

- ★ Green Device Available
- ★ Super Low Gate Charge
- ★ Excellent CdV/dt effect decline
- ★ Advanced high cell density Trench technology

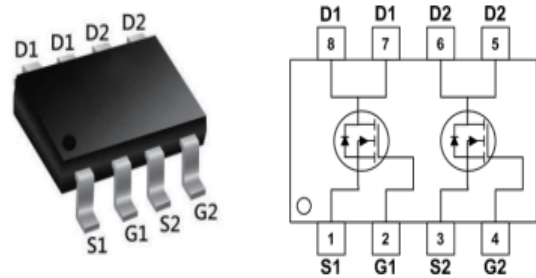
Product Summary

BVDSS	RDS(ON)	ID
20V	13mΩ	8A

Description

the 9928 uses advanced trench technology and design to provide excellent RDS(ON) with low gate charge. it can be used in a wide variety of applications.

Dual SOP8 Pin Configuration



Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{DS}	Drain-to-Source Voltage	20	V
V _{GS}	Gate-to-Source Voltage	±12	V
I _D	Continuous Drain Current	8	A
I _{DM}	Pulsed Drain Current ⁽¹⁾	28	A
P _D	Power Dissipation	2.25	W
R _{θJA}	Thermal Resistance, Junction to Ambient ⁽²⁾	80	°C/W
T _J , T _{STG}	Junction & Storage Temperature Range	-55 to 150	°C

Electrical Characteristics ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test condition	Min.	Typ.	Max.	Units
Static Characteristics						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
I_{GSS}	Gate-body Leakage current	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	± 100	nA
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = -30V, V_{GS} = 0V$	-	-	1	μA
$V_{GS(th)}$	Gate-Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu A$	0.45	0.7	1	V
$R_{DS(on)}$	Drain-Source on-Resistance ³	$V_{GS} = 4.5V, I_D = 5A$	-	13	20	m Ω
		$V_{GS} = 2.5V, I_D = 4.7A$	-	18	30	
		$V_{GS} = 1.8V, I_D = 4.3A$	-	28	57	
Dynamic Characteristics⁴						
C_{iss}	Input Capacitance	$V_{DS} = 10V, V_{GS} = 0V,$ $f = 1MHz$	-	700	-	pF
C_{oss}	Output Capacitance		-	120	-	pF
C_{rss}	Reverse Transfer Capacitance		-	105	-	pF
Switching Characteristics⁴						
Q_g	Total Gate Charge	$V_{GS} = 4.5V, V_{DS} = 10V,$ $I_D = 5A$	-	10.5	-	nC
Q_{gs}	Gate-Source Charge		-	2	-	nC
Q_{gd}	Gate-Drain Charge		-	2.5	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{GS} = 5V, V_{DD} = 10V,$ $R_G = 3\Omega, I_D = 5A$	-	10	-	ns
t_r	Rise Time		-	20	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	32	-	ns
t_f	Fall Time		-	12	-	ns
Drain-Source Body Diode Characteristics						
V_{SD}	Diode Forward Voltage ³	$I_S = 4A, V_{GS} = 0V$	-	-	1.2	V
I_S	Continuous Source Current	-	-	-	8	A

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)} = 150^\circ\text{C}$.
2. The data tested by surface mounted on a 1 inch² FR-4 board with 20Z copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
4. This value is guaranteed by design hence it is not included in the production test.

Typical Electrical and Thermal Characteristics (Curves)

