

Description

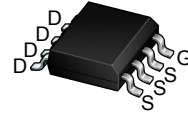
The XXW4402 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

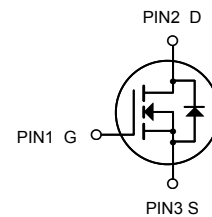
$V_{DS} = 20V$ $I_D = 20A$
 $R_{DS(ON)} < 5.5m\Omega @ V_{GS}=4.5V$

Application

Battery protection
 Load switch
 Uninterruptible power supply



SOP-8



N-Channel MOSFET

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current – Continuous ($T_C=25^\circ\text{C}$)	20	A
	Drain Current – Continuous ($T_C=70^\circ\text{C}$)	16	A
I_{DM}	Drain Current – Pulsed ¹	140	A
EAS	Single Pulse Avalanche Energy ²	162	mJ
IAS	Single Pulse Avalanche Current ²	57	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	3.1	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction to ambient	40	$^\circ\text{C/W}$

Electrical Characteristics Ta = 25°C

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V _{DSS}	I _D =250 uA, V _{GS} =0V	20			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =20V, V _{GS} =0V			1	uA
		V _{DS} =20V, V _{GS} =0V, T _J =55°C			5	
Gate-Body Leakage Current	I _{GSS}	V _{DS} =0V, V _{GS} =±12V			±100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250uA	0.5		1.6	V
Static Drain-Source On-Resistance	R _{DS(on)}	V _{GS} =4.5V, I _D =20A			5.5	mΩ
		V _{GS} =4.5V, I _D =20A T _J =125°C			7	
		V _{GS} =2.5V, I _D =18A			7	
On State Drain Current	I _{D(ON)}	V _{GS} =10V, V _{DS} =5V	140			A
Forward Transconductance	g _{FS}	V _{DS} =5V, I _D =20A		105		S
Input Capacitance	C _{iss}	V _{GS} =0V, V _{DS} =10V, f=1MHz	3080		4630	pF
Output Capacitance	C _{oss}		520		960	
Reverse Transfer Capacitance	C _{rss}		350		810	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.6		2.1	Ω
Total Gate Charge	Q _g	V _{GS} =10V, V _{DS} =10V, I _D =20A	28		43	nC
Gate Source Charge	Q _{gs}		7		11	
Gate Drain Charge	Q _{gd}		7		17	
Turn-On DelayTime	t _{d(on)}	V _{GS} =10V, V _{DS} =10V, R _L =0.5Ω, R _{GEN} =3Ω		7		ns
Turn-On Rise Time	t _r			8		
Turn-Off DelayTime	t _{d(off)}			70		
Turn-Off Fall Time	t _f			18		
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, di/dt= 500A/us	13		20	nC
Body Diode Reverse Recovery Charge	Q _{rr}		29		43	
Maximum Body-Diode Continuous Current	I _S				4	A
Diode Forward Voltage	V _{SD}	I _S =1A, V _{GS} =0V			1	V

Note : The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

Typical Characteristics

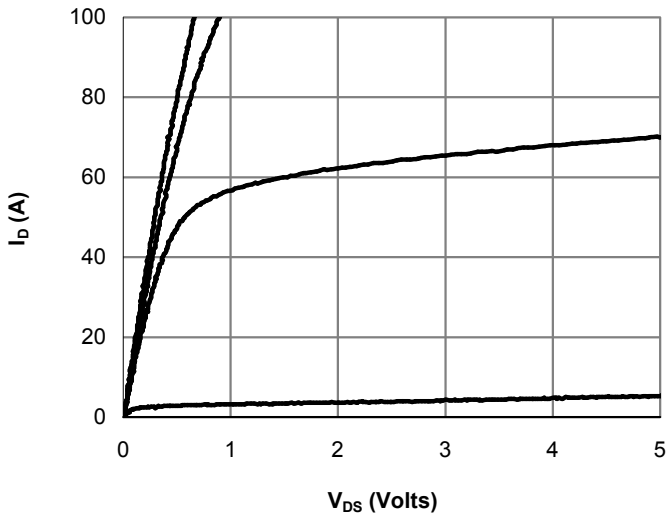


Fig 1: On-Region Characteristics (Note E)

