

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

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

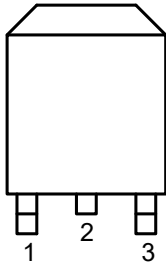
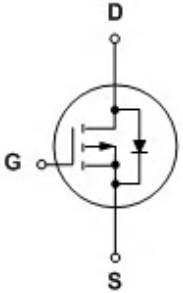
1.2 Applications

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

1.3 Quick reference

- ☒ $BV \geq -40\text{ V}$
- ☒ $P_{tot} \leq 125\text{ W}$
- ☒ $I_D \leq -70\text{ A}$
- ☒ $R_{DS(ON)} \leq 8\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- ☒ $R_{DS(ON)} \leq 13\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$

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 _C = 25 °C	-	- 40	V
V _{GS}	Gate-Source Voltage	T _C = 25 °C	-	± 20	V
I _D ^{*,***}	Drain Current (DC)	T _C = 25 °C, V _{GS} = - 10 V	-	- 70	A
		T _C = 100 °C, V _{GS} = - 10 V	-	- 57	A
I _{DM} ^{*,**}	Drain Current (Pulsed)	T _C = 25 °C, V _{GS} = - 10 V	-	- 220	A
P _{tot}	Drain power dissipation	T _C = 25 °C	-	125	W
T _{stg}	Storage Temperature		-55	150	°C
T _J	Junction Temperature		-	150	°C
I _S	Continuous-Source Current	T _C = 25 °C	-	- 70	A
E _{AS} [*]	Single Pulsed Avalanche Energy	V _{DD} = - 40V , L = 1.0 mH	-	338	mJ
R _{θJA} [*]	Thermal Resistance- Junction to Ambient		-	46	°C/W
R _{θJC} [*]	Thermal Resistance- Junction to Case		-	1	

Notes :

* Surface Mounted on 1 in² pad area, t ≤ 10 sec

** Pulse width ≤ 300 μs, duty cycle ≤ 2 %

*** Limited by bonding wire

4. Marking Information

Product Name	Marking
UP70P04K	70P04 YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP70P04K	TO252			2500	

