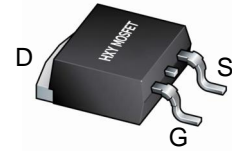




Description

The SUD23N06-31 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.



TO-252-2L

General Features

$V_{DS} = 60V$ $I_D = 20A$

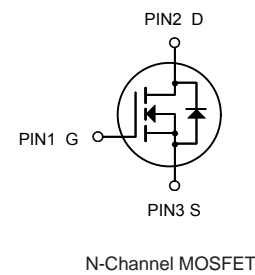
$R_{DS(ON)} < 32m\Omega$ @ $V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SUD23N06-31	TO-252-2L	HXY MOSFET	2500

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	20	A
$I_D @ T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	10	A
I_{DM}	Pulsed Drain Current ²	80	A
EAS	Single Pulse Avalanche Energy ³	38	mJ
$P_D @ T_C=25^\circ C$	Total Power Dissipation ⁴	34.7	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$



Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit	
Static Characteristics							
Drain-Source Breakdown Voltage	V_{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	60	-	-	V	
Gate-Body Leakage Current	I_{GSS}	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA	
Zero Gate Voltage Drain Current	I_{DSS}	V _{DS} = 60V, V _{GS} = 0V	T _J =25°C	-	-	1	μA
			T _J =100°C	-	-	100	
Gate-Threshold Voltage	V_{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.7	2.5	V	
Drain-Source on-Resistance ⁴	R_{DS(on)}	V _{GS} = 10V, I _D = 10A	-	25	32	mΩ	
		V _{GS} = 4.5V, I _D = 5A	-	31.5	40		
Forward Transconductance ⁴	g_{fs}	V _{DS} = 5V, I _D = 10A	-	15.5	-	S	
Dynamic Characteristics⁵							
Input Capacitance	C_{iss}	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz	-	1355	-	pF	
Output Capacitance	C_{oss}		-	60	-		
Reverse Transfer Capacitance	C_{rss}		-	49	-		
Gate Resistance	R_G	f = 1MHz	-	1.2	-	Ω	
Switching Characteristics⁵							
Total Gate Charge	Q_g	V _{GS} = 10V, V _{DD} = 30V, I _D = 10A	-	22	-	nC	
Gate-Source Charge	Q_{gs}		-	4.2	-		
Gate-Drain Charge	Q_{gd}		-	6.9	-		
Turn-on Delay Time	t_{d(on)}	V _{GS} = 10V, V _{DD} = 30V, R _G = 3Ω, I _D = 10A	-	6.4	-	ns	
Rise Time	t_r		-	15.3	-		
Turn-off Delay Time	t_{d(off)}		-	25	-		
Fall Time	t_f		-	7.6	-		
Body Diode Reverse Recovery Time	t_{rr}	I _F = 10A, dI _F /dt = 100A/μs	-	26	-	ns	
Body Diode Reverse Recovery Charge	Q_{rr}		-	45	-	nC	
Drain-Source Body Diode Characteristics							
Diode Forward Voltage ⁴	V_{SD}	I _S = 10A, V _{GS} = 0V	-	-	1.2	V	
Continuous Source Current	T _C =25°C	I_S	-	-	20	A	

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)} = 150°C
2. The EAS data shows Max. rating. The test condition is V_{DD} = 25V, V_{GS} = 10V, L = 0.4mH, I_{AS} = 14A
3. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.



