

UP50P06

P-Channel Enhancement Mode MOSFET

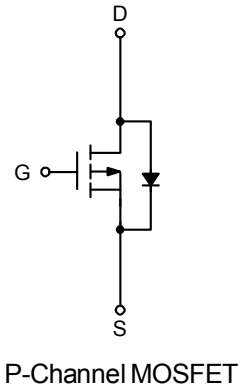
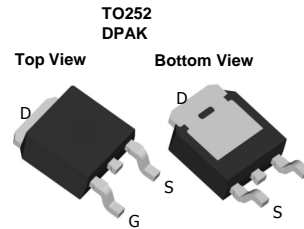
Features

- -60V/-50 A,
 $R_{DS(ON)} = 12.5m\Omega(\text{max.}) @ V_{GS} = -10V$
- Reliable and Rugged
- Lead Free and Green Devices Available
(RoHS Compliant)
- 100% UIS Tested

Applications

- Power Management in Desktop Computer or
DC/ DC Converters

Pin Description



UP50P06

Absolute Maximum Ratings (T_A = 25°C Unless Otherwise Noted)

Symbol	Parameter	Rating	Unit	
Common Ratings				
V _{DSS}	Drain-Source Voltage	-60	V	
V _{GSS}	Gate-Source Voltage	±25		
T _J	Maximum Junction Temperature	150	°C	
T _{STG}	Storage Temperature Range	-55 to 150		
I _S	Diode Continuous Forward Current	T _C =25°C	-50	A
I _D	Continuous Drain Current	T _C =25°C	-50	
		T _C =100°C	-33	
I _{DM}	Pulsed Drain Current	T _C =25°C	- 0*	
P _D	Maximum Power Dissipation	T _C =25°C	62.5	W
		T _C =100°C	25	
R _{θJC}	Thermal Resistance-Junction to Case	Steady State	2	°C/W
I _D	Continuous Drain Current	T _A =25°C	-19.5	A
		T _A =70°C	-14.2	
P _D	Maximum Power Dissipation	T _A =25°C	6.25	W
		T _A =70°C	4	
R _{θJA}	Thermal Resistance-Junction to Ambient	t < 10s	20	°C/W
		Steady State	55	
I _{AS} ^a	Avalanche Current, Single pulse	L=0.5mH	34	A
E _{AS} ^a	Avalanche Energy, Single pulse	L=0.5mH	244	mJ

Note * Current limited by bond wire.

Note a UIS tested and pulse width are limited by maximum junction temperature 150°C (initial temperature T_J = 25°C).

UP50P06

Electrical Characteristics (T_A = 25°C Unless Otherwise Noted)

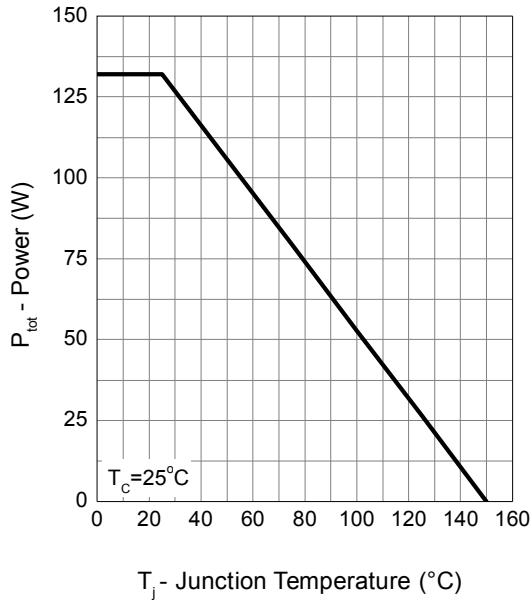
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =-250μA	-60	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-48V, V _{GS} =0V	-	-	1	μA
		T _J =85°C	-	-	-30	
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =-250μA	-1	-2	-3	V
I _{GSS}	Gate Leakage Current	V _{GS} =±25V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)} ^b	Drain-Source On-state Resistance	V _{GS} =-10V, I _{DS} =-25A	-	10	12.5	mΩ
Diode Characteristics						
V _{SD} ^b	Diode Forward Voltage	I _{SD} =-1A, V _{GS} =0V	-	-0.7	-1	V
t _{rr}	Reverse Recovery Time	I _{SD} =-25A, di _{SD} /dt=100A/μs	-	35	-	ns
Q _{rr}	Reverse Recovery Charge		-	37	-	nC
Dynamic Characteristics^c						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2.7	-	Ω
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-30V, Frequency=1.0MHz	-	4068	-	pF
C _{oss}	Output Capacitance		-	495	-	
C _{rss}	Reverse Transfer Capacitance		-	281	-	
t _{d(ON)}	Turn-on Delay Time		V _{DD} =-30V, R _L =30Ω, I _{DS} =-1A, V _{GEN} =-10V, R _G =6Ω	-	15	-
t _r	Turn-on Rise Time	-		13	-	
t _{d(OFF)}	Turn-off Delay Time	-		119	-	
t _f	Turn-off Fall Time	-		60	-	
Gate Charge Characteristics^c						
Q _g	Total Gate Charge	V _{DS} =-30V, V _{GS} =-10V, I _{DS} =-25A	-	88	-	nC
Q _{gs}	Gate-Source Charge		-	12	-	
Q _{gd}	Gate-Drain Charge		-	21	-	

