

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

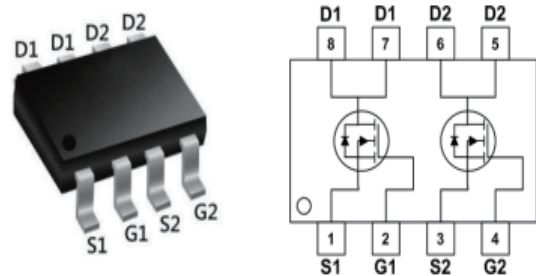
## Product Summary

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 <sub>DS</sub>	Drain-to-Source Voltage	20	V
V <sub>GS</sub>	Gate-to-Source Voltage	±12	V
I <sub>D</sub>	Continuous Drain Current	8	A
I <sub>DM</sub>	Pulsed Drain Current <sup>(1)</sup>	28	A
P <sub>D</sub>	Power Dissipation	2.25	W
R <sub>θJA</sub>	Thermal Resistance, Junction to Ambient <sup>(2)</sup>	80	°C/W
T <sub>J</sub> , T <sub>STG</sub>	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
<b>Static Characteristics</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS} = 0V, I_D = 250\mu A$	20	-	-	V
$I_{GSS}$	Gate-body Leakage current	$V_{GS} = \pm 12V, V_{DS} = 0V$	-	-	$\pm 100$	nA
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -30V, V_{GS} = 0V$	-	-	1	$\mu A$
$V_{GS(th)}$	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 <sup>3</sup>	$V_{GS} = 4.5V, I_D = 5A$	-	13	20	m $\Omega$
		$V_{GS} = 2.5V, I_D = 4.7A$	-	18	30	
		$V_{GS} = 1.8V, I_D = 4.3A$	-	28	57	
<b>Dynamic Characteristics<sup>4</sup></b>						
$C_{iss}$	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
<b>Switching Characteristics<sup>4</sup></b>						
$Q_g$	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
<b>Drain-Source Body Diode Characteristics</b>						
$V_{SD}$	Diode Forward Voltage <sup>3</sup>	$I_S = 4A, V_{GS} = 0V$	-	-	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 inch<sup>2</sup> FR-4 board with 2OZ 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

