

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

DESCRIPTION

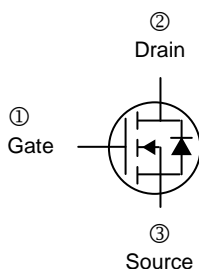
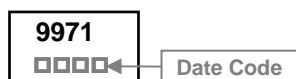
The SID9971-S is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the synchronous buck converter applications.

The SID9971-S meet the RoHS and Green Product requirement with full function reliability approved.

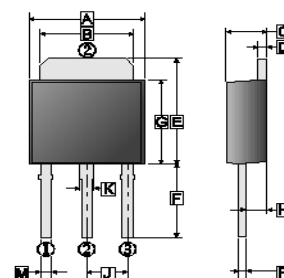
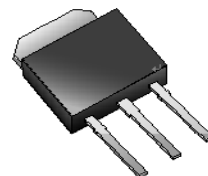
FEATURES

- Advanced high cell density Trench technology
- Super Low Gate Charge
- Green Device Available

MARKING



TO-251S



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	6.40	6.731	G	6.0	6.223
B	5.21	5.46	H	0.85	1.15
C	2.20	2.38	J	2.286 BSC.	
D	0.40	0.58	K	0.77	1.14
E	6.89	7.493	M	0.64	0.88
F	3.98	4.28	P	0.40	0.60

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current @ $V_{GS}=10V$ ¹	I_D	$T_C=25^\circ C$	25
		$T_C=100^\circ C$	16
Pulsed Drain Current ²	I_{DM}	50	A
Total Power Dissipation ¹	P_D	$T_C=25^\circ C$	39
		$T_A=25^\circ C$	2
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55~+150	$^\circ C$
Thermal Resistance Rating			
Maximum Thermal Resistance from Junction to Ambient ¹	$R_{\theta JA}$	62.5	$^\circ C / W$
Maximum Thermal Resistance from Junction to Ambient		110	
Maximum Thermal Resistance from Junction to Case ¹	$R_{\theta JC}$	3.2	

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

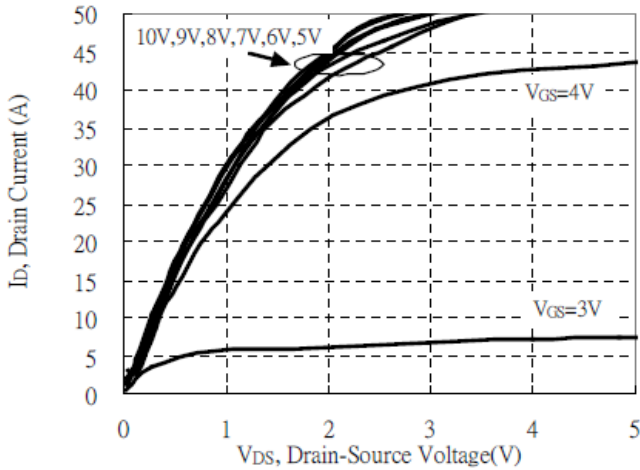
Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Drain-Source Breakdown Voltage	B_{VDSS}	60	-	-	V	$V_{GS}=0V, I_D=250\mu A$
Gate-Threshold Voltage	$V_{GS(th)}$	1	-	2.5	V	$V_{DS}=V_{GS}, I_D=250\mu A$
Drain-Source Leakage Current	I_{DSS}	-	-	1	μA	$V_{DS}=48V, V_{GS}=0V, T_J=25^\circ\text{C}$
		-	-	25		$V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$
Gate-Source Leakage Current	I_{GSS}	-	-	± 100	nA	$V_{GS}=\pm 20V, V_{DS}=0V$
Forward Transfer conductance	g_{fs}	-	10	-	S	$V_{DS}=10V, I_D=18A$
Static Drain-Source On-Resistance ³	$R_{DS(ON)}$	-	27	36	m Ω	$V_{GS}=10V, I_D=18A$
		-	31	45		$V_{GS}=4.5V, I_D=12A$
Total Gate Charge @ $V_{GS}=4.5V$	Q_g	-	12.5	-	nC	$V_{DS}=48V$ $V_{GS}=10V$ $I_D=18A$
Total Gate Charge	Q_g	-	18	-		
Gate-Source Charge	Q_{gs}	-	5	-		
Gate-Drain ("Miller") Charge	Q_{gd}	-	6	-		
Turn-on Delay Time	$T_{d(on)}$	-	7	-	nS	$V_{DD}=30V$ $I_D=18A$ $V_{GS}=10V$ $R_G=3.3\Omega$ $R_L=1.67\Omega$
Turn-on Rise Time	T_r	-	9	-		
Turn-off Delay Time	$T_{d(off)}$	-	23	-		
Turn-off Fall Time	T_f	-	6	-		
Input Capacitance	C_{iss}	-	1572	-	pF	$V_{DS}=30V$ $V_{GS}=0V$ $f=1\text{MHz}$
Output Capacitance	C_{oss}	-	58	-		
Reverse Transfer Capacitance	C_{rss}	-	39	-		
Source-Drain Diode						
Diode Forward Voltage ³	V_{SD}	-	-	1.2	V	$I_S=25A, V_{GS}=0$
Continuous Source Current ¹	I_S	-	-	25	A	
Pulsed Source Current ²	I_{SM}	-	-	50		
Reverse Recovery Time	T_{rr}	-	37	-	nS	$I_S=18A, dI/dt=100A/\mu s$
Reverse Recovery Charge	Q_{rr}	-	38	-	nC	$T_J=25^\circ\text{C}$