Typical Characteristics

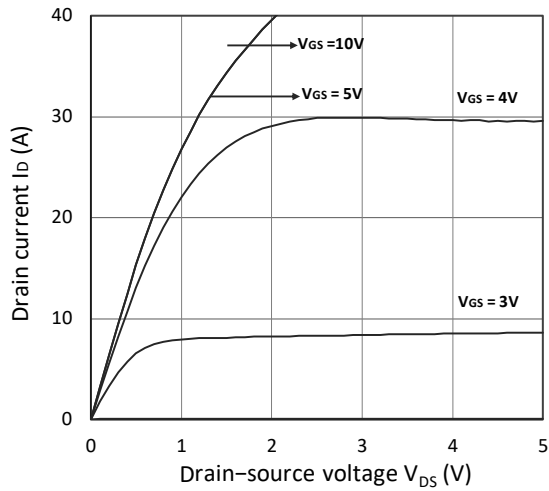


Figure 1. Output Characteristics

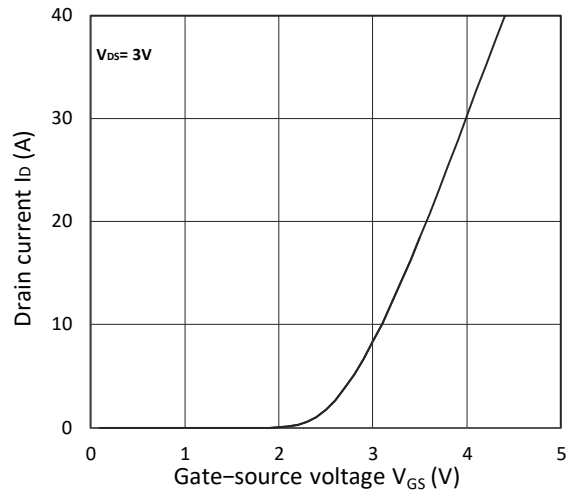


Figure 2. Transfer Characteristics

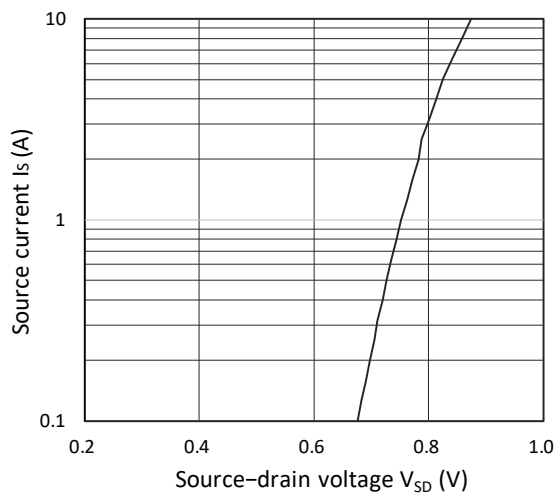


Figure 3. Forward Characteristics of Reverse

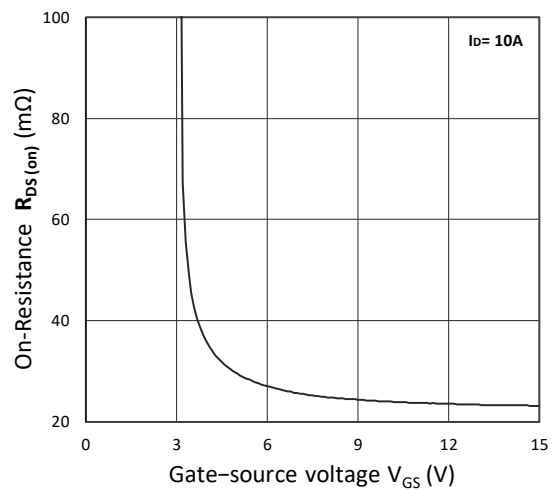


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

