

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Advanced trench cell design

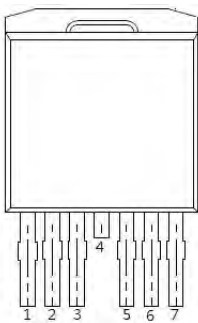
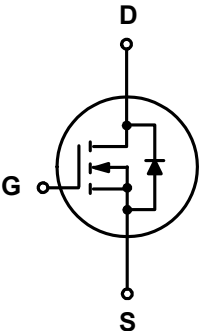
1.2 Applications

- ☑ LCD TV appliances
- ☑ LCDM appliances
- ☑ High power inverter system

1.3 Quick reference

- ☑ $BV \geq 40\text{ V}$
- ☑ $P_{tot} \leq 375\text{ W}$
- ☑ $I_D \leq 150\text{ A}$
- ☑ $R_{DS(ON)} \leq 1.0\text{ m}\Omega @ V_{GS} = 10\text{ V}$
- ☑ $R_{DS(ON)} \leq 2.4\text{ m}\Omega @ V_{GS} = 4.5\text{ V}$

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate(G)	 Top View TO-263-7L	
2,3	Source (S)		
4	Drain(D)		
5,6,7	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	40	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
$I_D^{*,***}$	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	150	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	150	A
$I_{DM}^{*,**,***}$	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	300	A
P_{tot}^*	Drain power dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	375	W
T_{stg}	Storage Temperature		- 55	175	$^{\circ}\text{C}$
T_J	Junction Temperature		-	175	$^{\circ}\text{C}$
I_S	Continuous-Source Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	150	A
E_{AS}^*	Single Pulsed Avalanche Energy	$V_{DD} = 40\text{ V}, L = 1\text{ mH}$	-	1568	mJ
$R_{\theta JA}^*$	Thermal Resistance- Junction to Ambient		-	40	$^{\circ}\text{C/W}$
$R_{\theta JC}^*$	Thermal Resistance- Junction to Case		-	0.4	

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
UP400N04D7	N400N04D7 AYWW01 XXXXXX

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP400N04D7	TO263-7L(D2-PAK)			800	