Note b : Pulse test; pulse width≤300μs, duty cycle≤2%.

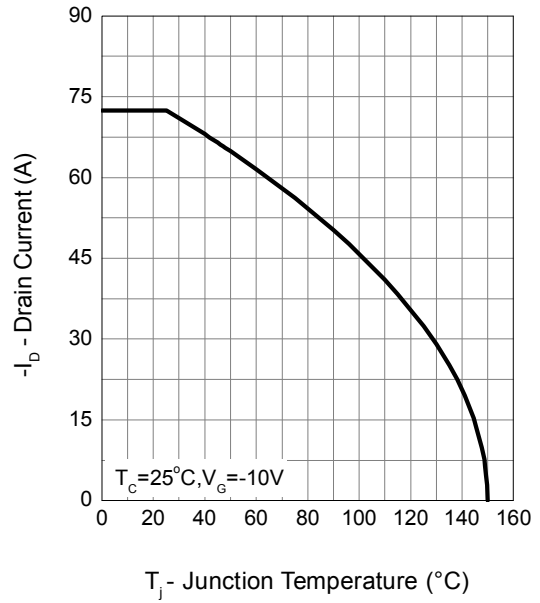
Note c : Guaranteed by design, not subject to production testing.

Typical Operating Characteristics

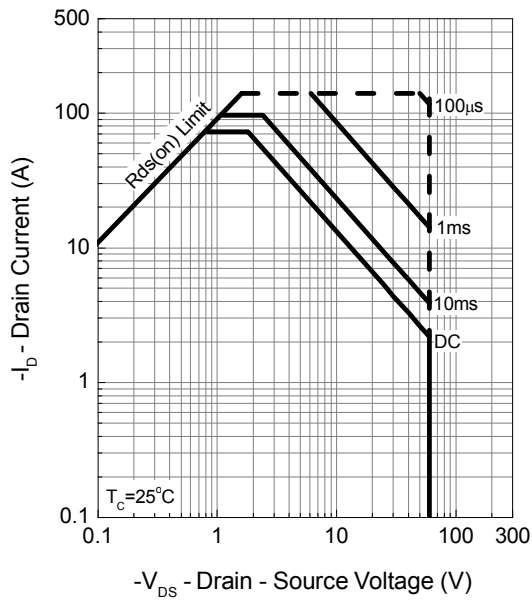
Power Dissipation



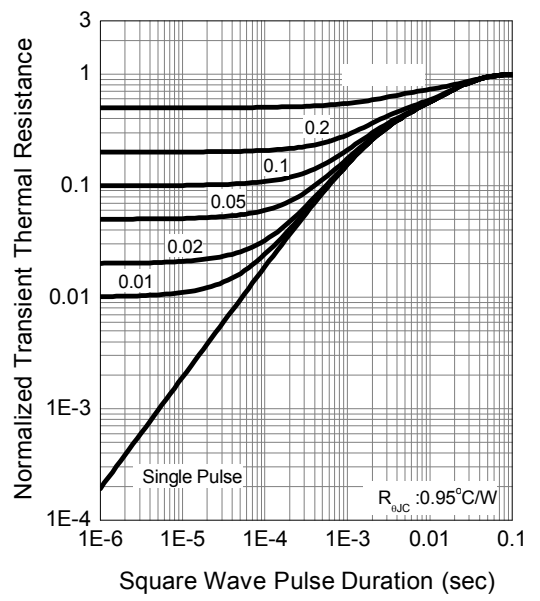
Drain Current



Safe Operation Area



Thermal Transient Impedance

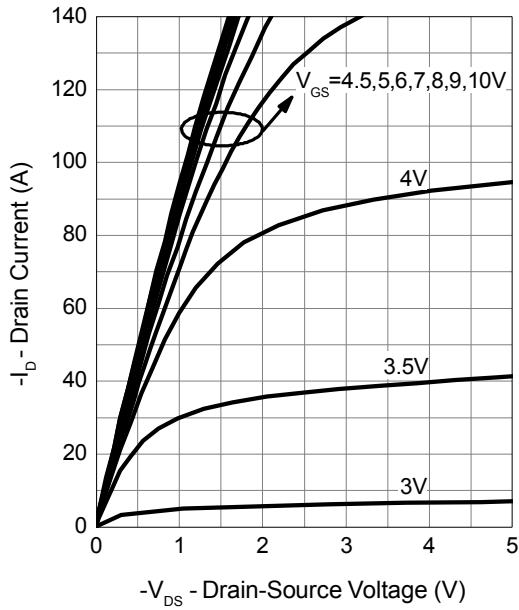


UP50P06

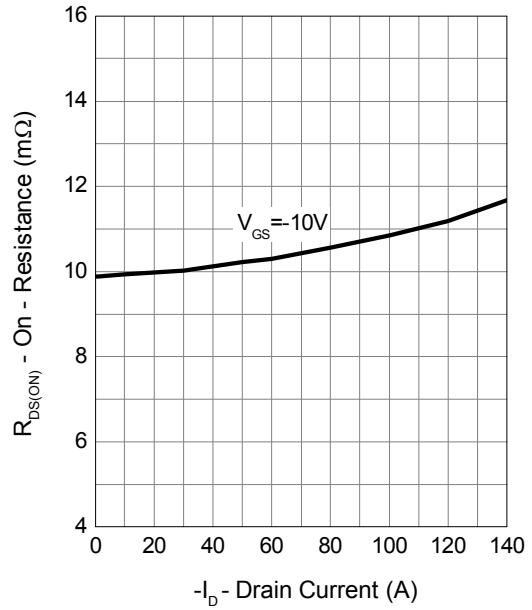
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Typical Operating Characteristics (Cont.)