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

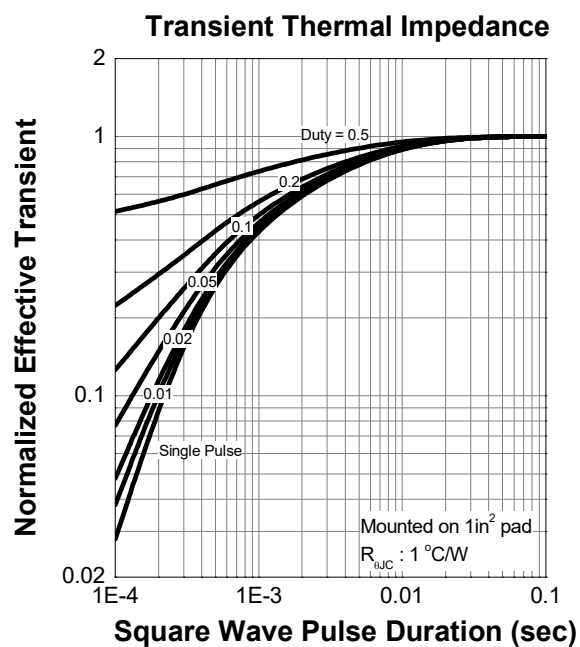
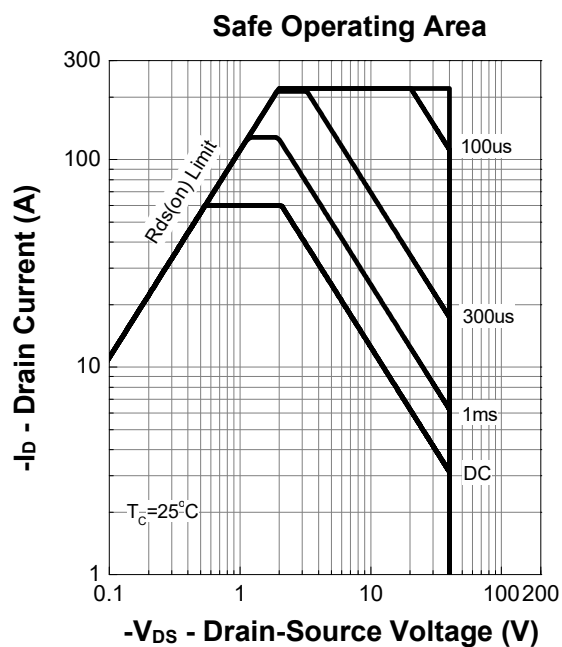
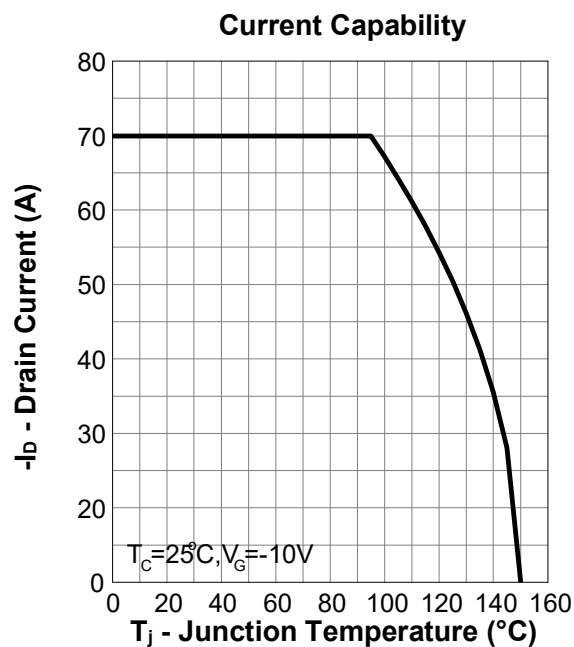
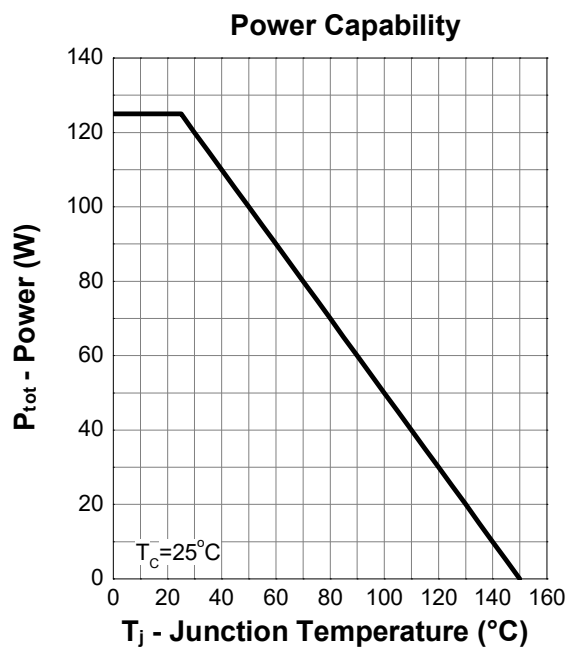
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = - 250 μA	- 40	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = - 250 μA	- 1	-	- 2	V
I _{DSS}	Drain Leakage Current	V _{DS} = - 32 V, V _{GS} = 0 V	-	-	- 1	μA
I _{GSS}	Gate Leakage Current	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	±100	nA
R _{DS(ON)} ^a	On-State Resistance	V _{GS} = - 10 V, I _{DS} = - 15 A	-	7	8	m Ω
		V _{GS} = - 4.5 V, I _{DS} = - 8 A	-	11	13	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = - 15 A, V _{GS} = 0 V	-	-	- 1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = 20 A, V _{GS} = 0 V dI _{SD} /dt = 100 A/μs	-	21	-	nS
Q _{rr}	Reverse Recovery Charge		-	15	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = - 20 V Frequency = 1 MHz	-	5952	-	pF
C _{oss}	Output Capacitance		-	402	-	
C _{rss}	Reverse Transfer Capacitance		-	268	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = - 20 V, V _{GEN} = - 10 V, R _G = 3.9 Ω, R _L = 1.33 Ω, I _{DS} = - 15 A	-	67	-	nS
t _r	Turn-on Rise Time		-	118	-	
t _{d(off)}	Turn-off Delay Time		-	650	-	
t _f	Turn-off Fall Time		-	320	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = - 20 V, V _{GS} = - 10 V, I _{DS} = - 15 A	-	95	-	nC
Q _{gs}	Gate-Source Charge		-	23	-	
Q _{gd}	Gate-Drain Charge		-	11	-	