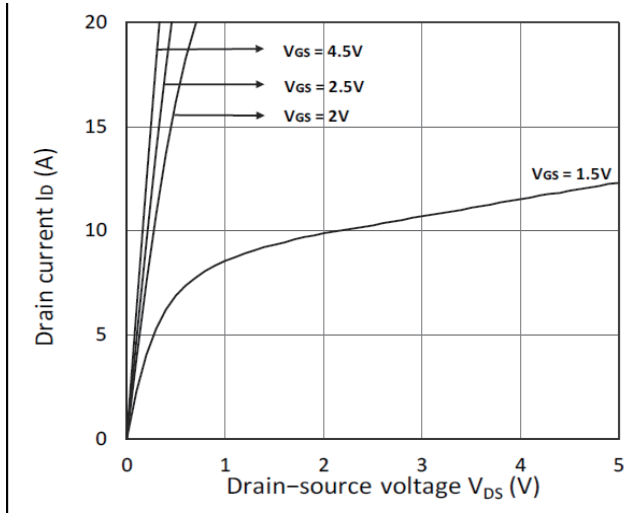


Figure 2: Typical Transfer Characteristics

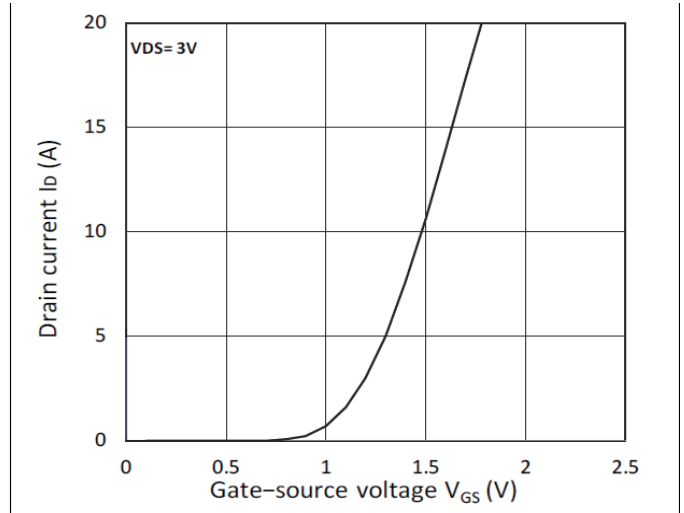


Figure 3: Forward Characteristics of Reverse

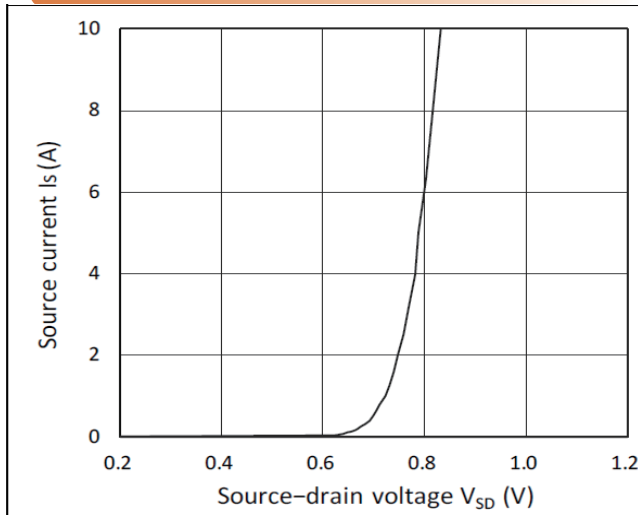


Figure 4: RDS(ON) vs. VGS

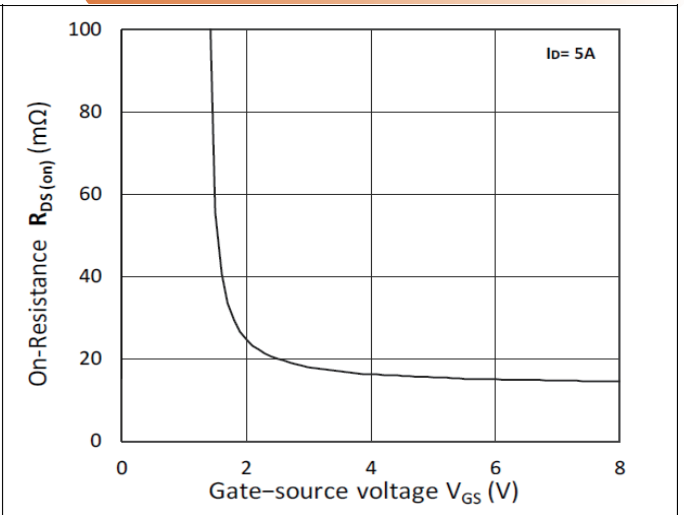


Figure 5: RDS(ON) vs. ID

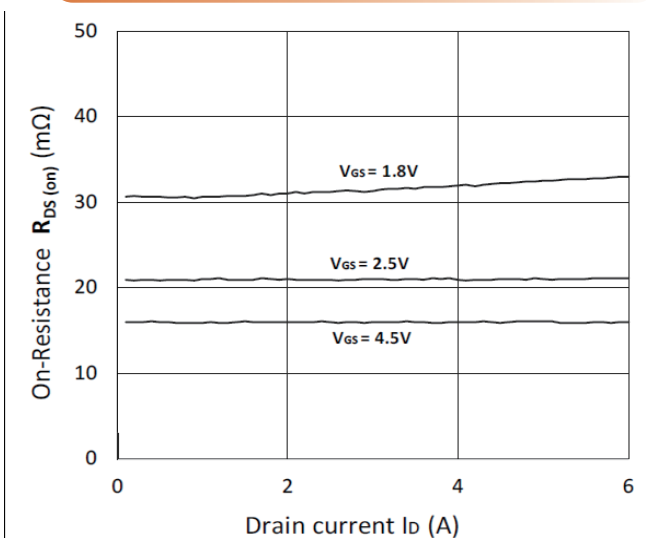
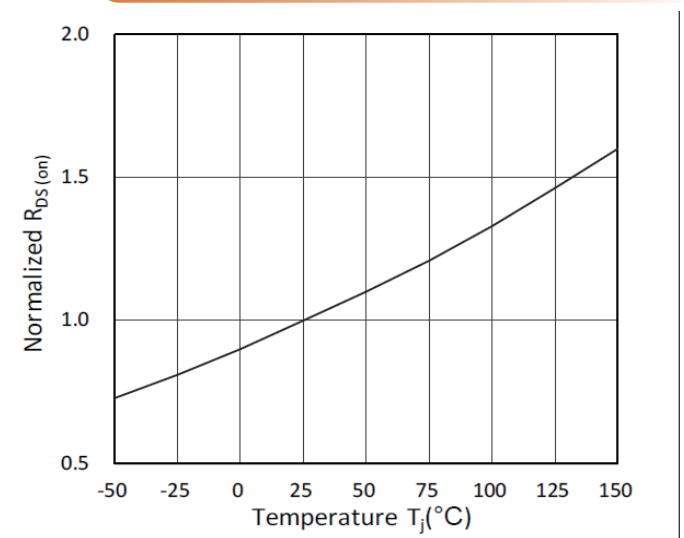