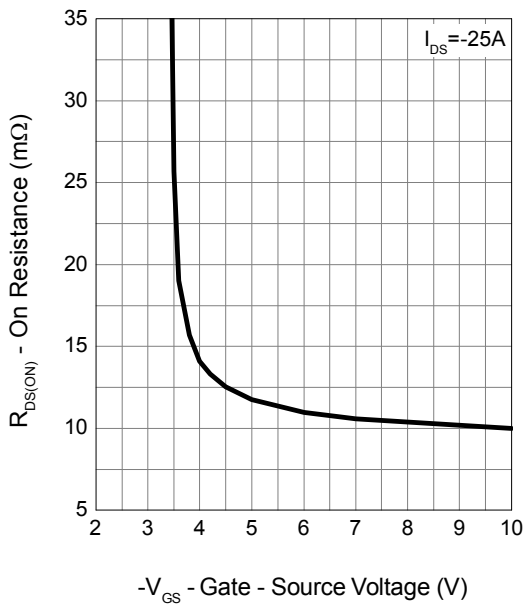
Output Characteristics



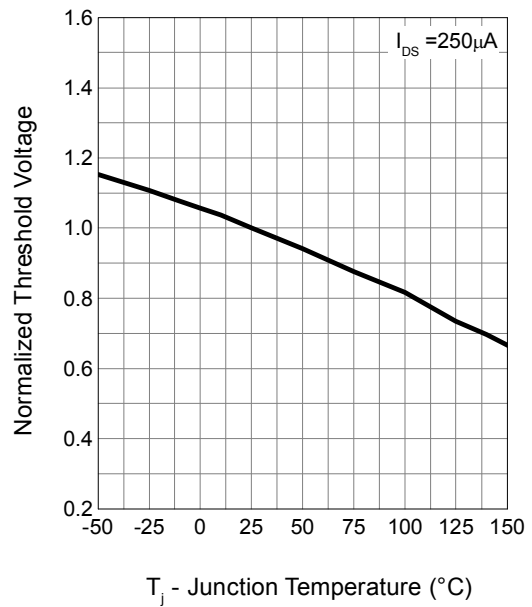
Drain-Source On Resistance



Gate-Source On Resistance



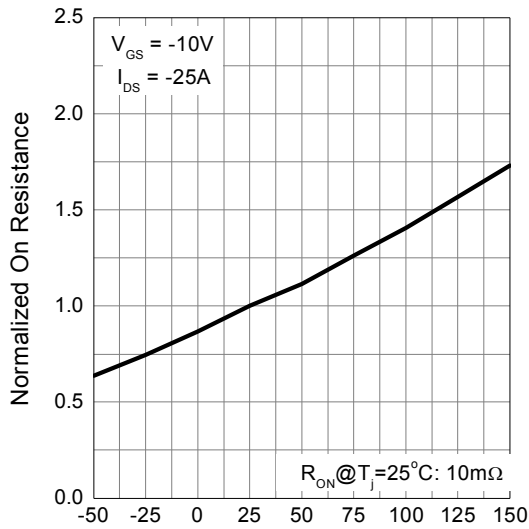
Gate Threshold Voltage



UP50P06

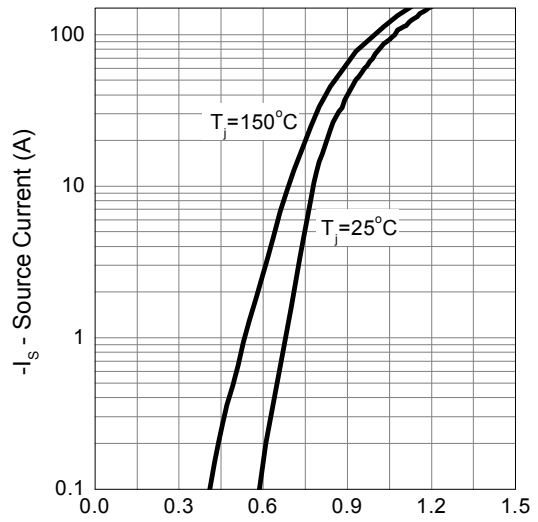
Typical Operating Characteristics (Cont.)

Drain-Source On Resistance



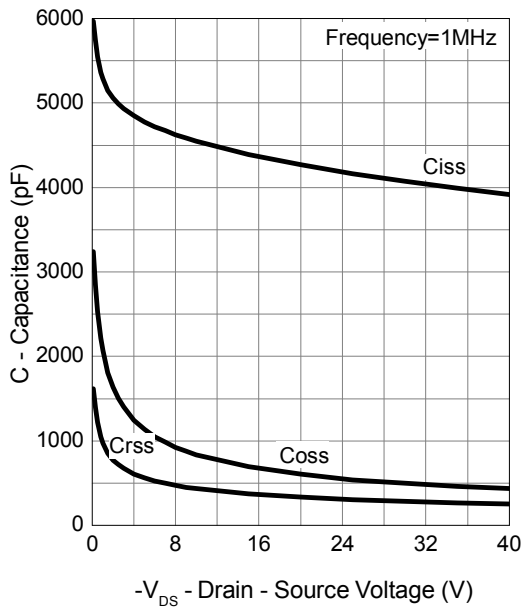