Notes:

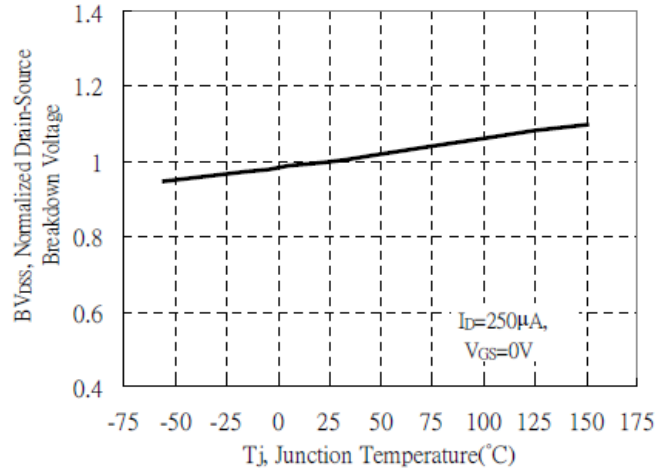
- The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- The power dissipation is limited by 150 $^\circ\text{C}$ junction temperature
- The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

CHARACTERISTIC CURVES

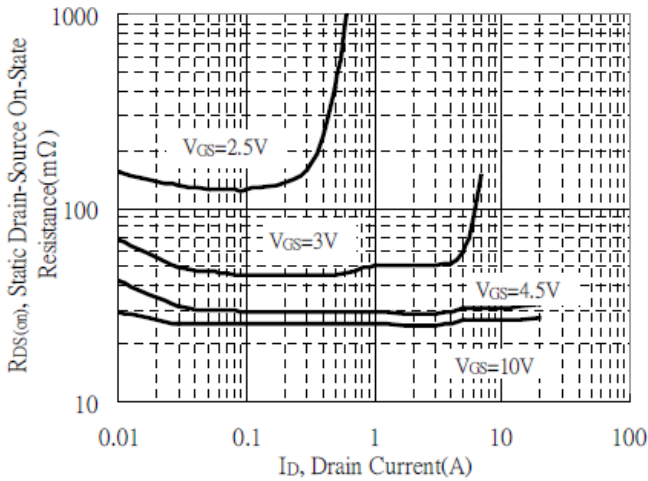
