



### Description

The XPX4407XS 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 load switch or in PWM applications.

$V_{DS} = -30V, I_D = 13A$

$R_{DS(ON)} = 11m\Omega$  (typ) @  $V_{GS} = 10V$

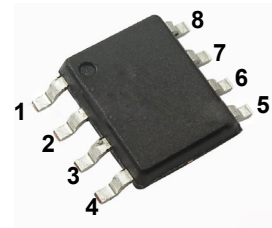
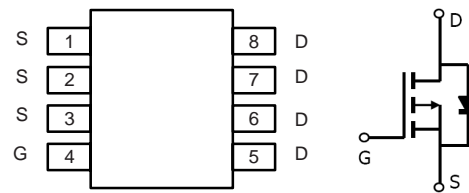
$R_{DS(ON)} = 16m\Omega$  (typ) @  $V_{GS} = 4.5V$

### General Features

- High Power and current handling capability
- Lead free product is acquired
- Surface mount package

### Application

- PWM applications
- Load switch
- Power management



### Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity
XPX4407XS	XPX4407XS	SOP-8	Ø330mm	12mm	3000 units

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_C = 25^\circ C$ )	$I_D$	-13	A
Drain Current-Continuous ( $T_C = 100^\circ C$ )		-9.4	
Drain Current-Pulsed <sup>(Note 1)</sup>	$I_{DM}$	-49	A
Maximum Power Dissipation ( $T_C = 25^\circ C$ )	$P_D$	3.2	W
Maximum Power Dissipation ( $T_C = 100^\circ C$ )		1.5	
Single pulse avalanche energy <sup>(Note 5)</sup>	$E_{AS}$	235	mJ
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	$^\circ C$
Thermal Resistance, Junction-to-Ambient <sup>(Note 2)</sup>	$R_{\theta JA}$	42.3	$^\circ C/W$

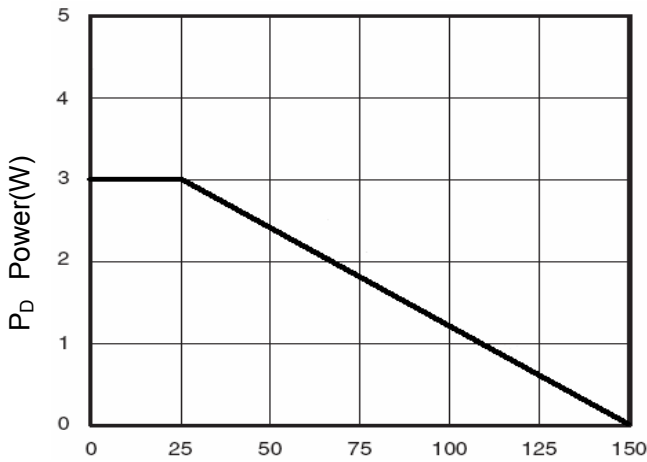
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =-250μA	-30	-33	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V	-	-	-1	μA
Gate-Body Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
<b>On Characteristics</b> (Note 3)						
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =-250μA	-1.2	-1.6	-2.5	V
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-10A	-	11	15	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-7A	-	16	25	mΩ
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> =-10V, I <sub>D</sub> =-10A	-	20	-	S
<b>Dynamic Characteristics</b> (Note 4)						
Input Capacitance	C <sub>ISS</sub>	V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1.0MHz	-	1630	-	PF
Output Capacitance	C <sub>OSS</sub>		-	214	-	PF
Reverse Transfer Capacitance	C <sub>RSS</sub>		-	168	-	PF
<b>Switching Characteristics</b> (Note 4)						
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>DD</sub> =-15V, I <sub>D</sub> =-10A, V <sub>GS</sub> =-10V, R <sub>GEN</sub> =1Ω	-	9	-	nS
Turn-on Rise Time	t <sub>r</sub>		-	8	-	nS
Turn-Off Delay Time	t <sub>d(off)</sub>		-	28	-	nS
Turn-Off Fall Time	t <sub>f</sub>		-	10	-	nS
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =-15V, I <sub>D</sub> =-10A, V <sub>GS</sub> =-10V	-	24	-	nC
Gate-Source Charge	Q <sub>gs</sub>		-	3.5	-	nC
Gate-Drain Charge	Q <sub>gd</sub>		-	6	-	nC
<b>Drain-Source Diode Characteristics</b>						
Diode Forward Current (Note 2)	I <sub>S</sub>		-	-	-13	A
Diode Forward Voltage (Note 3)	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =-12A	-	-	-1.2	V

