

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ✓ Surface-mounted package
- ✓ Advanced trench cell design
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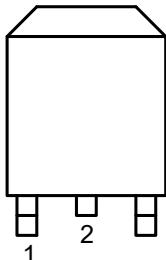
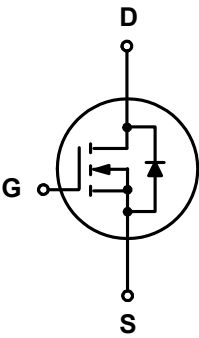
1.2 Applications

- ✓ Portable appliances
- ✓ High speed switch
- ✓ Battery management
- ✓ Low power DC to DC Converter

1.3 Quick reference

- ✓ $BV \geq -100\text{ V}$
- ✓ $P_{tot} \leq 50\text{ W}$
- ✓ $I_D \leq -6\text{ A}$
- ✓ $R_{DS(ON)} \leq 500\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- ✓ $R_{DS(ON)} \leq 550\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View TO-252	
2	Drain(D)		
3	Source(S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_A = 25\text{ }^{\circ}\text{C}$	-	-100	V
V_{GS}	Gate-Source Voltage	$T_A = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D^*	Drain Current	$T_A = 25\text{ }^{\circ}\text{C}$, $V_{GS} = 10\text{ V}$	-	-6	A
$I_{DM}^{*,**}$	Pulsed Drain Current	$T_A = 25\text{ }^{\circ}\text{C}$, $V_{GS} = 10\text{ V}$	-	-15	A
P_{tot}^*	Total Power Dissipation	$T_A = 25\text{ }^{\circ}\text{C}$	-	50	W
T_{stg}	Storage Temperature		- 55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		- 55	150	$^{\circ}\text{C}$
I_S	Diode Forward Current	$T_A = 25\text{ }^{\circ}\text{C}$	-	- 6	A
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	37	$^{\circ}\text{C/W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	1.2	

Notes :

- * Surface Mounted on 1 in² pad area, $t \leq 10\text{ sec}$
- ** Pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- *** limited by bonding wire

4. Marking Information

Product Name	Marking
UP06P10K	06P10 YWWXXX

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP06P10K	TO252			2500	

6. Electrical Characteristics ($T_A = 25\text{ }^{\circ}\text{C}$ Unless Otherwise Noted)

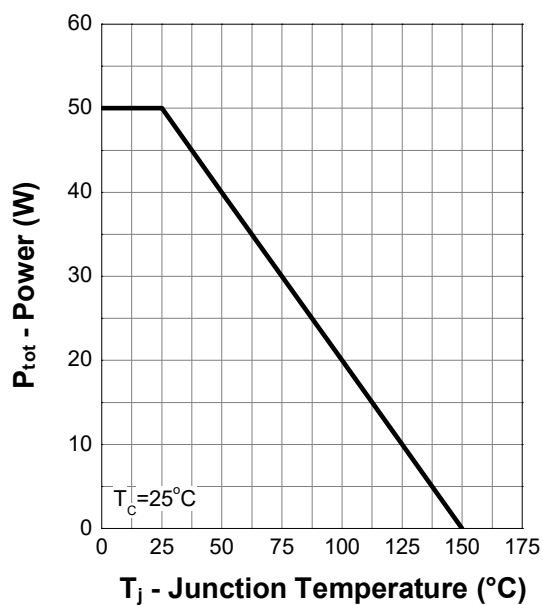
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = -250 μA	-100	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = -250 μA	-1	-	-2.5	V
I _{DSS}	Drain Leakage Current	V _{DS} = -80 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = ± 20 V, V _{DS} = 0 V	-	-	± 100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = -10 V, I _{DS} = -2.5 A	-	440	500	mΩ
		V _{GS} = -4.5 V, I _{DS} = -2.5 A	-	470	550	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = -0.9 A, V _{GS} = 0 V	-	-	-1.3	V
t _{rr}	Reverse Recovery Time	I _{SD} = -0.9 A, dI _{SD} / dt = 100 A / μs	-	17	-	nS
Q _{rr}	Reverse Recovery Charge		-	13	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = -50 V Frequency = 1 MHz	-	460	-	pF
C _{oss}	Output Capacitance		-	17	-	
C _{rss}	Reverse Transfer Capacitance		-	16	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = -50 V, V _{GEN} = -10 V, R _G = 3.9 Ω, R _L = 55 Ω, I _{DS} = -0.9 A	-	3.8	-	nS
t _r	Turn-on Rise Time		-	3.2	-	
t _{d(off)}	Turn-off Delay Time		-	54	-	
t _f	Turn-off Fall Time		-	25	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{GS} = -10 V, V _{DS} = -50 V, I _{DS} = -0.9 A	-	10	-	nC
Q _{gs}	Gate-Source Charge		-	1.9	-	
Q _{gd}	Gate-Drain Charge		-	1	-	