Figure 1: Output Characteristics

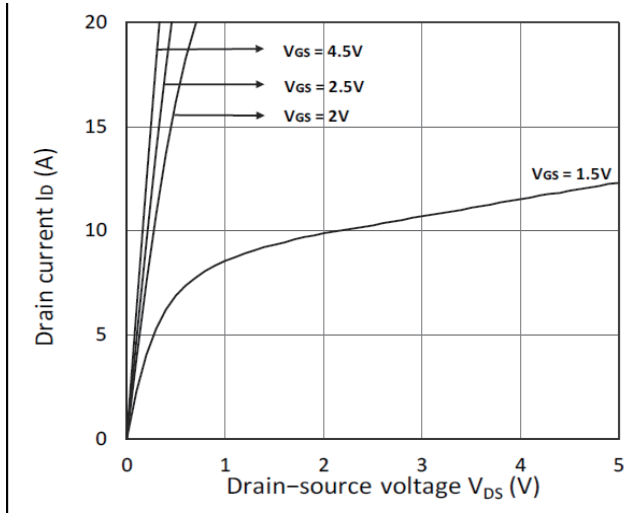


Figure 2: Typical Transfer Characteristics

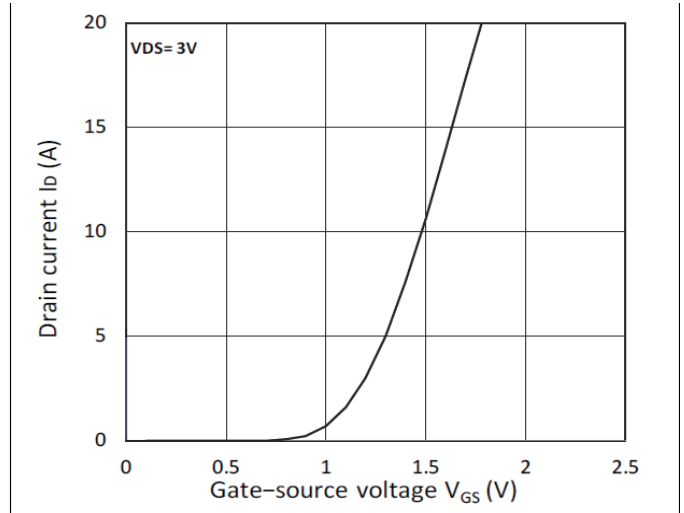


Figure 3: Forward Characteristics of Reverse