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

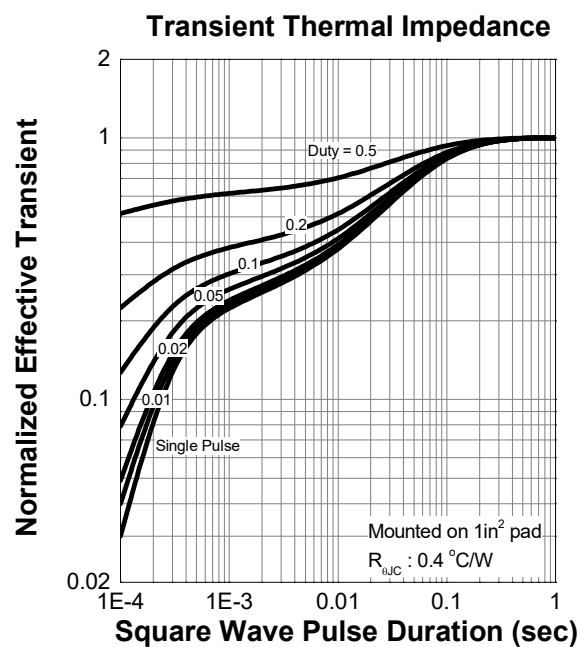
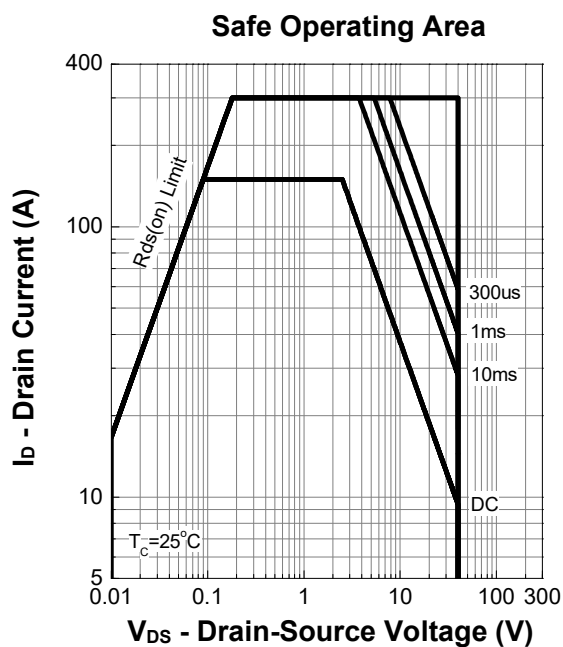
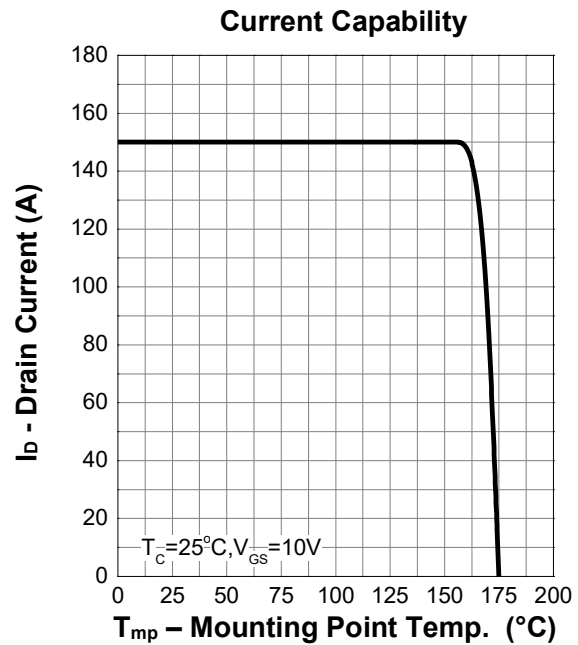
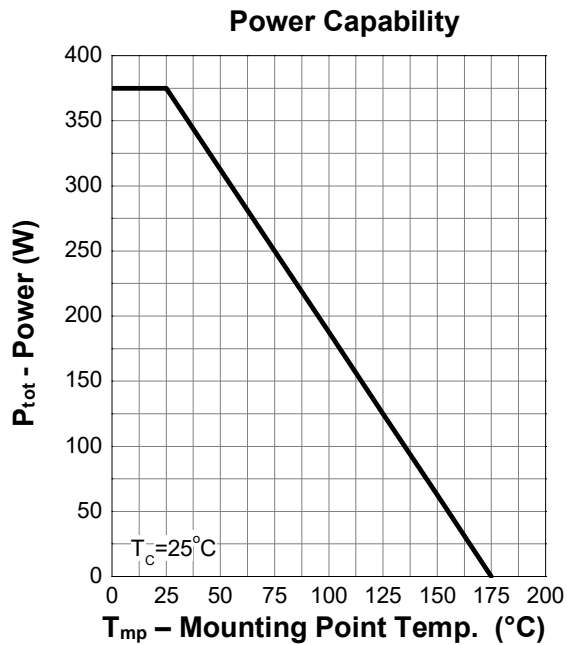
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = 250 μA	40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	1	-	2.5	V
I _{DSS}	Drain Leakage Current	V _{DS} = 32 V, V _{GS} = 0 V	-	-	1	μA
I _{GSS}	Gate Leakage Current	V _{GS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = 10 V, I _{DS} = 50 A	-	0.9	1.0	m Ω
		V _{GS} = 4.5 V, I _{DS} = 30 A	-	2.1	2.4	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 50 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = 50 A, V _{GS} = 0 V dI _{SD} /dt = 100 A/μs	-	24	-	nS
Q _{rr}	Reverse Recovery Charge		-	16	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 20 V Frequency = 1 MHz	-	13785	-	pF
C _{oss}	Output Capacitance		-	1026	-	
C _{rss}	Reverse Transfer Capacitance		-	303	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 20 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 0.4 Ω, I _{DS} = 50 A	-	31	-	nS
t _r	Turn-on Rise Time		-	117	-	
t _{d(off)}	Turn-off Delay Time		-	180	-	
t _f	Turn-off Fall Time		-	125	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 20 V, V _{GS} = 10 V, I _{DS} = 50 A	-	232	-	nC
Q _{gs}	Gate-Source Charge		-	60	-	
Q _{gd}	Gate-Drain Charge		-	34	-	

Notes :