Typical Output Characteristics



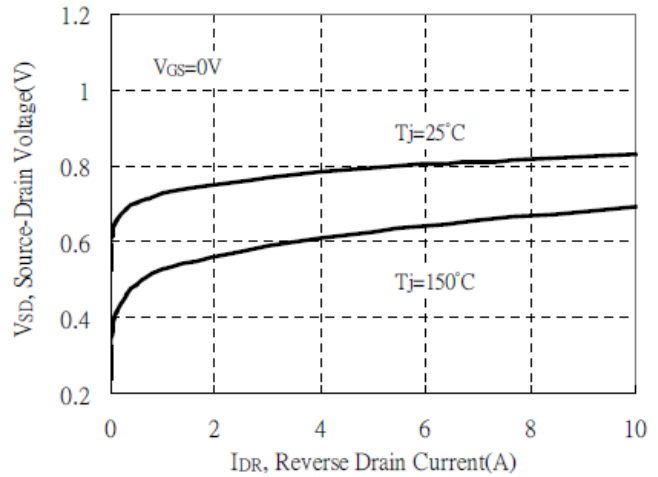
Breakdown Voltage vs Ambient Temperature



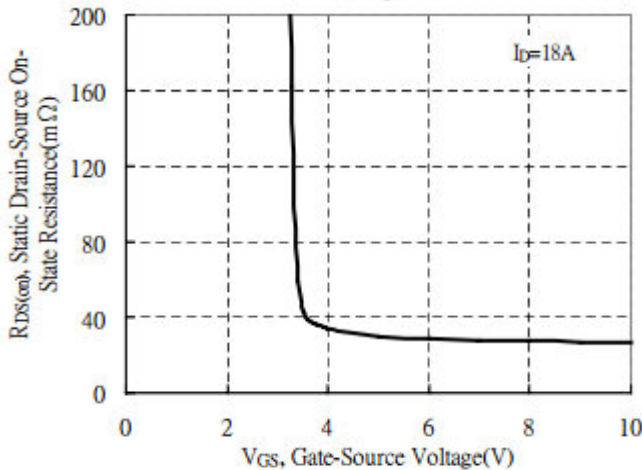
Static Drain-Source On-State resistance vs Drain Current



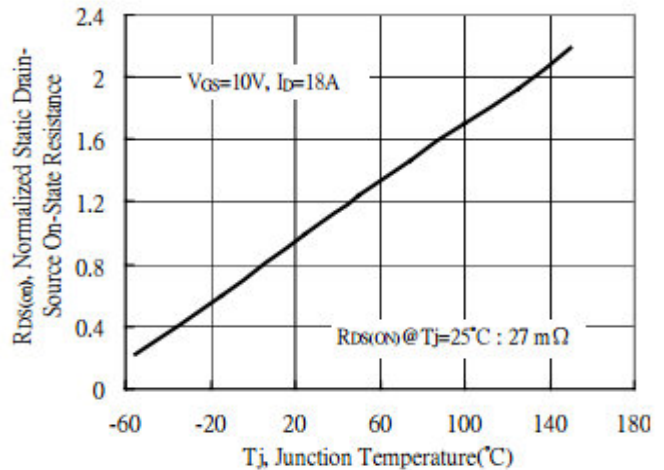
Reverse Drain Current vs Source-Drain Voltage