Notes : a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

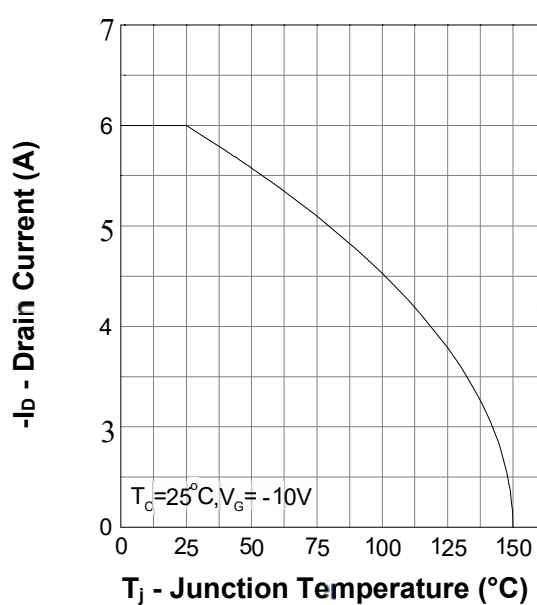
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

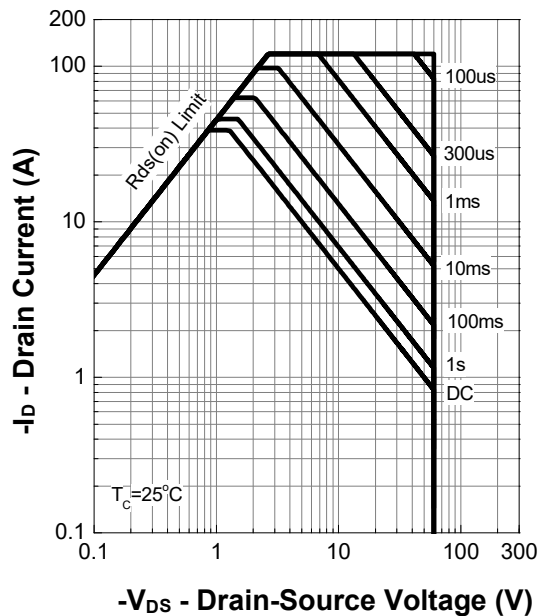
Power Capability



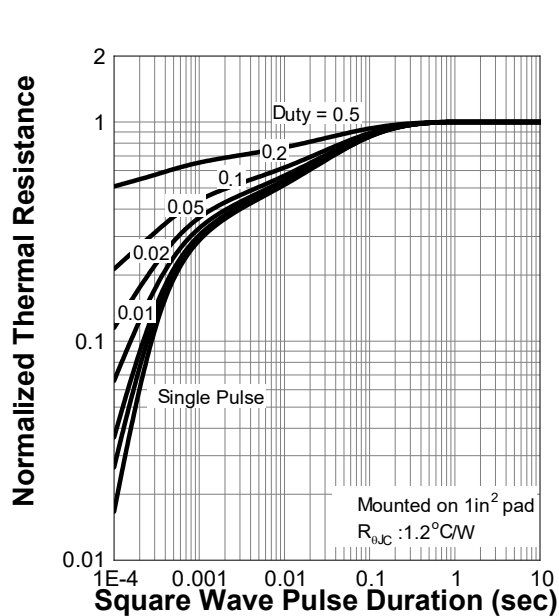
