



12-V P-Channel 1.8-V (G-S) MOSFET

PRODUCT SUMMARY		
V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
-12	0.055 @ V _{GS} = -4.5 V	-4.9
	0.070 @ V _{GS} = -2.5 V	-4.4
	0.090 @ V _{GS} = -1.8 V	-4.0

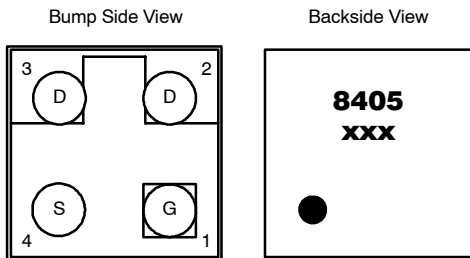
FEATURES

- TrenchFET® Power MOSFET
- New MICRO FOOT® Chipscale Packaging
Reduces Footprint Area Profile (0.62 mm) and On-Resistance Per Footprint Area

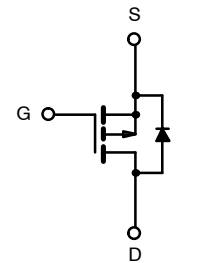
APPLICATIONS

- PA, Battery and Load Switch
- Battery Charger Switch

MICRO FOOT



Device Marking: 8405
xxx = Date/Lot Traceability Code



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _A = 25°C UNLESS OTHERWISE NOTED)					
Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V _{DS}	-12		V
Gate-Source Voltage		V _{GS}	±8		
Continuous Drain Current (T _J = 150°C) ^a	T _A = 25°C	I _D	-4.9	-3.6	A
	T _A = 70°C		-3.9	-2.8	
Pulsed Drain Current		I _{DM}	-10		
continuous Source Current (Diode Conduction) ^a		I _S	-2.5	-1.3	
Maximum Power Dissipation ^a	T _A = 25°C	P _D	2.77	1.47	W
	T _A = 70°C		1.77	0.94	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C
Package Reflow Conditions ^b	VPR		215		
	IR/Convection		220		

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 5 sec	R _{thJA}	35	45	°C/W
	Steady State		72	85	
Maximum Junction-to-Foot (drain)	Steady State	R _{thJF}	16	20	

Notes

- Surface Mounted on 1" x 1" FR4 Board.
- Refer to IPC/JEDEC (J-STD-020A), no manual or hand soldering.

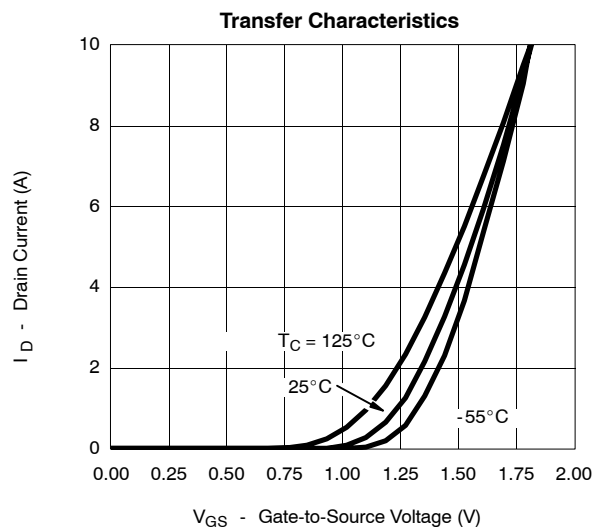
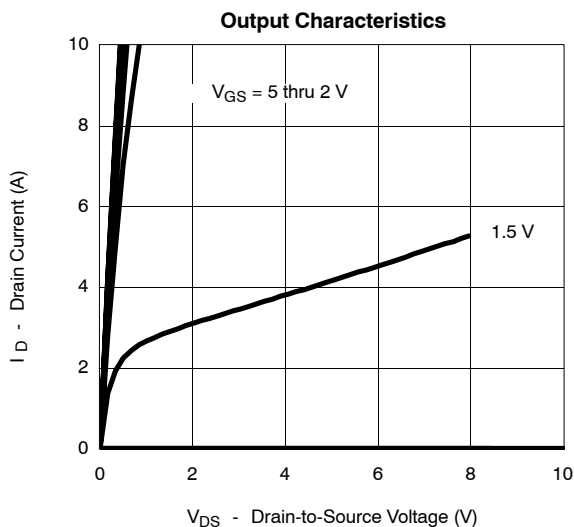
SPECIFICATIONS (T_J = 25 °C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = -250 μA	-0.45	-0.7	-0.95	V
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ±8 V			±100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = -12 V, V _{GS} = 0 V			-1	μA
		V _{DS} = -12 V, V _{GS} = 0 V, T _J = 70 °C			-5	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≤ -5 V, V _{GS} = -4.5 V	-5			A
Drain-Source On-State Resistance ^a	r _{DS(on)}	V _{GS} = -4.5 V, I _D = -1 A		0.045	0.055	Ω
		V _{GS} = -2.5 V, I _D = -1 A		0.055	0.070	
		V _{GS} = -1.8 V, I _D = -1 A		0.073	0.090	
Forward Transconductance ^a	g _{fs}	V _{DS} = -10 V, I _D = -1 A		6		S
Diode Forward Voltage ^a	V _{SD}	I _S = -1 A, V _{GS} = 0 V		-0.73	-1.1	V
Dynamic^b						
Total Gate Charge	Q _g	V _{DS} = -6 V, V _{GS} = -4.5 V, I _D = -1 A		14	21	nC
Gate-Source Charge	Q _{gs}			1.7		
Gate-Drain Charge	Q _{gd}			2.5		
Turn-On Delay Time	t _{d(on)}	V _{DD} = -6 V, R _L = 6 Ω I _D ≅ -1 A, V _{GEN} = -4.5 V, R _G = 6 Ω		16	25	ns
Rise Time	t _r			32	50	
Turn-Off Delay Time	t _{d(off)}			120	180	
Fall Time	t _f			80	120	
Source-Drain Reverse Recovery Time	t _{rr}		I _F = - A, di/dt = 100 A/μs		46	