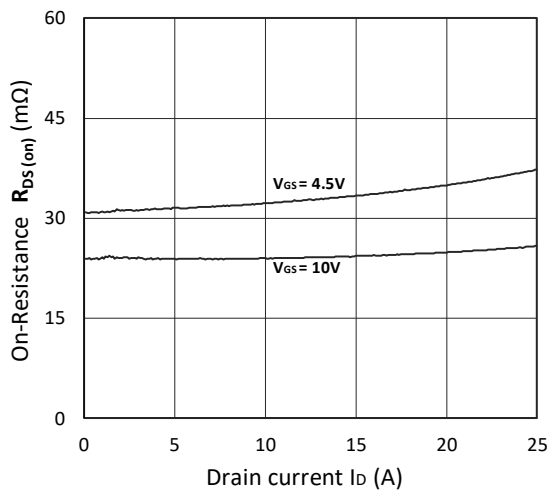


Figure 5. $R_{DS(ON)}$ vs. I_D

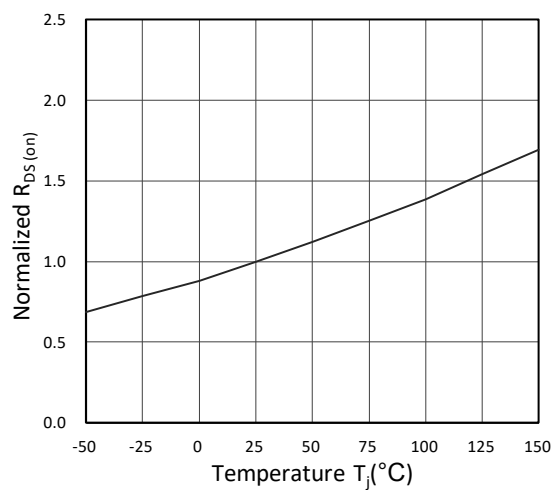


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

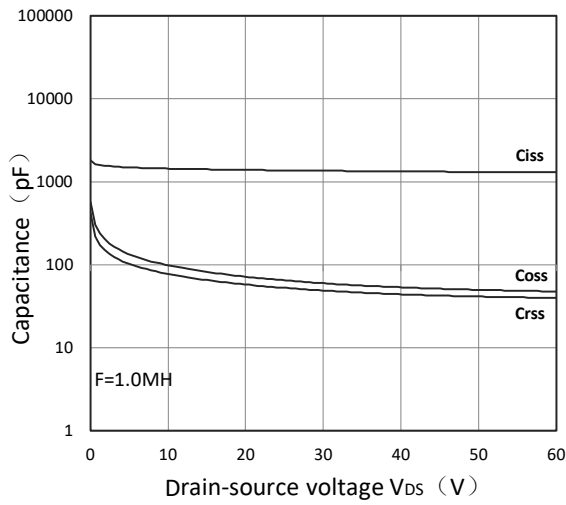


Figure 7. Capacitance Characteristics

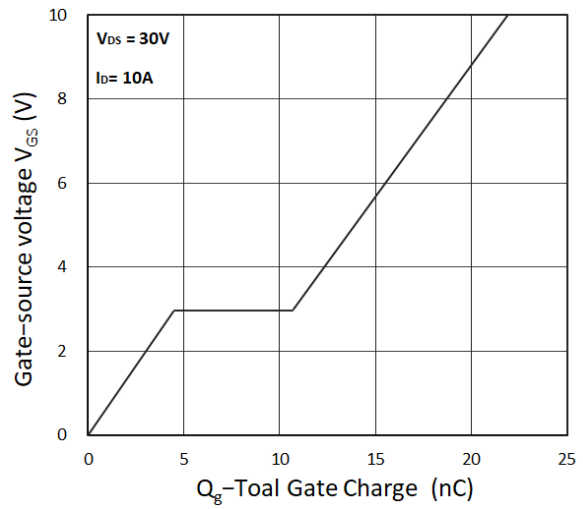


Figure 8. Gate Charge Characteristics

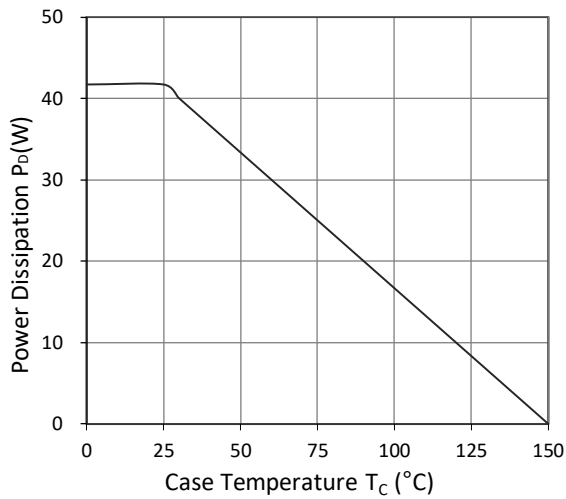