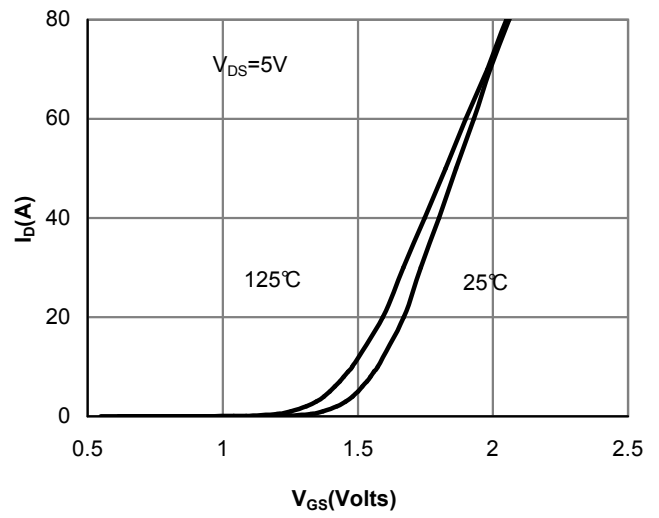


Figure 2: Transfer Characteristics (Note E)

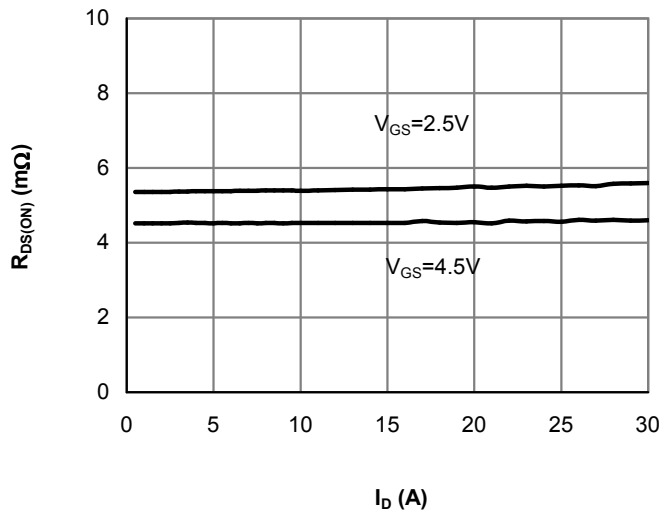


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

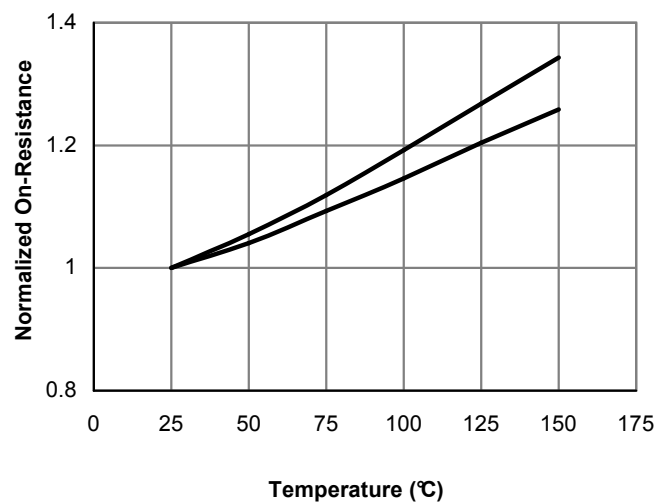


Figure 4: On-Resistance vs. Junction Temperature (Note E)

