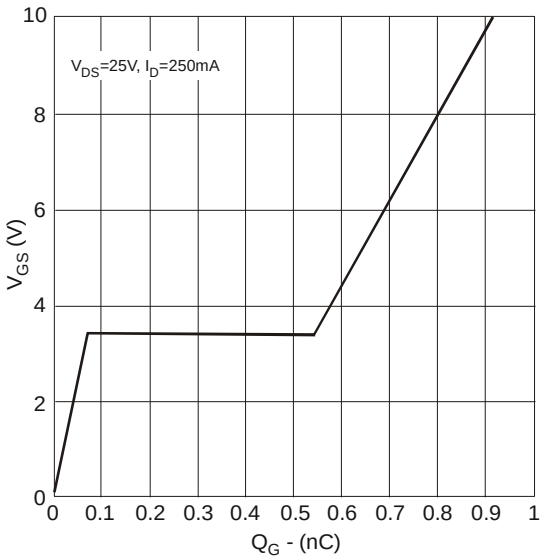


Fig. 8 Gate Charge Characteristics

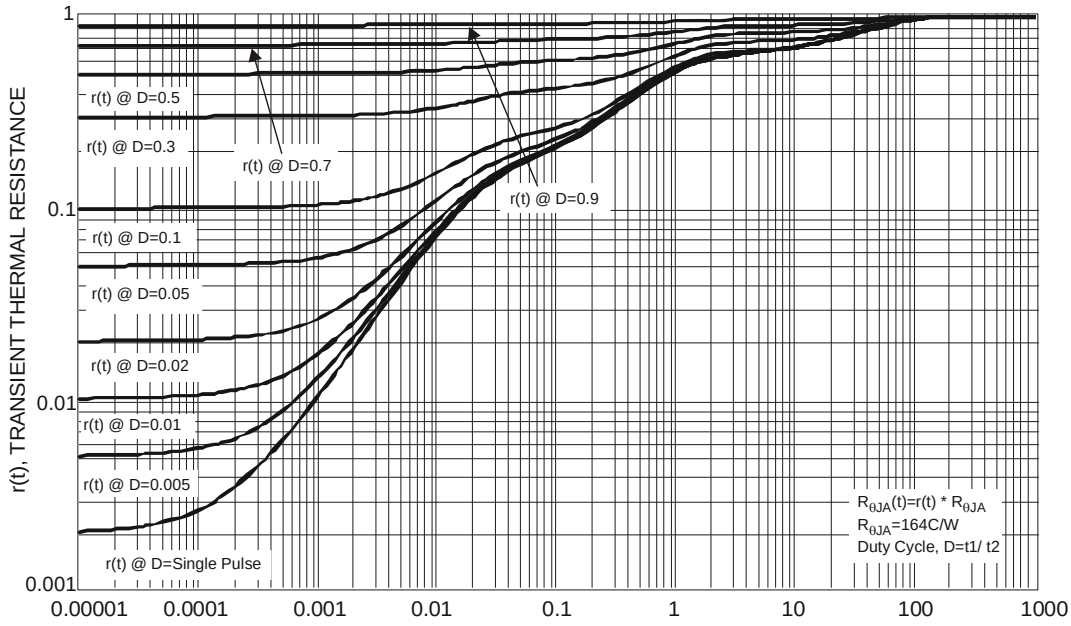
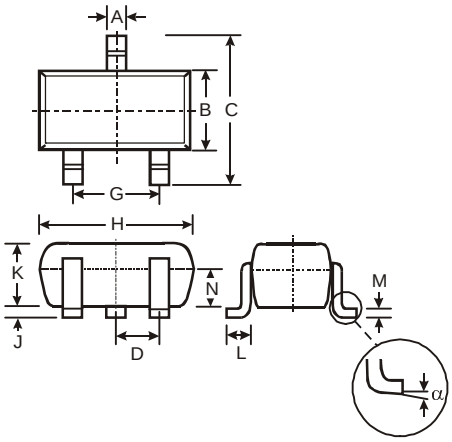
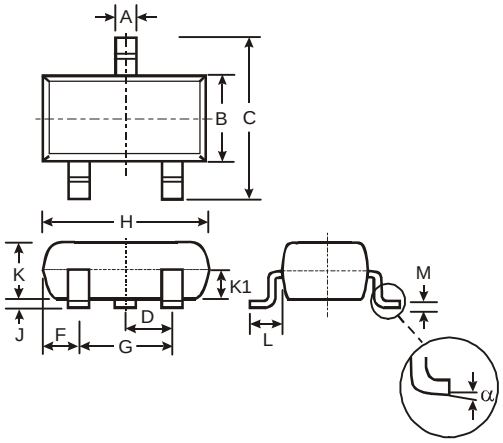


Fig. 9 Transient Thermal Resistance

Package Outline Dimensions

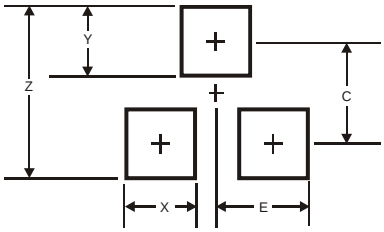


SC59			
Dim	**Min**	**Max**	**Typ**
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
G	-	-	1.90
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			

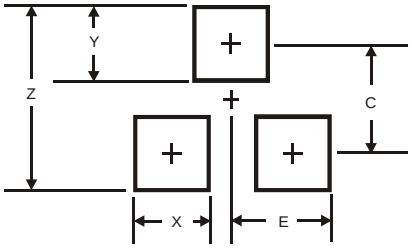


SOT23			
Dim	**Min**	**Max**	**Typ**
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	0.085	0.18	0.11
α	0°	8°	-
All Dimensions in mm			

Suggested Pad Layout



SOT23	
Dimensions	**Value (in mm)**
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35



SC59	
Dimensions	**Value (in mm)**
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35