Figure 6: Normalized RDS(on) vs. Temperature



Typical Performance Characteristics

Figure 7: Capacitance Characteristics

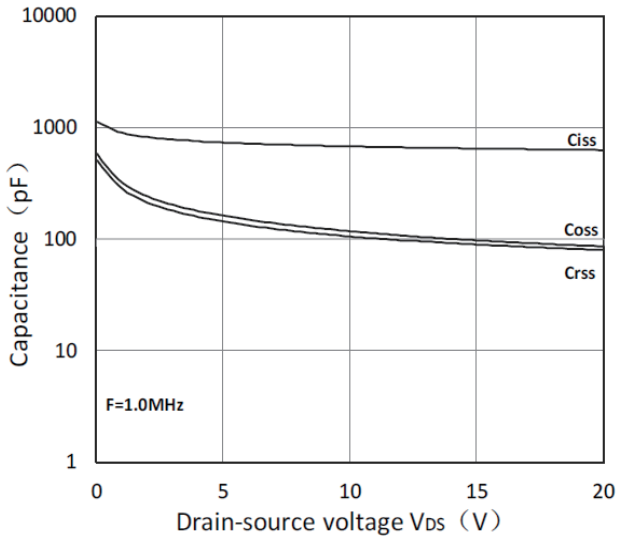
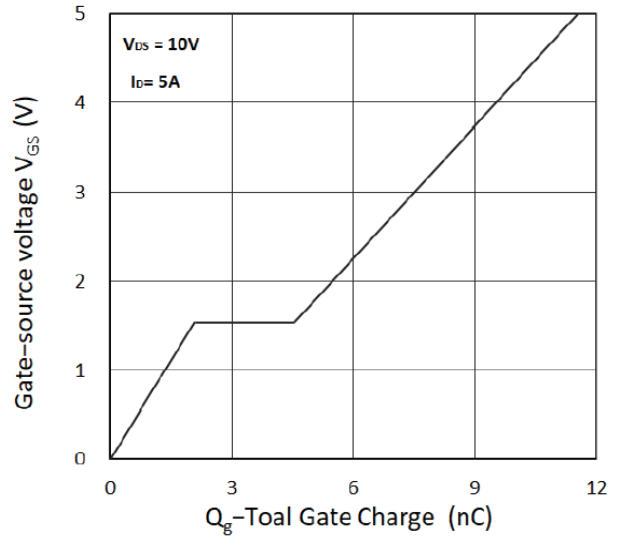
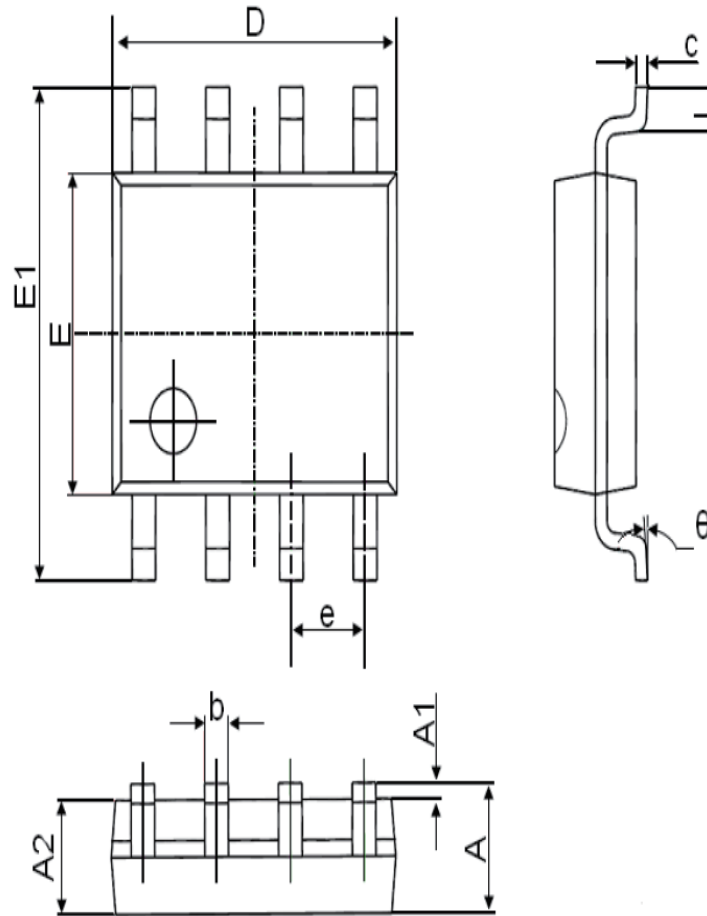


Figure 8: Gate Charge Characteristics



## 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
$\theta$	0°	8°	0°	8°

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFET](#) category:*

*Click to view products by [HL](#) manufacturer:*

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [BUK455-60A/B](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#) [IPS70R2K0CEAKMA1](#) [SQD23N06-31L-GE3](#)  
[TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#) [DMN1017UCP3-7](#) [DMN1053UCP4-7](#) [SQJ469EP-T1-GE3](#) [NTE2384](#) [DMC2700UDMQ-7](#)  
[DMN2080UCB4-7](#) [DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#)  
[STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [DMN2990UFB-7B](#)  
[IPB80P04P405ATMA2](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [MCQ7328-TP](#) [NTMC083NP10M5L](#) [BXP7N65D](#) [BXP4N65F](#) [AOL1454G](#)  
[WMJ80N60C4](#) [BXP2N20L](#) [BXP2N65D](#) [BXT1150N10J](#) [BXT1700P06M](#) [TSM60NB380CP](#) [ROG](#) [RQ7L055BGTGR](#) [DMNH15H110SK3-13](#)  
[SLF10N65ABV2](#) [BSO203SP](#) [BSO211P](#) [IPA60R230P6](#)