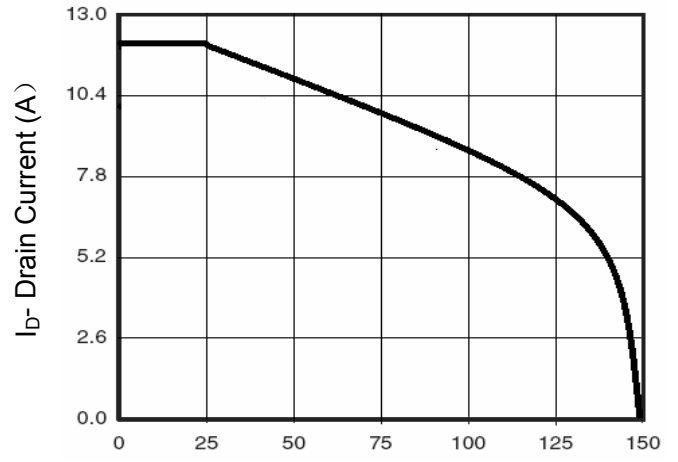
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. E<sub>AS</sub> condition: T<sub>J</sub>=25°C, V<sub>DD</sub>=-15V, V<sub>G</sub>=10V, L=0.5mH, R<sub>g</sub>=25Ω, I<sub>AS</sub>=-34A

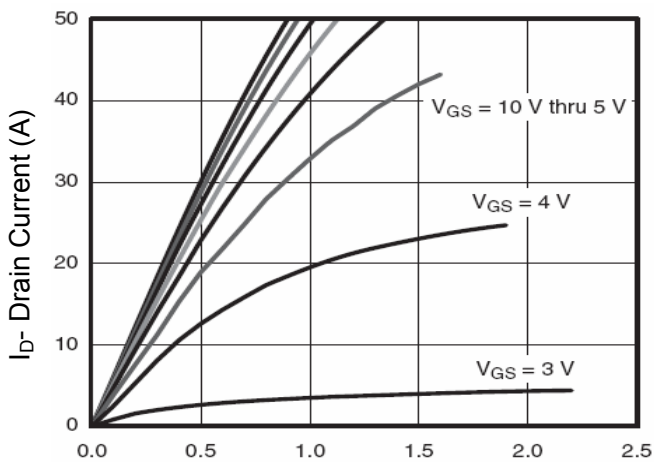
Typical Electrical and Thermal Characteristics



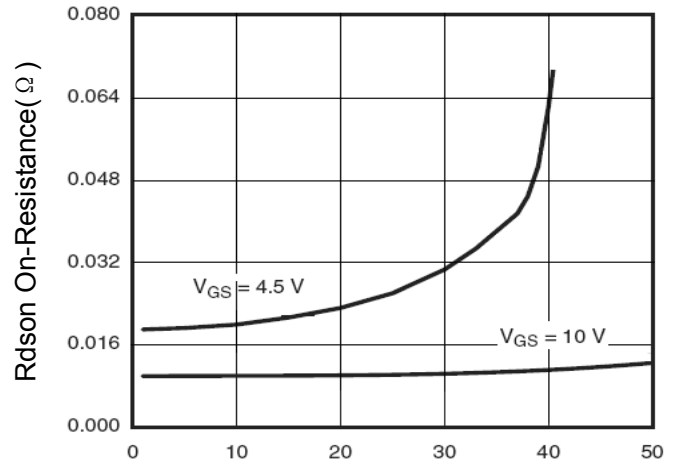
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 1 Power Dissipation**