Notes

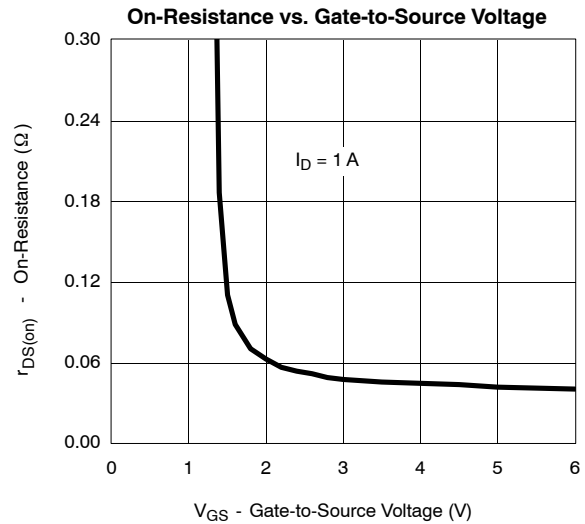
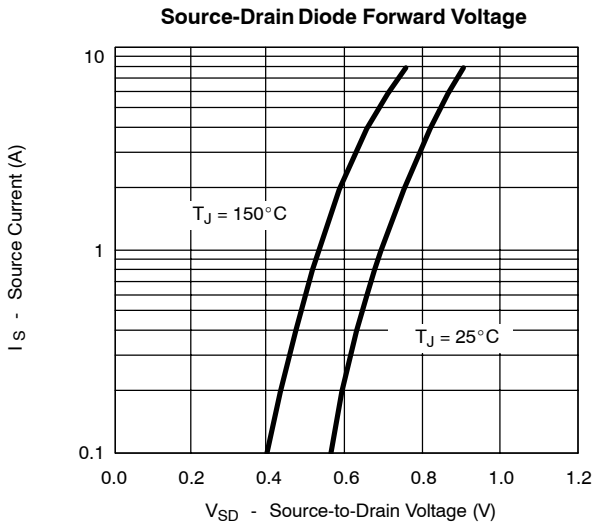
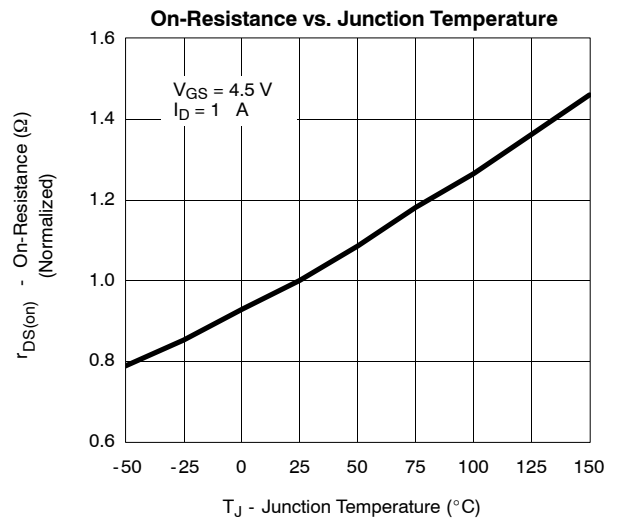
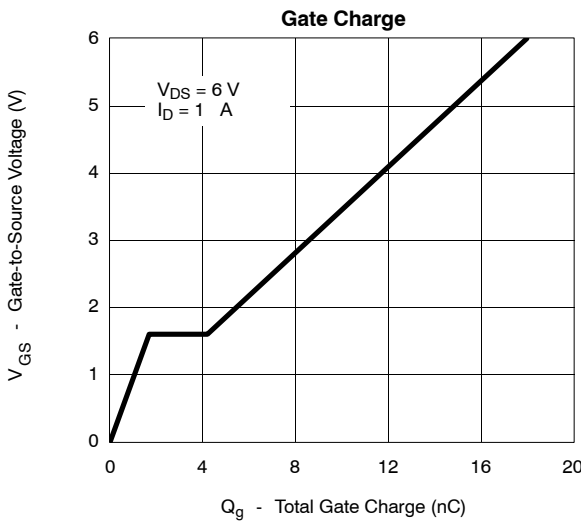
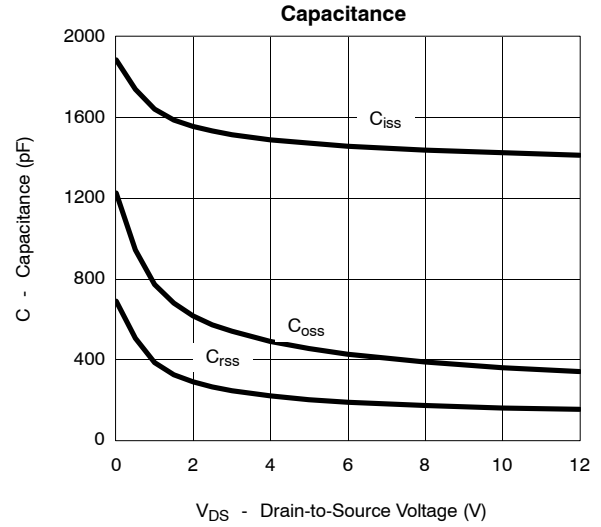
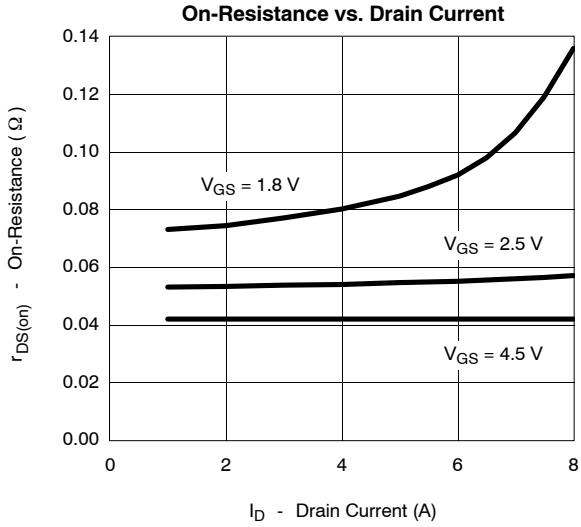
- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%.
- b. Guaranteed by design, not subject to production testing.

TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

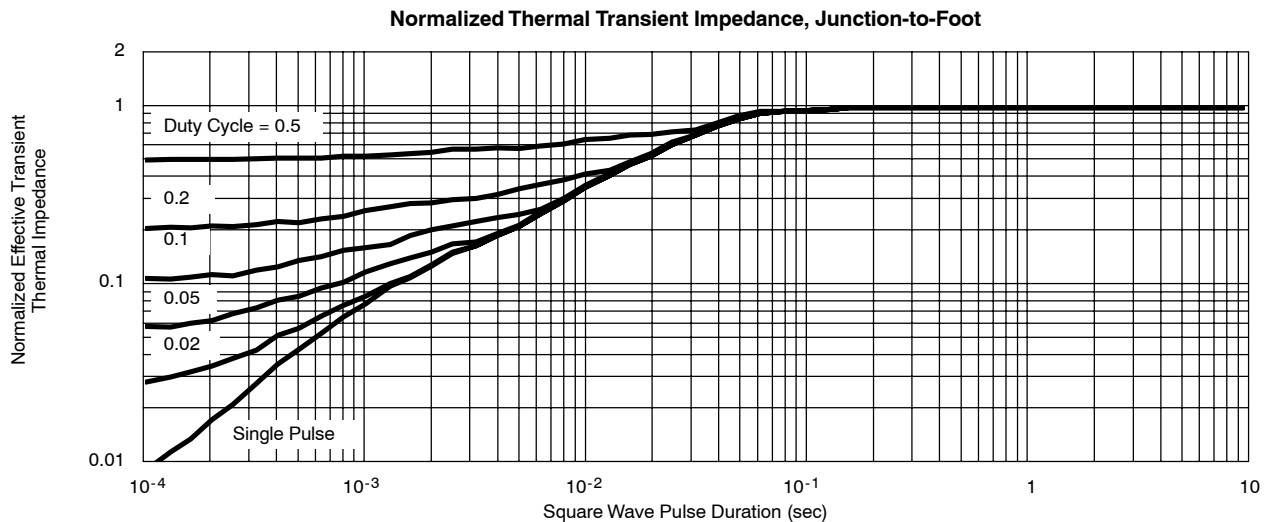