Current Capability



Safe Operation Area

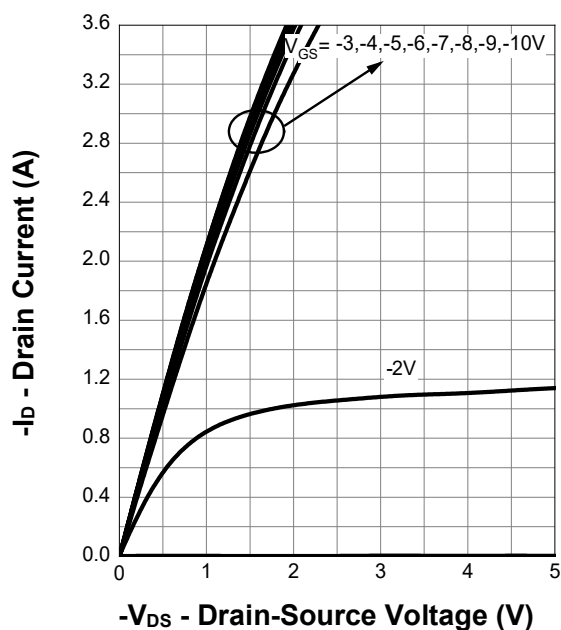


Transient Thermal Impedance

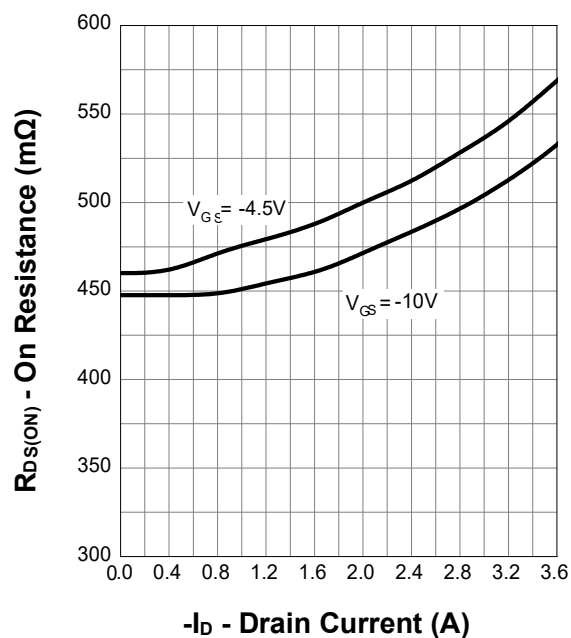


7. Typical Characteristics (cont.)

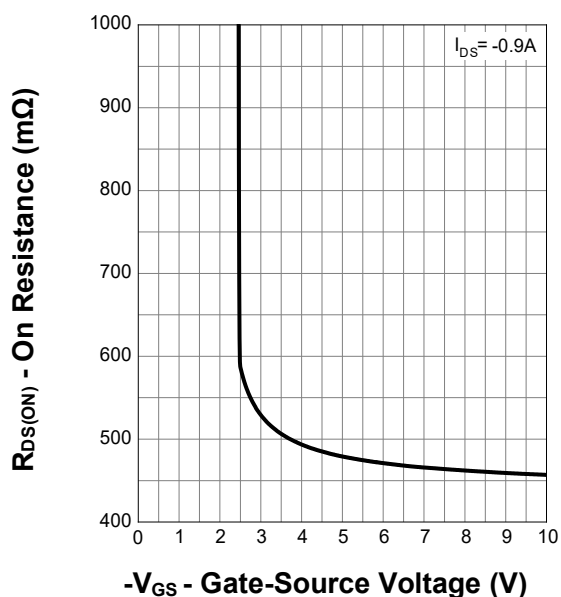
Output Characteristics