Figure 9. Power Dissipation

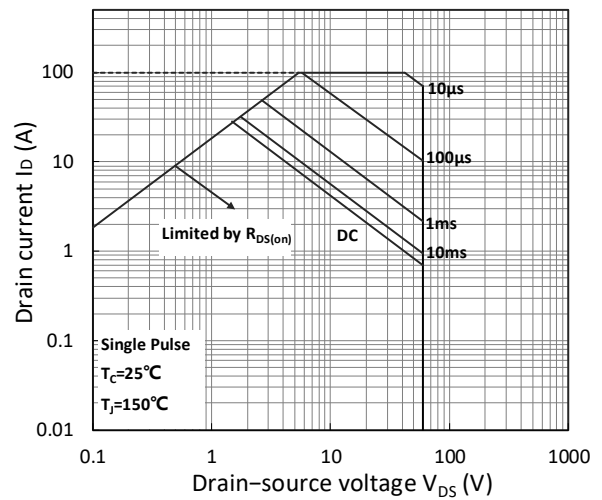


Figure 10. Safe Operating Area

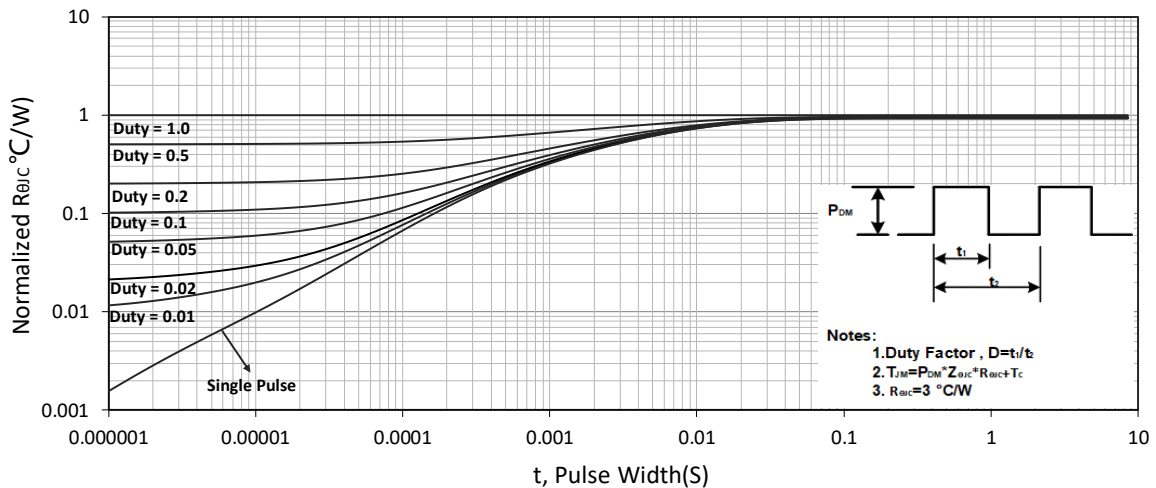
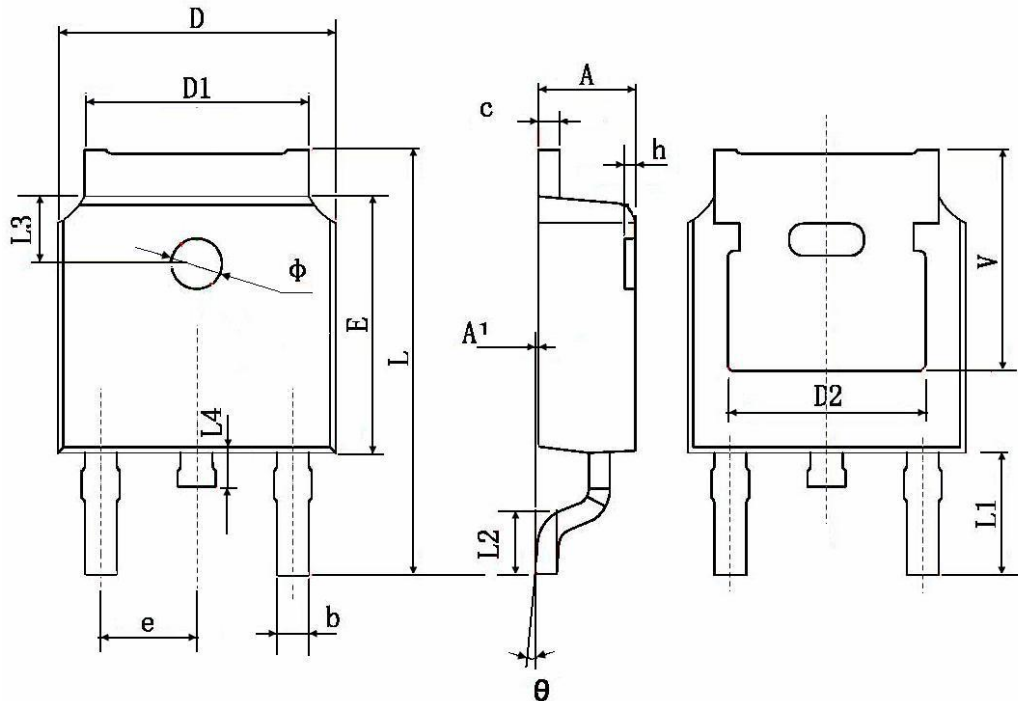


Figure 11. Normalized Maximum Transient Thermal Impedance



TO-252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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