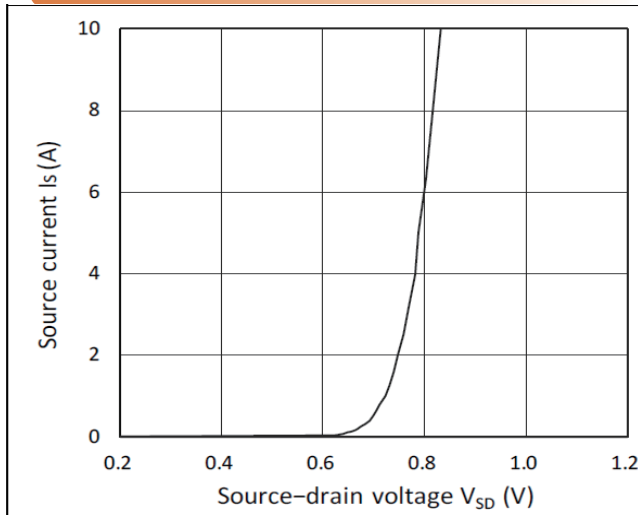


Figure 4: RDS(ON) vs. VGS

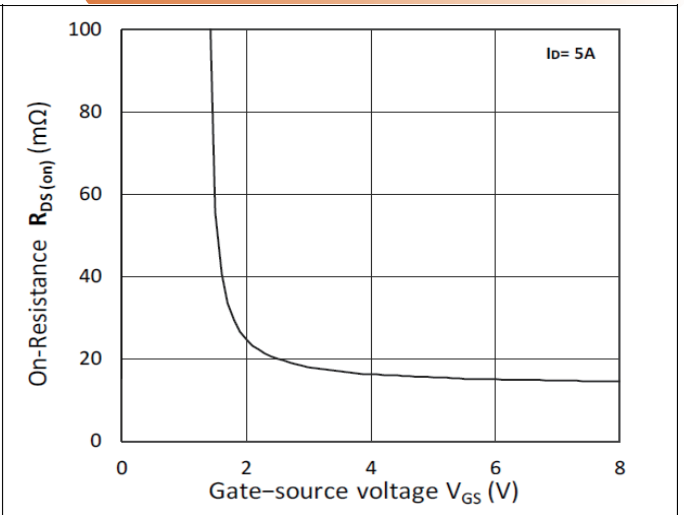


Figure 5: RDS(ON) vs. ID

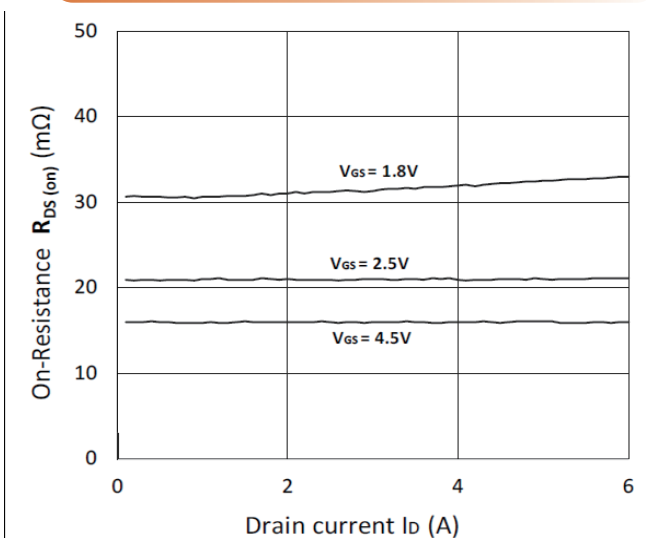
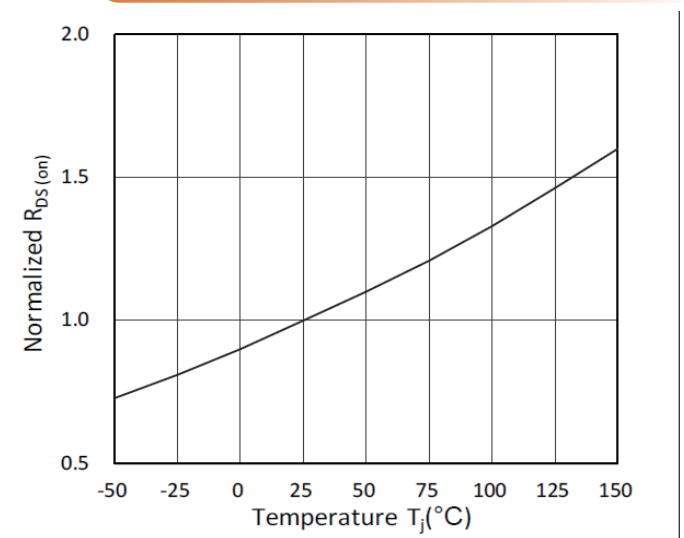