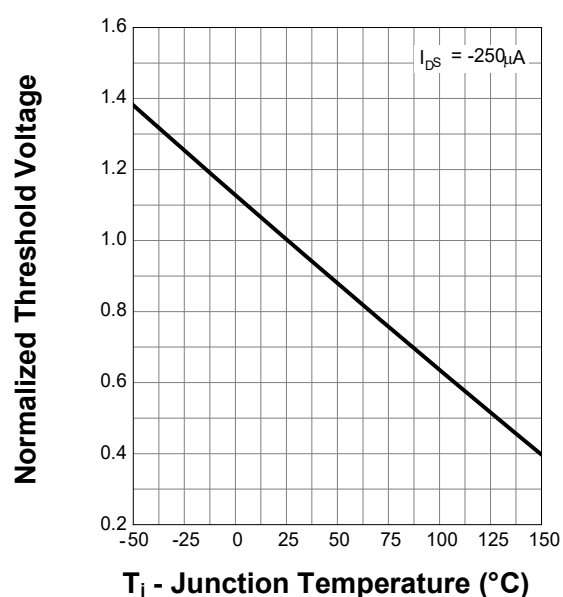
On Resistance



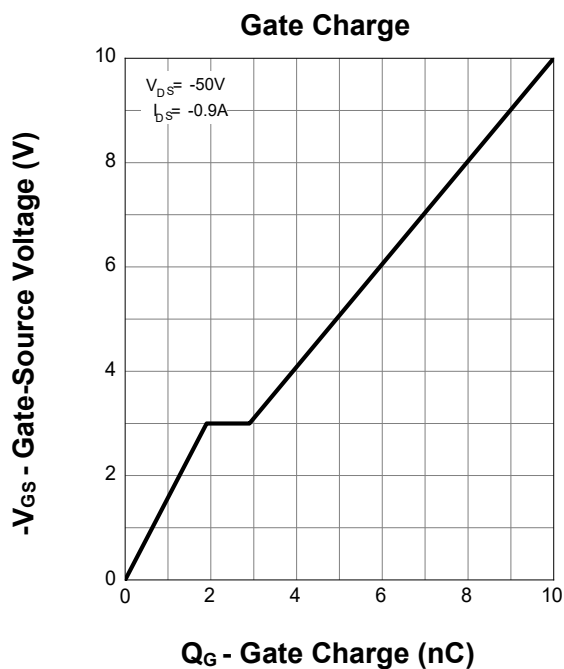
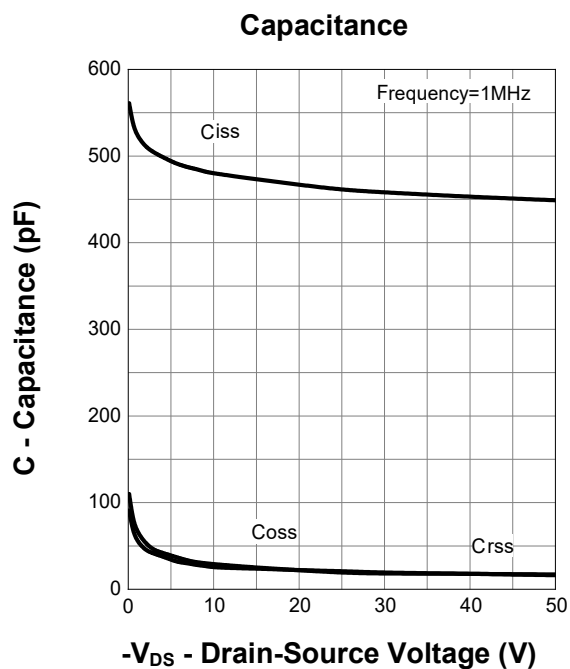
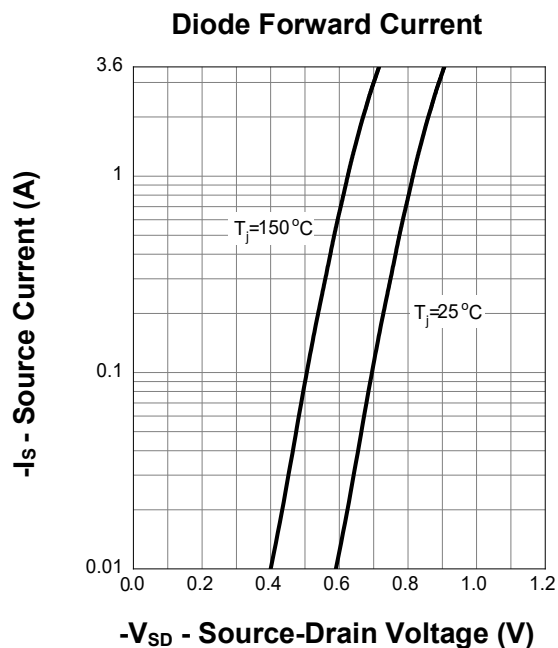
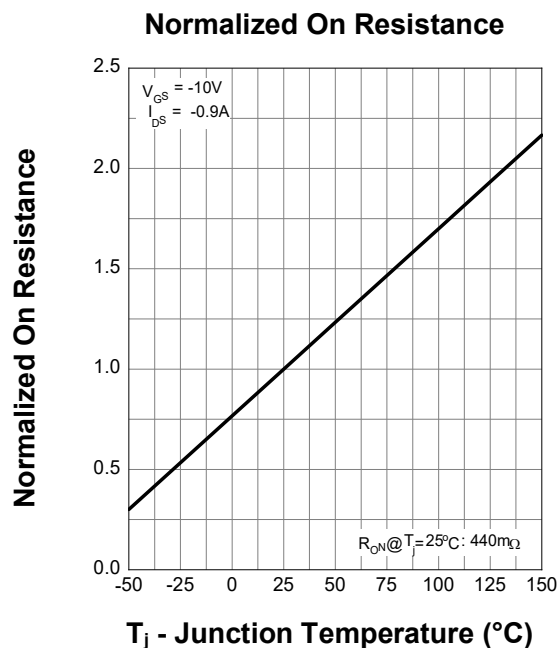
Transfer Characteristics