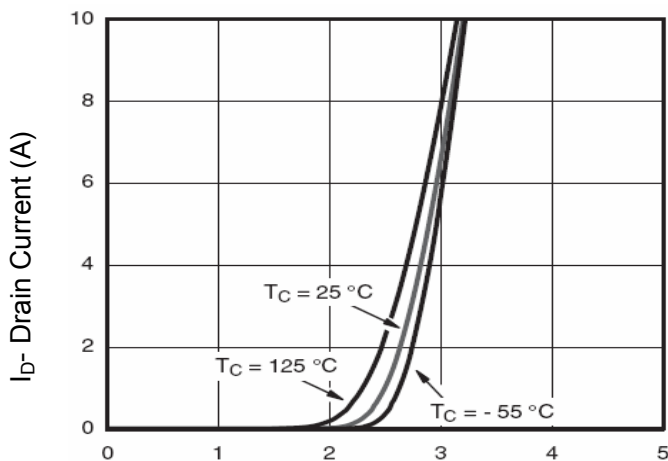
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 2 Drain Current**



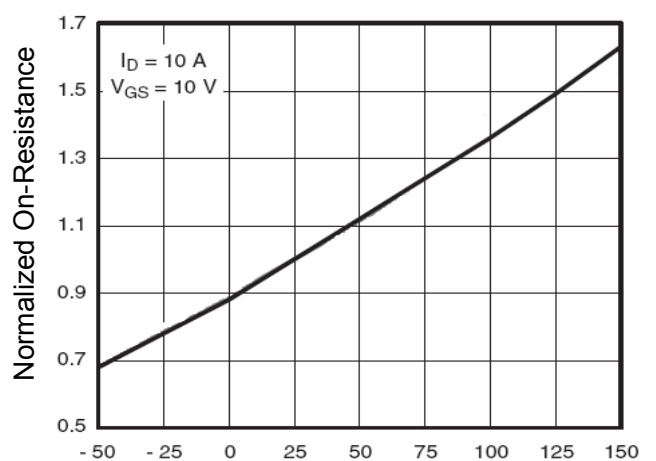
V<sub>ds</sub> Drain-Source Voltage (V)  
**Figure 3 Output Characteristics**



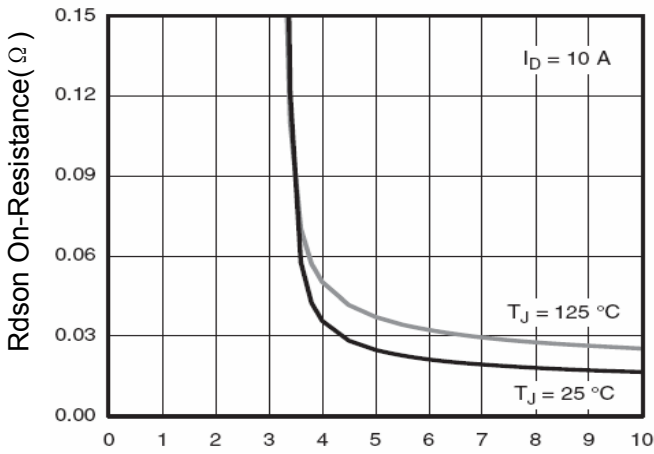
I<sub>D</sub>- Drain Current (A)  
**Figure 4 Drain-Source On-Resistance**



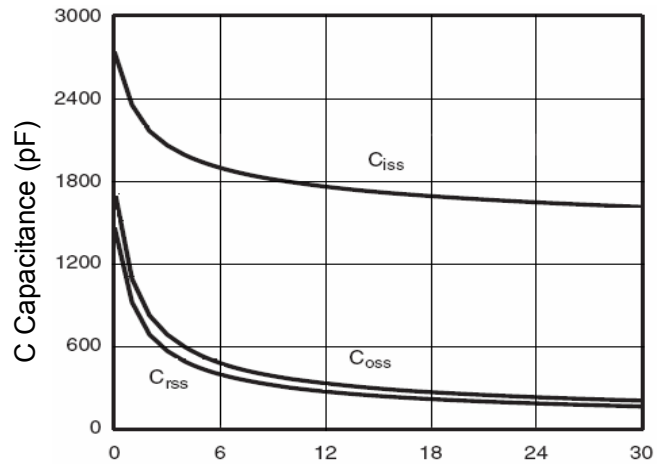
V<sub>gs</sub> Gate-Source Voltage (V)  
**Figure 5 Transfer Characteristics**