Notes :

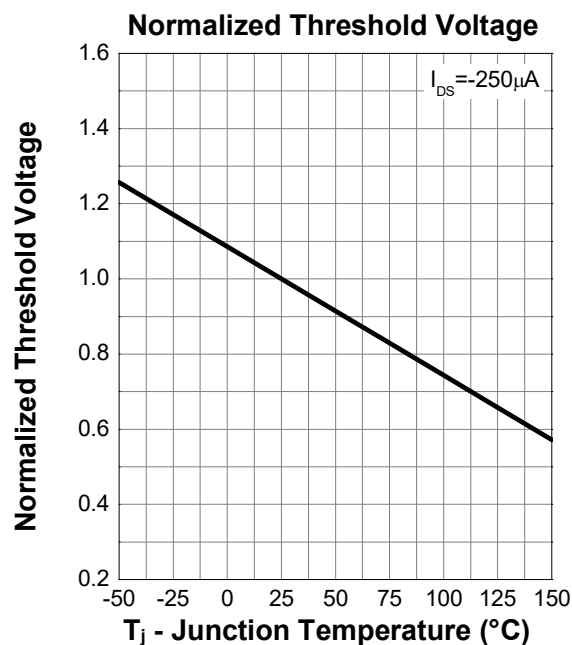
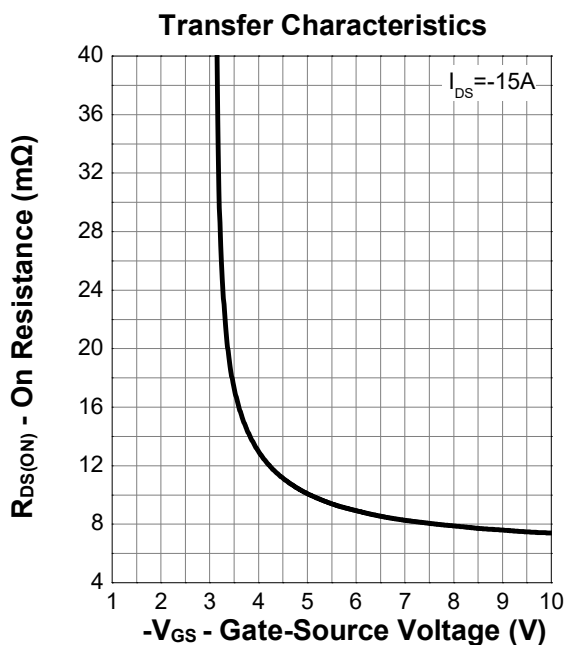
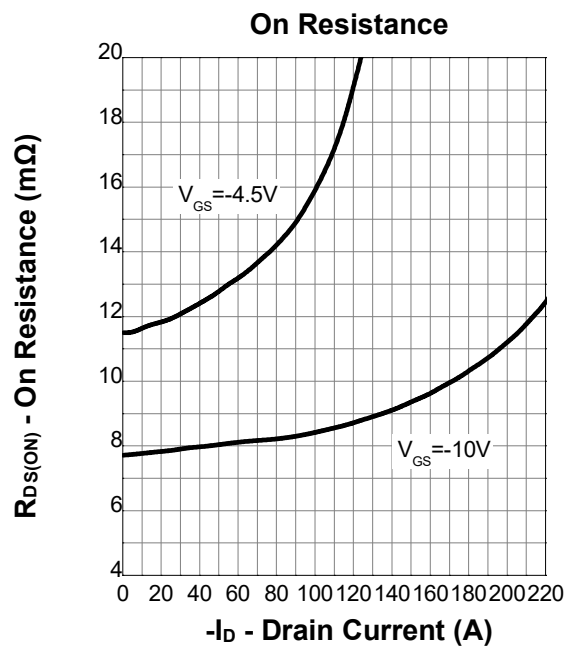
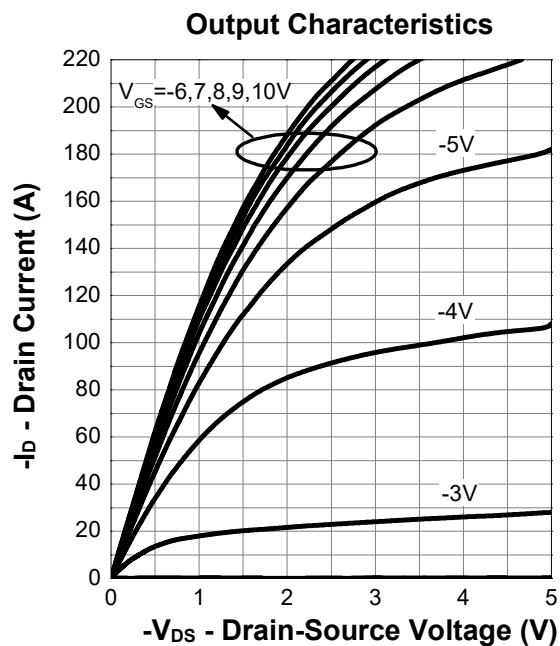
a : Pulse test ; pulse width ≤ 300 μs, duty cycle ≤ 2%