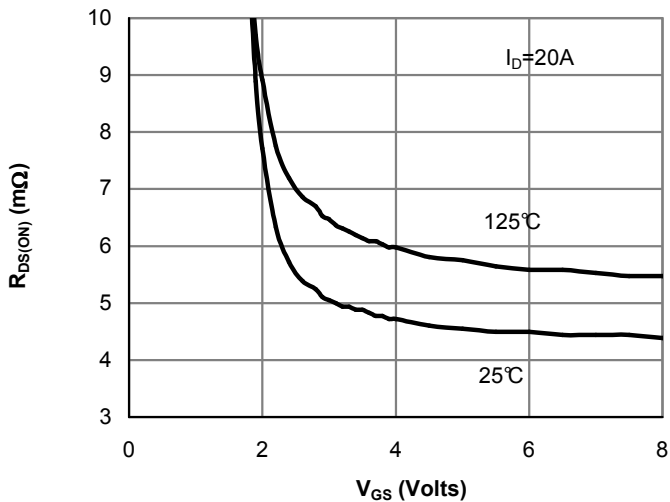


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

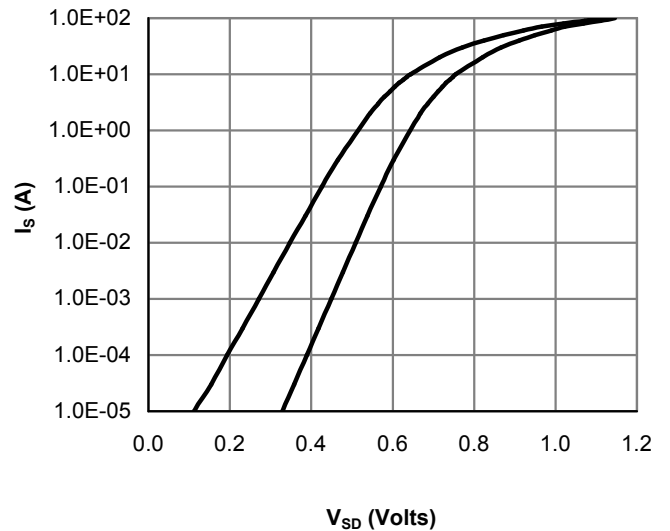


Figure 6: Body-Diode Characteristics (Note E)

Typical Characteristics

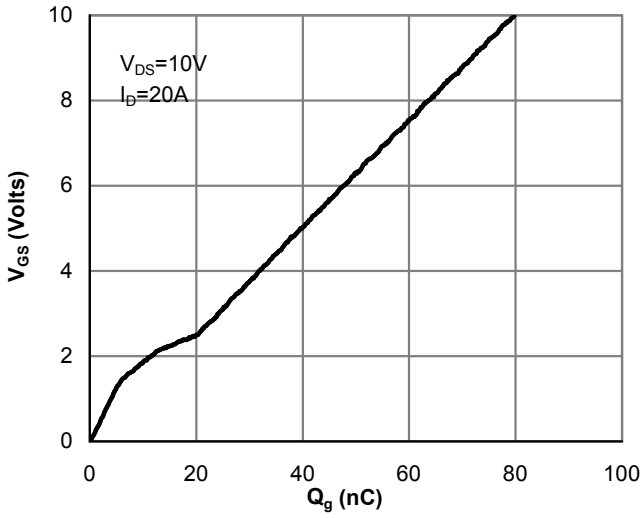


Figure 7: Gate-Charge Characteristics

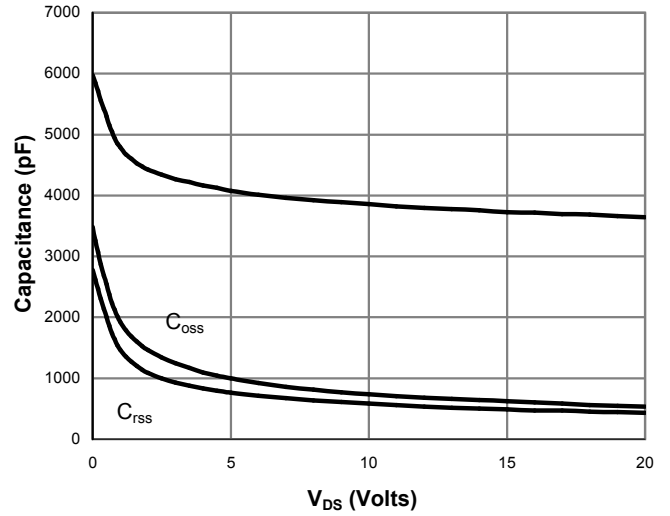


Figure 8: Capacitance Characteristics

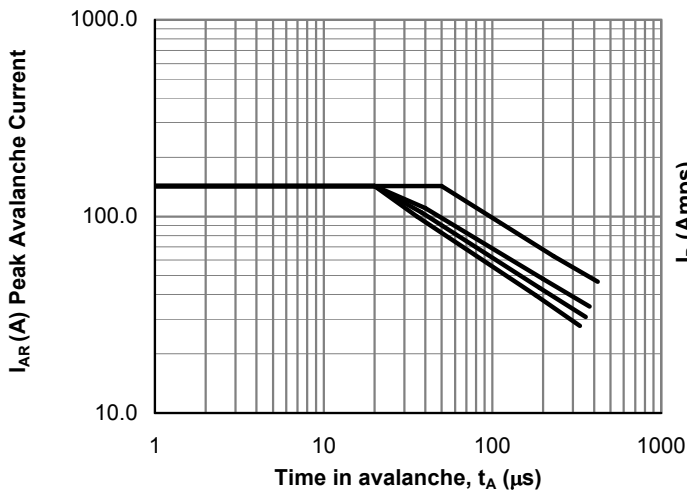


Figure 9: Single Pulse Avalanche capability (Note C)