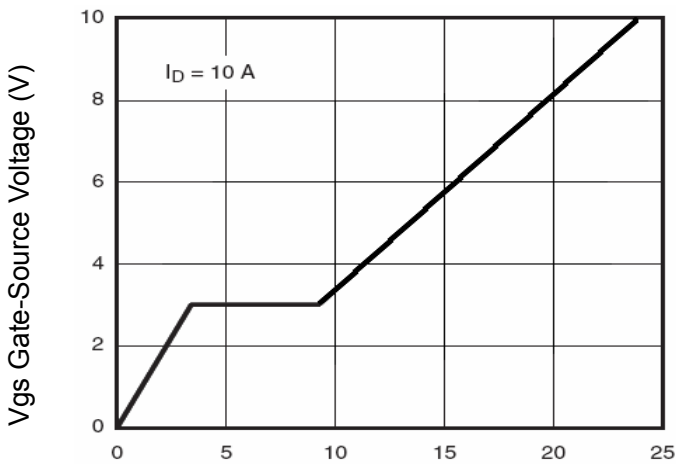
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 6 Drain-Source On-Resistance**



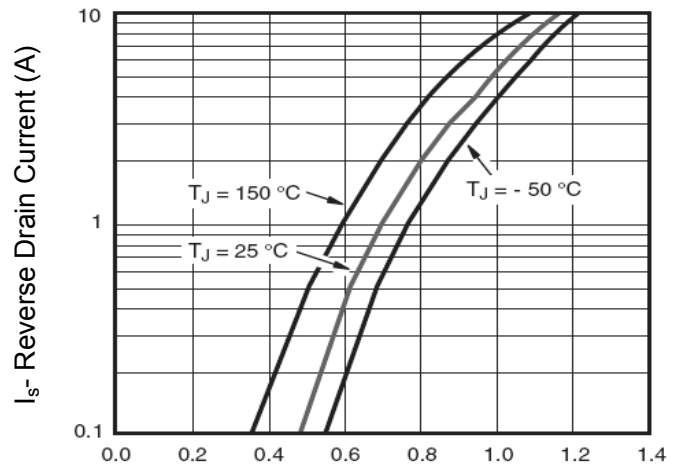
Vgs Gate-Source Voltage (V)  
**Figure 7 Rdson vs Vgs**



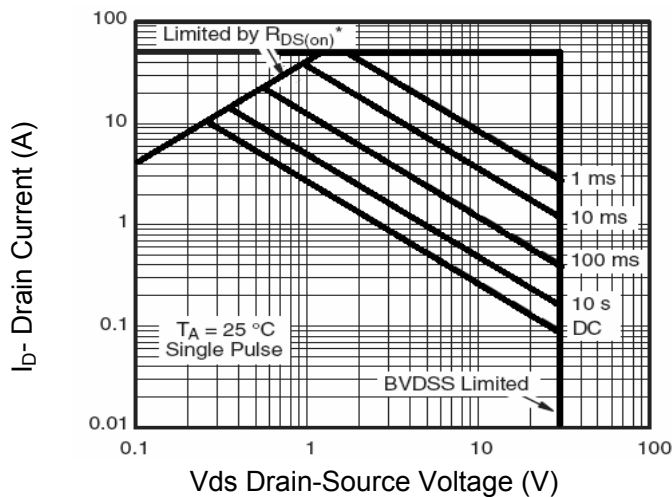
Vds Drain-Source Voltage (V)  
**Figure 8 Capacitance vs Vds**