T_j - Junction Temperature ($^\circ C$)

Source-Drain Diode Forward



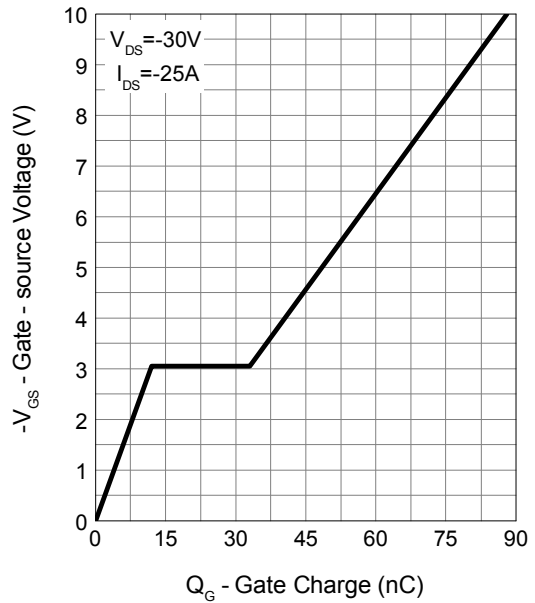
$-V_{SD}$ - Source - Drain Voltage (V)

Capacitance



$-V_{DS}$ - Drain - Source Voltage (V)

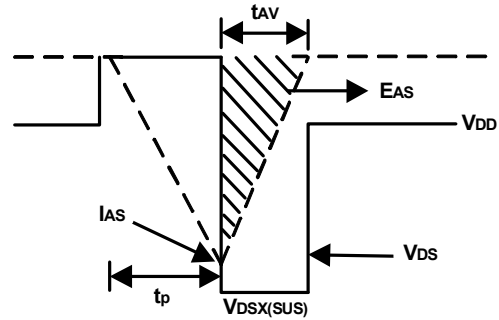
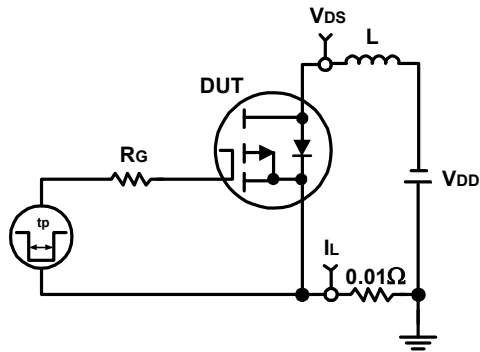
Gate Charge



Q_g - Gate Charge (nC)

UP50P06

Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