b : Guaranteed by design, not subject to production testing

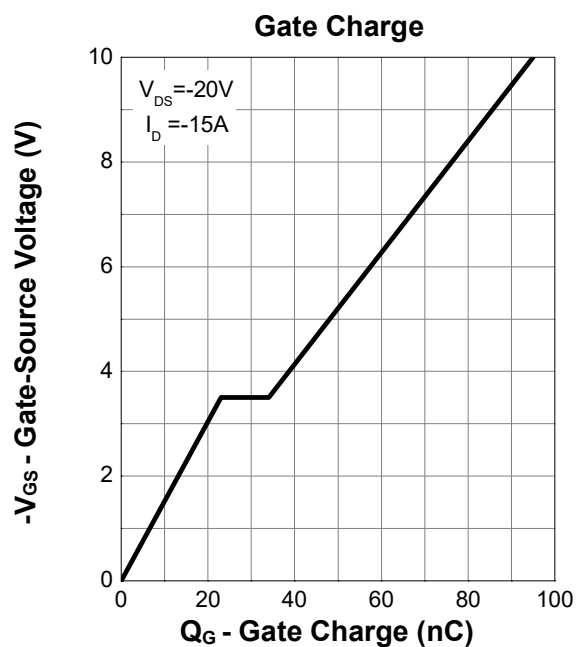
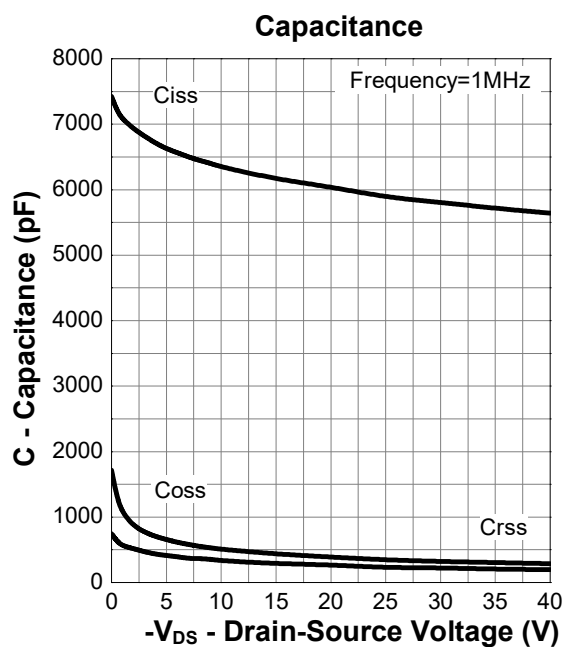
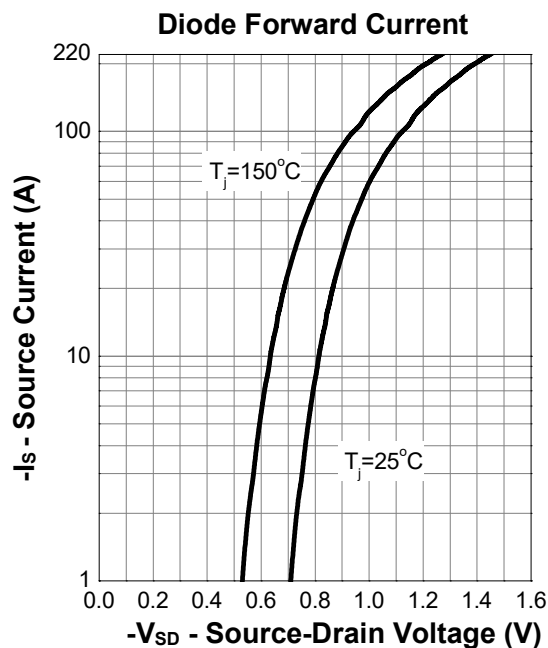
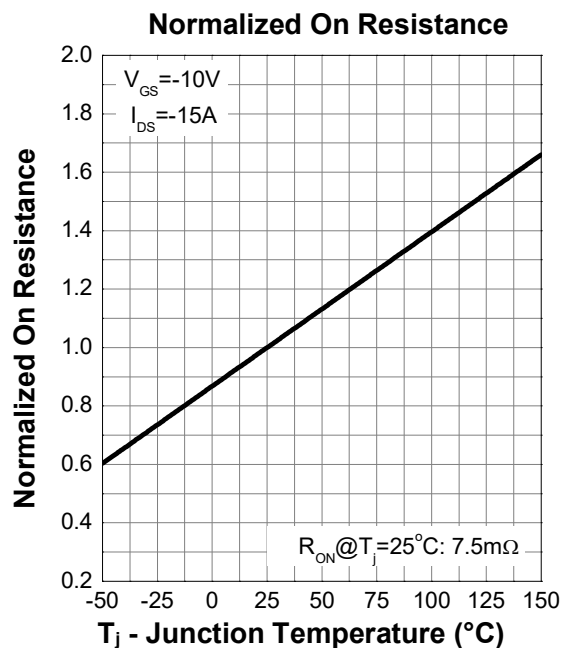