Qg Gate Charge (nC)  
**Figure 9 Gate Charge**



Vsd Source-Drain Voltage (V)  
**Figure 10 Source-Drain Diode Forward**



**Figure 11 Safe Operation Area**

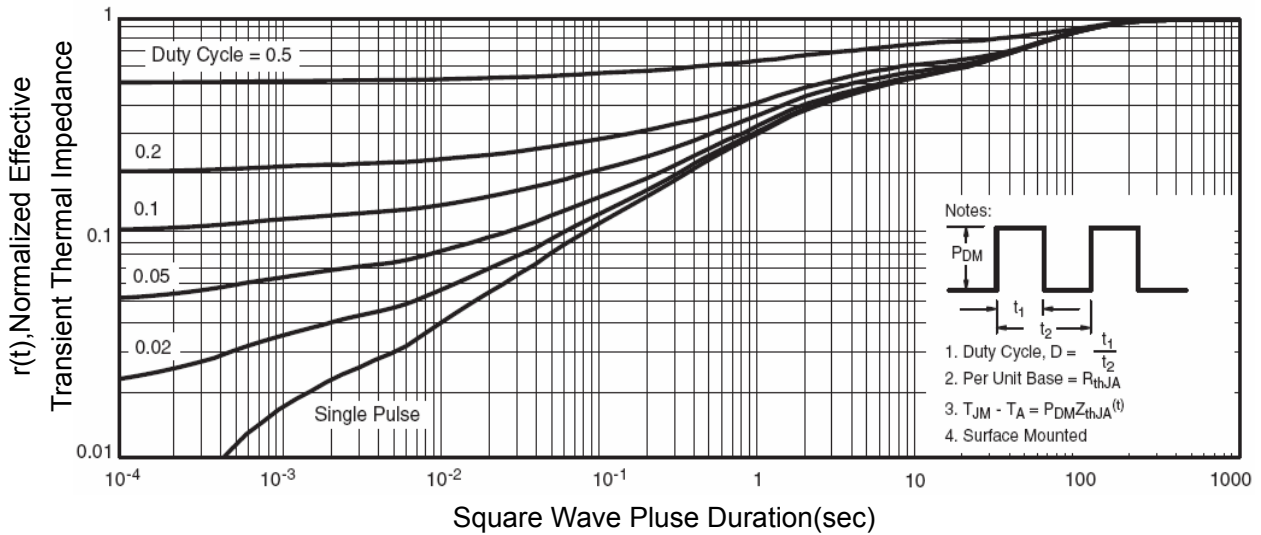
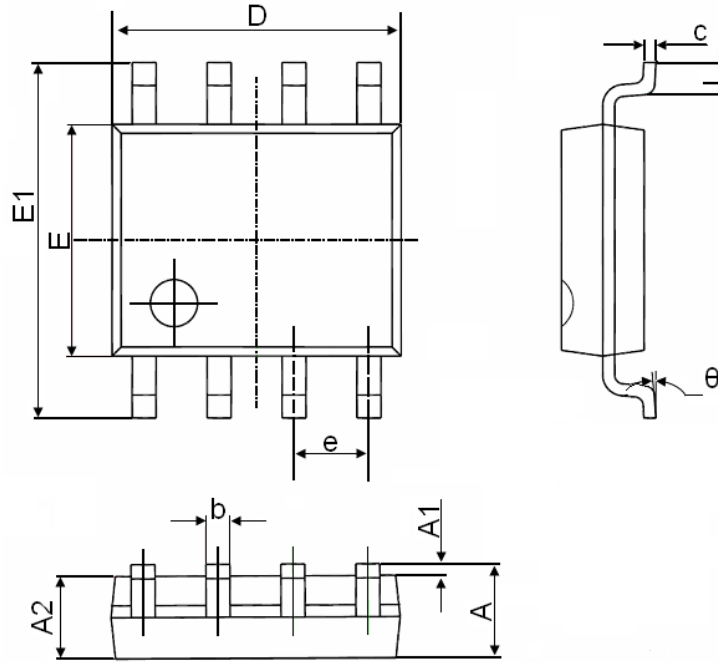


Figure 12 Normalized Maximum Transient Thermal Impedance

**SOP-8 Package Information**



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	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Flow (wave) soldering (solder dipping)

Product	Peak Temperature	Dipping Time
Pb device	245°C ±5°C	5sec ±1sec
Pb-Free device	260°C +0/-5°C	5sec ±1sec



This integrated circuit can be damaged by ESD. UniverChip Corporation recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedure can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

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