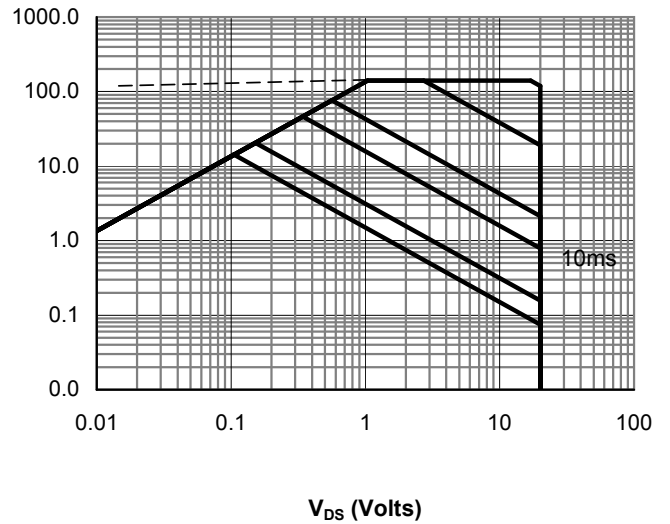
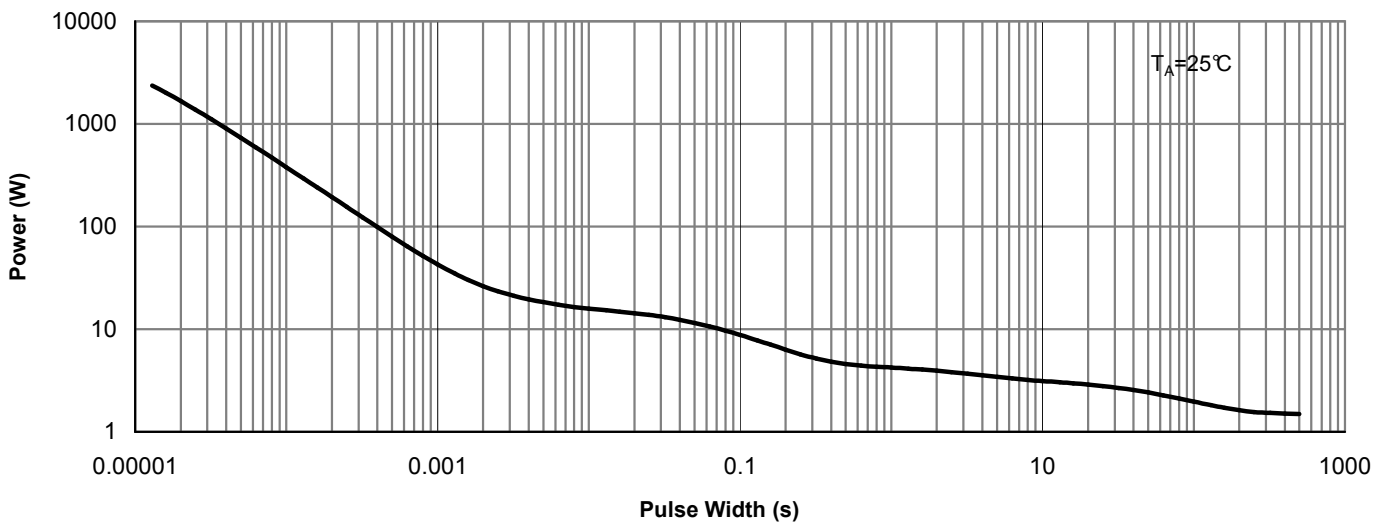


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)