7. Typical Characteristics



7. Typical Characteristics (cont.)

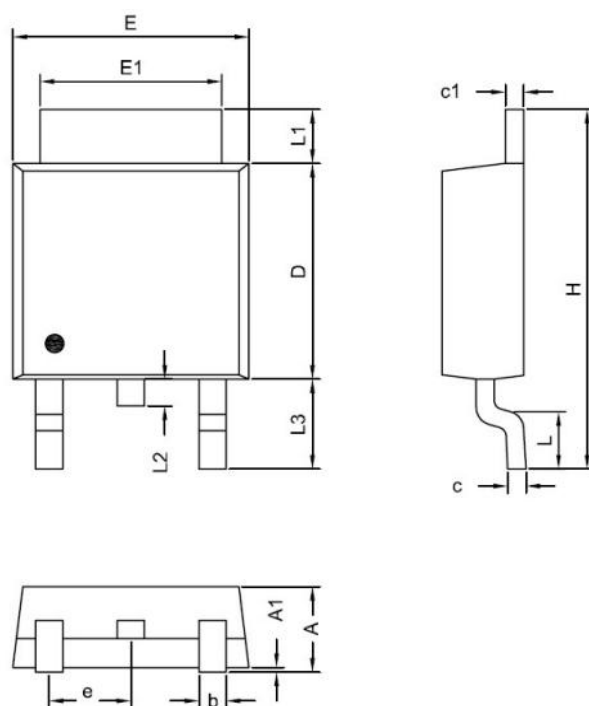


7. Typical Characteristics (cont.)



8. Package Dimensions

TO252-3L



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