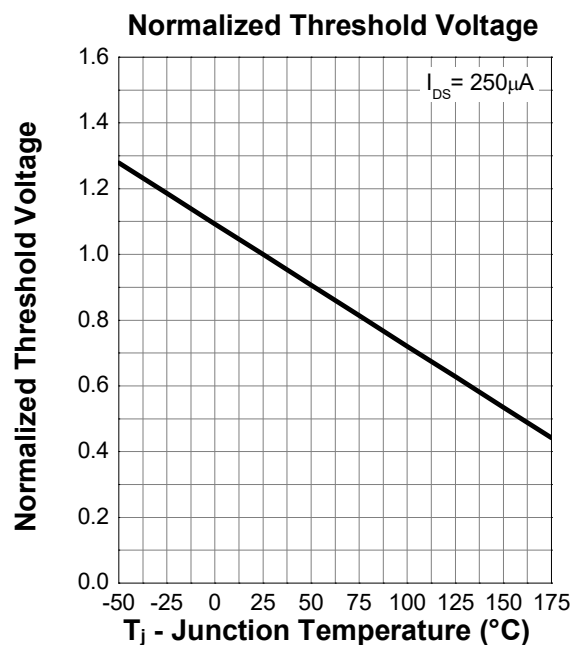
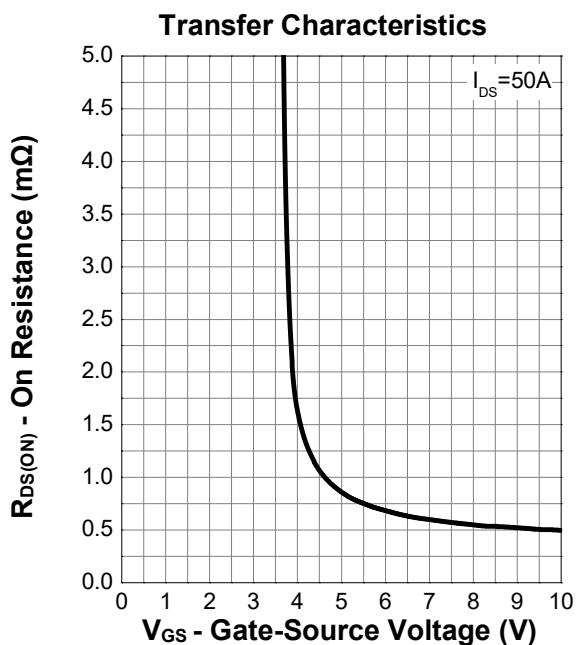
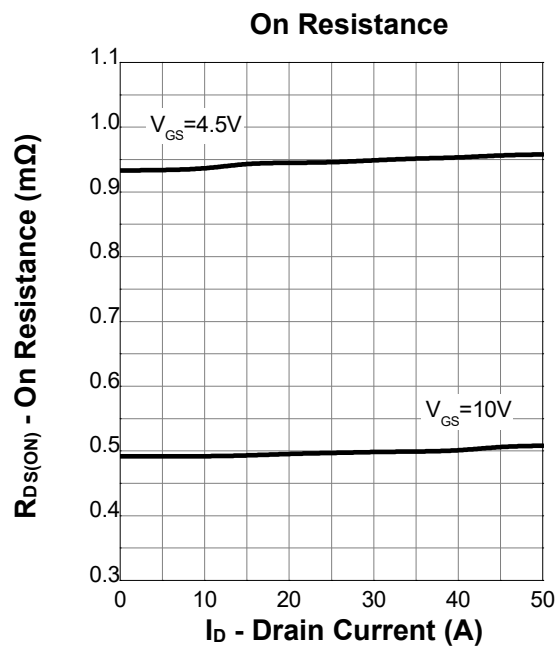
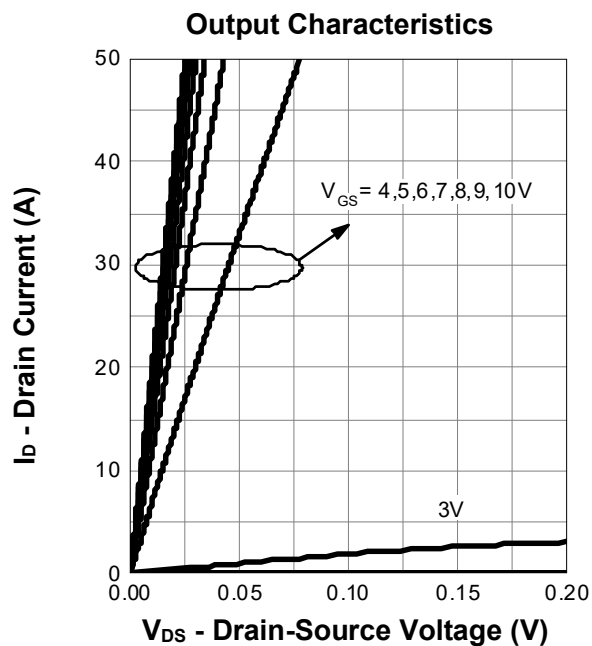
a : Pulse test ; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b : Guaranteed by design, not subject to production testing