Typical Characteristics

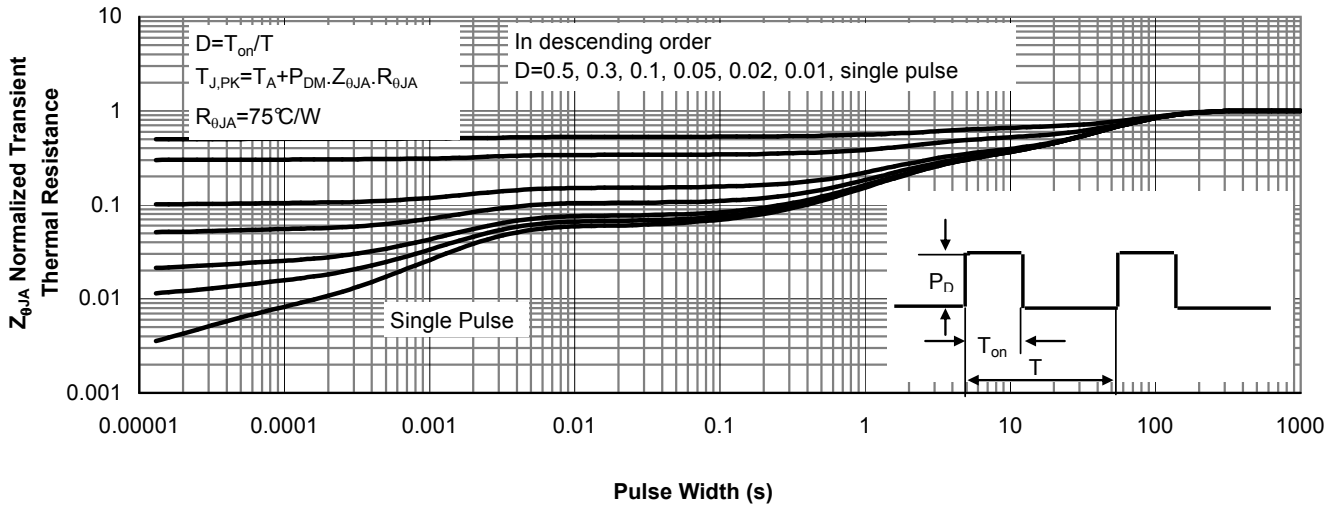
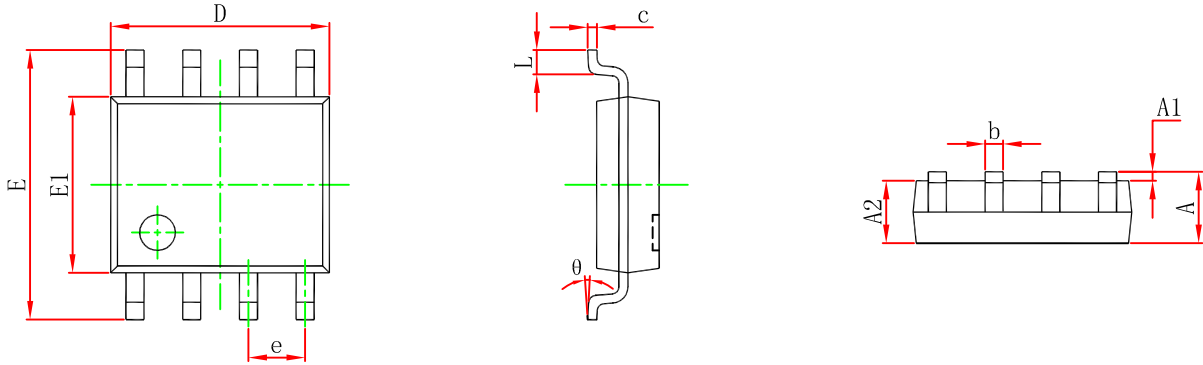
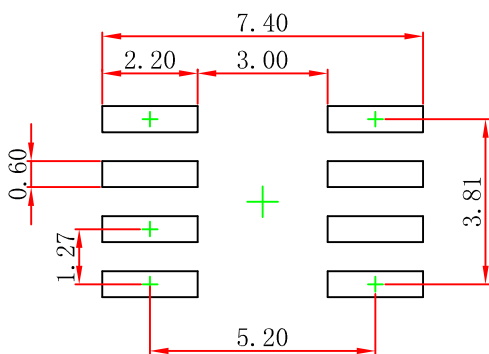


Figure 12: Normalized Maximum Transient Thermal Impedance (Note F)

SOP-8 Package Outline Dimensions


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Note:
 1. Controlling dimension: in millimeters.
 2. General tolerance: $\pm 0.05\text{mm}$.
 3. The pad layout is for reference purposes only.