Figure 6: Normalized RDS(on) vs. Temperature



Typical Performance Characteristics

Figure 7: Capacitance Characteristics

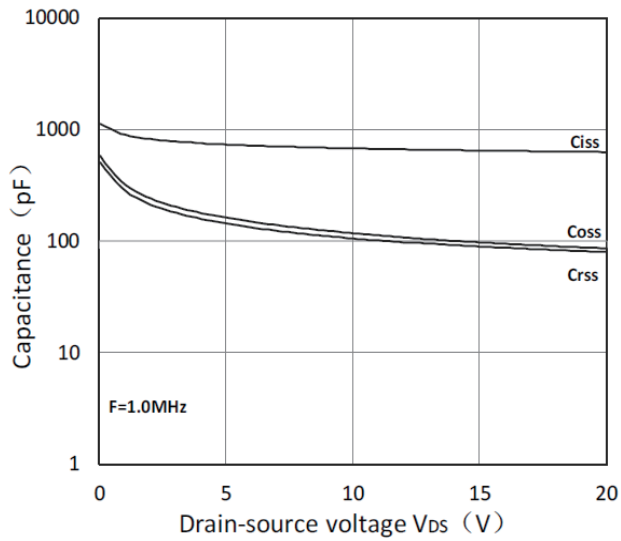
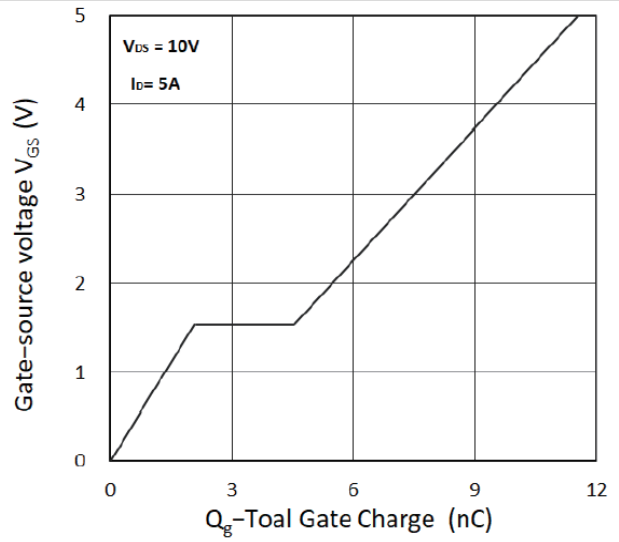
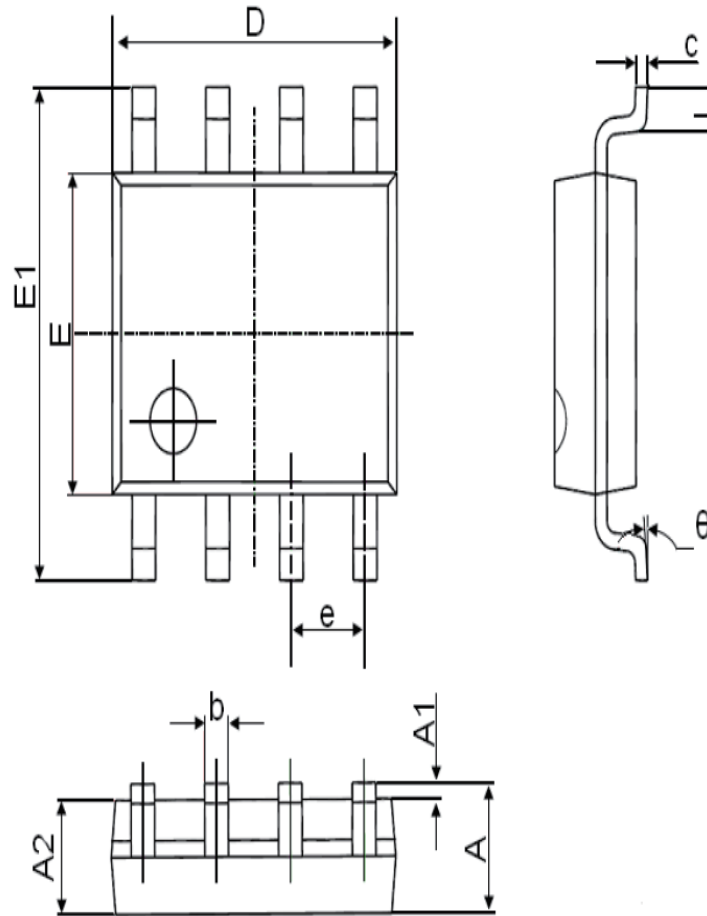


Figure 8: Gate Charge Characteristics



Package Mechanical Data-SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.35	1.75	0.053	0.069
A1	0.1	0.25	0.004	0.01
A2	1.35	1.55	0.053	0.061
b	0.33	0.51	0.013	0.02
c	0.17	0.25	0.006	0.01
D	4.7	5.1	0.185	0.2
E	3.8	4	0.15	0.157
E1	5.8	6.2	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.4	1.27	0.016	0.05
θ	0°	8°	0°	8°