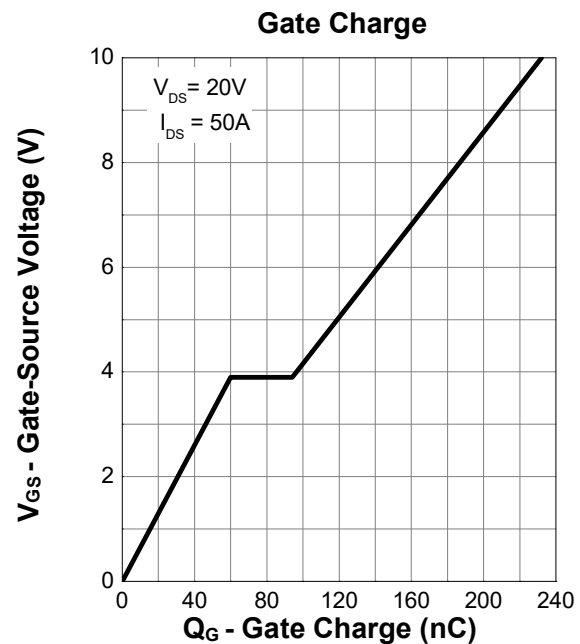
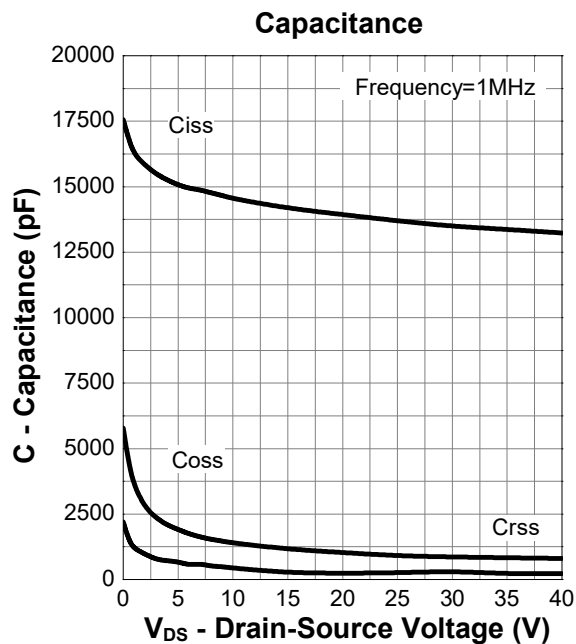
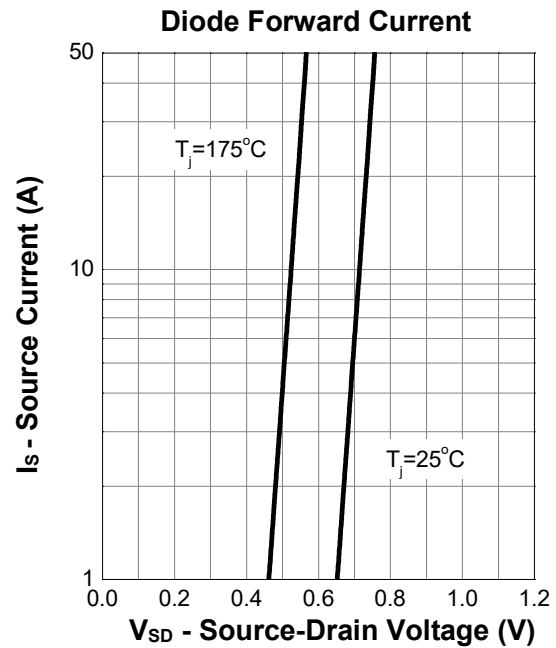
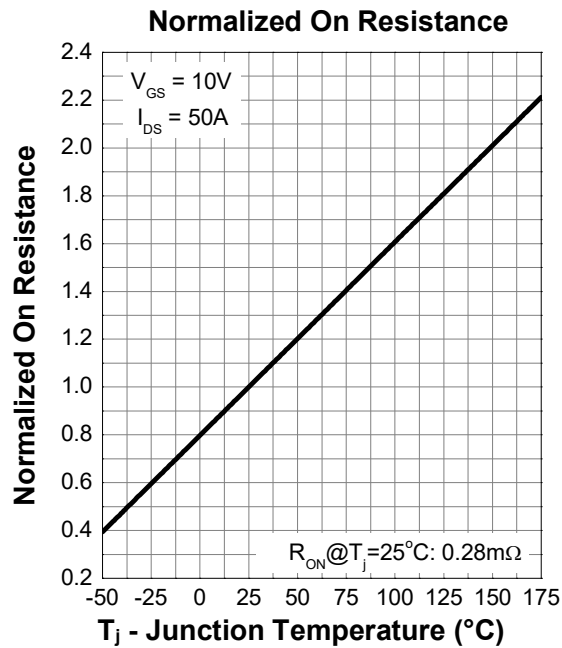
7. Typical Characteristics



7. Typical Characteristics (cont.)



7. Typical Characteristics (cont.)



8. Package Dimensions

TO-263-7L Package