Static Drain-Source On-State Resistance vs Gate-Source Voltage

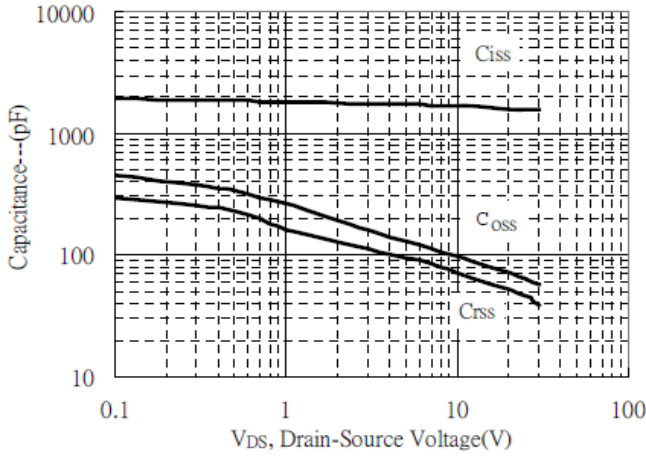


Drain-Source On-State Resistance vs Junction Temperature

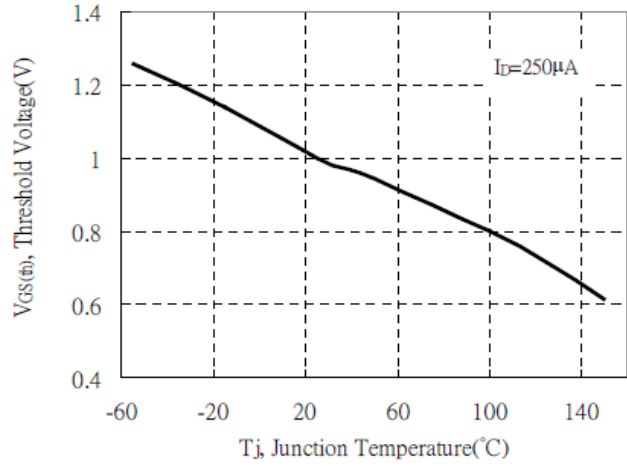


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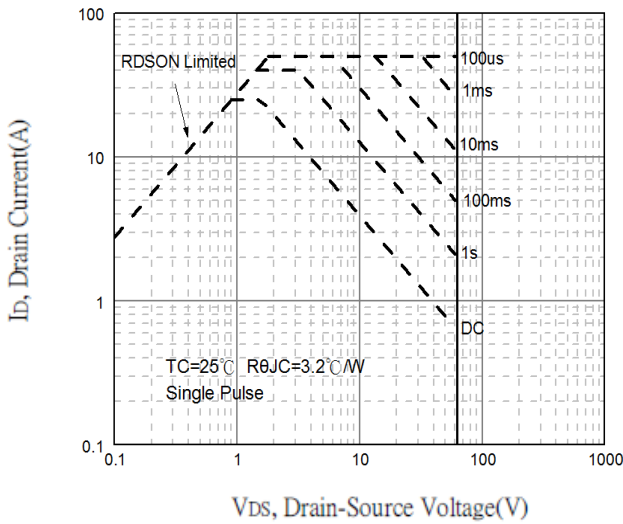
Capacitance vs Drain-to-Source Voltage



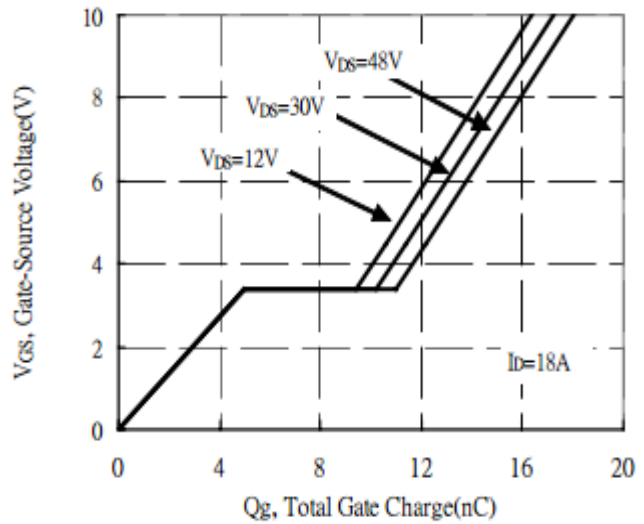
Threshold Voltage vs Junction Temperature



Maximum Safe Operating Area



Gate Charge Characteristics



Transient Thermal Response Curves