Normalized Threshold Voltage

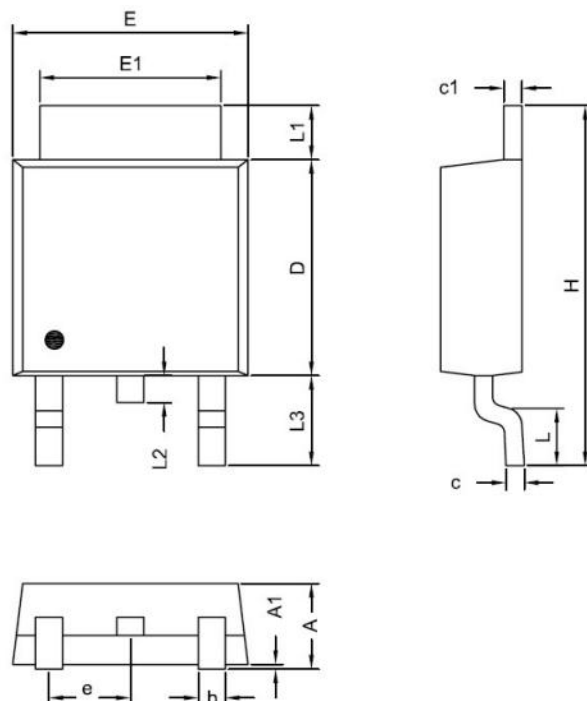


7. Typical Characteristics (cont.)



8. Package Dimensions

TO252



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	2.19	2.38
A1	0.02	0.13
D	5.30	6.40
E	6.35	6.80
E1	5.20	5.50
c	0.40	0.60
c1	0.40	0.60
b	0.55	0.85
e	2.30 BCS	
L	1.00	1.80
L1	0.70	1.80
L2	0.70 BCS	
L3	2.40	2.80
H	9.20	10.40