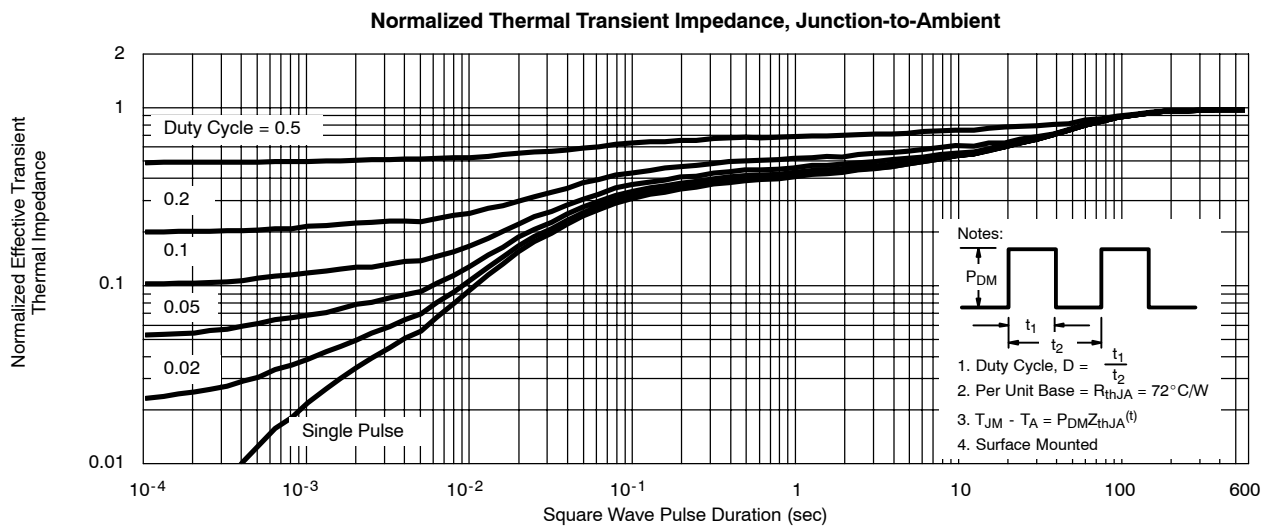
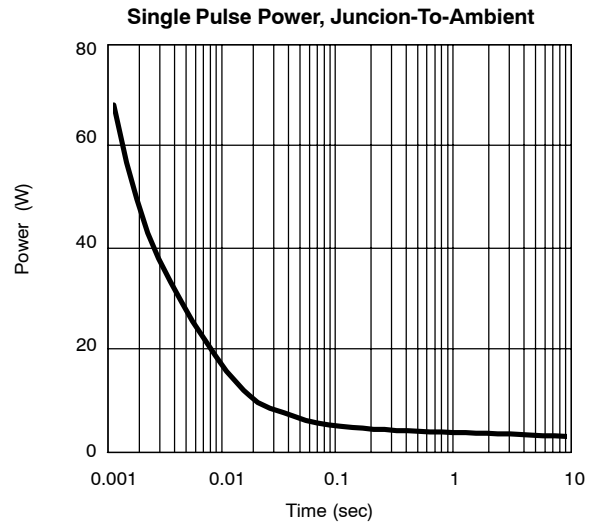
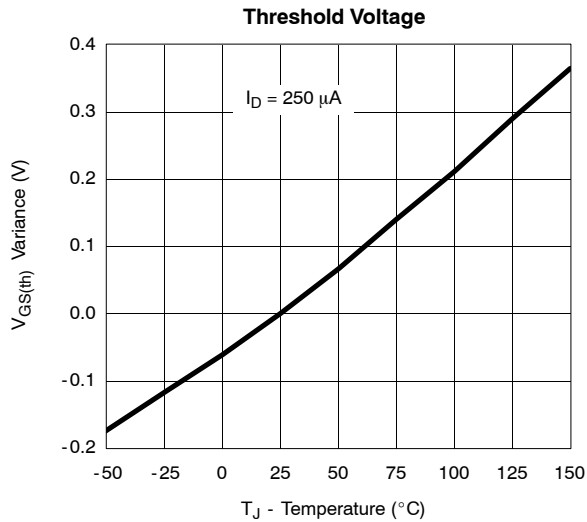




TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

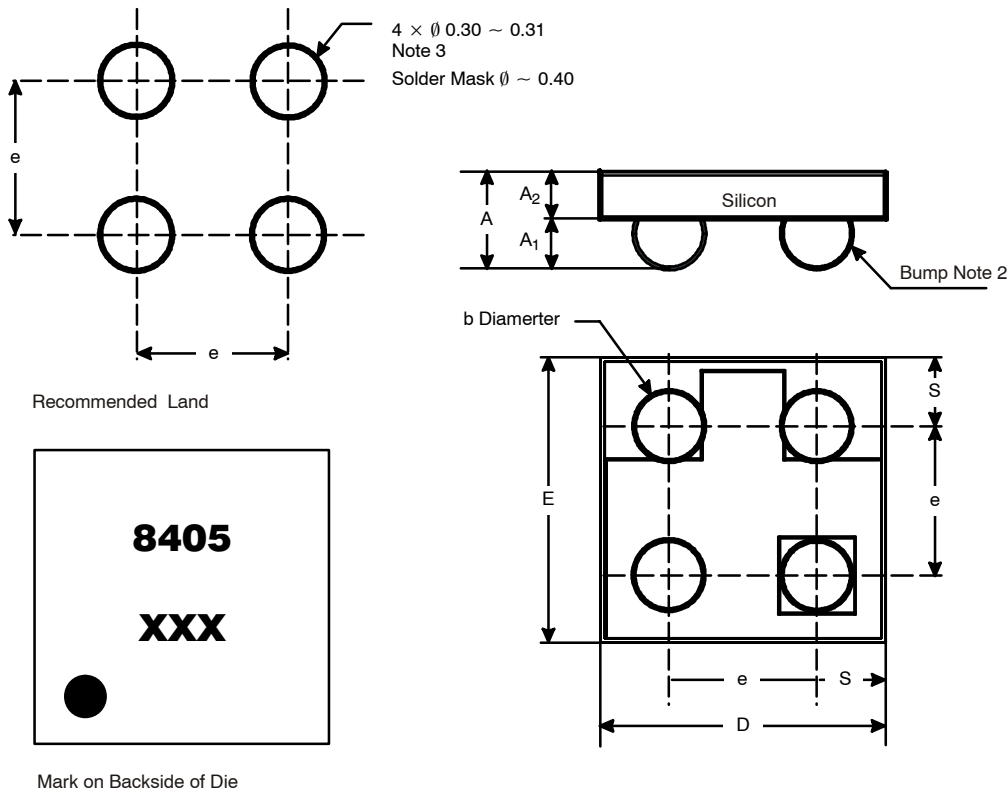


TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)



PACKAGE OUTLINE

MICRO FOOT: 4-BUMP (2 X 2, 0.8-mm PITCH)



NOTES (Unless Otherwise Specified):

5. Laser mark on the silicon die back, coated with a thin metal.
6. Bumps are Eutectic solder 63/57 Sn/Pb.
7. Non-solder mask defined copper landing pad.
8. The flat side of wafers is oriented at the bottom.

Dim	MILLIMETERS*		INCHES	
	Min	Max	Min	Max
A	0.600	0.650	0.0236	0.0256
A ₁	0.260	0.290	0.0102	0.0114
A ₂	0.340	0.360	0.0134	0.0142
b	0.370	0.410	0.0146	0.0161
D	1.520	1.600	0.0598	0.0630
E	1.520	1.600	0.0598	0.0630
e	0.750	0.850	0.0295	0.0335
S	0.370	0.380	0.0146	0.0150

* Use millimeters as the primary measurement.