

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

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

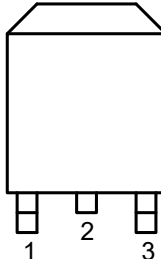
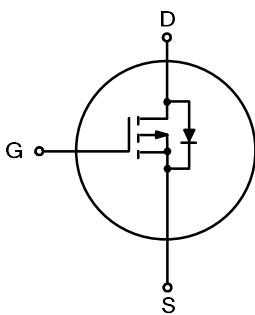
1.2 Applications

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

1.3 Quick reference

- ☒ $BV \geq -60\text{ V}$
- ☒ $P_{tot} \leq 62.5\text{ W}$
- ☒ $I_D \leq -18\text{ A}$
- ☒ $R_{DS(ON)} \leq 88\text{ m}\Omega @ V_{GS} = -10\text{ V}$
- ☒ $R_{DS(ON)} \leq 99\text{ m}\Omega @ V_{GS} = -4.5\text{ V}$

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	-	-60	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	-	- 18	A
		T _C = 100°C, V _{GS} = - 10 V		- 11.5	A
I _{DM} *,**,***	Drain Current (Pulsed)	T _C = 25 °C, V _{GS} = - 10 V	-	- 48	A
P _{tot}	Drain power dissipation	T _C = 25 °C	-	62.5	W
T _{stg}	Storage Temperature		-55	150	°C
T _J	Junction Temperature		-	150	°C
I _S	Continuous-Source Current	T _C = 25 °C	-	- 18	A
E _{AS} *	Single Pulsed Avalanche Energy	V _{DD} = - 50 V , L= 1.0 mH	-	40.5	mJ
R _{θJA} *	Thermal Resistance- Junction to Ambient		-	38.9	°C/W
R _{θJC} *	Thermal Resistance- Junction to Case		-	2	

Notes :

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

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

4. Marking Information

Product Name	Marking
N13P06K	13P06 YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
N13P06K	TO252			2500	

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

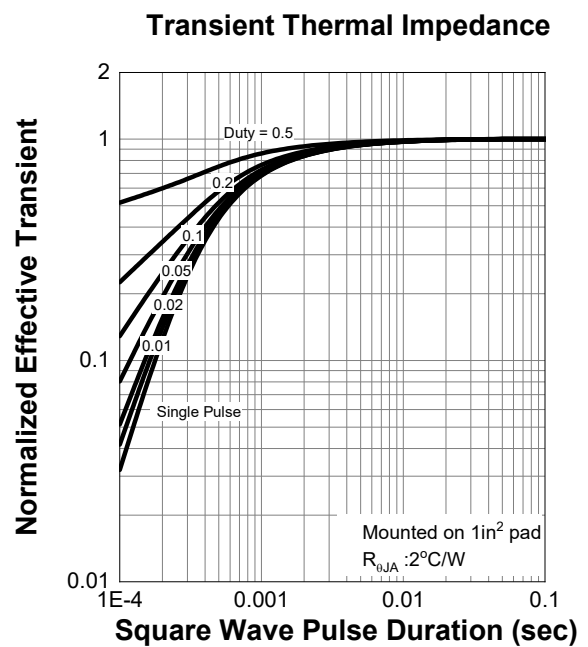
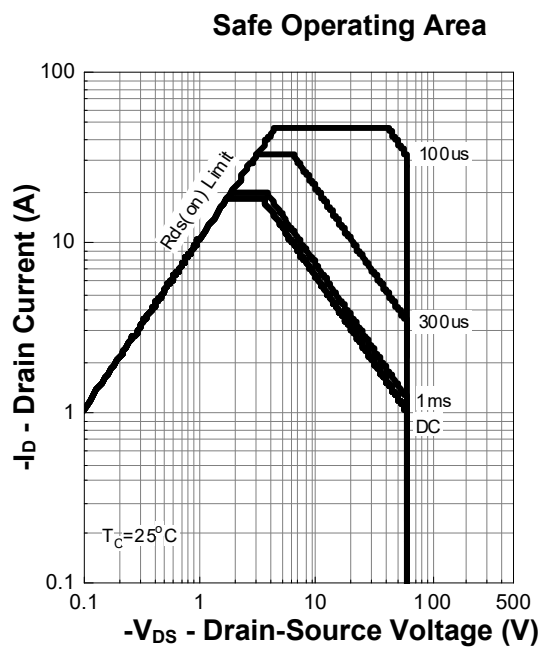
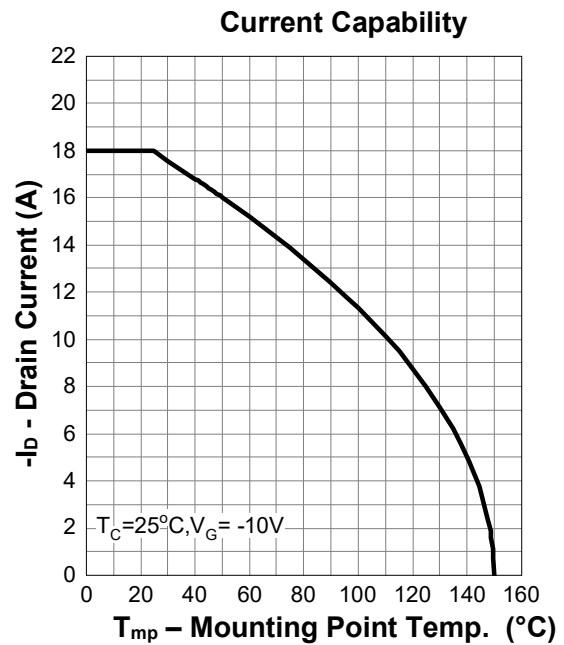
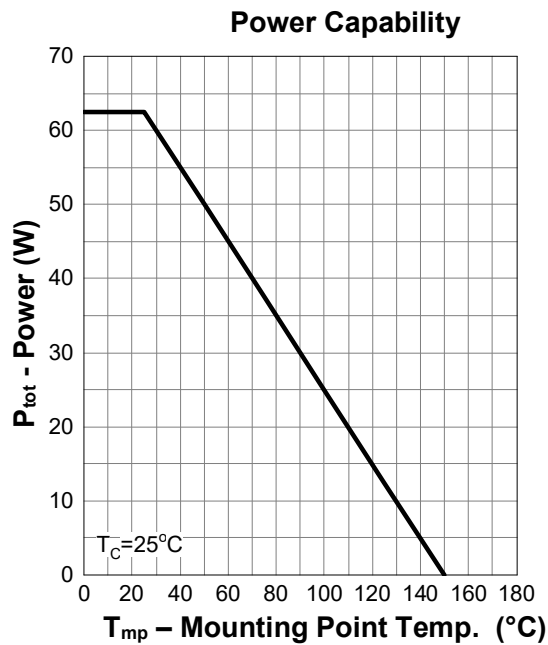
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _{DS} = - 250 μA	- 60	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = - 250 μA	- 1	-	- 3	V
I _{DSS}	Drain Leakage Current	V _{DS} = - 48 V, V _{GS} = 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} = - 5 A	-	78	88	m Ω
		V _{GS} = - 4.5 V, I _{DS} = - 2.5A	-	95	99	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = - 5 A, V _{GS} = 0 V	-	-	- 1.2	V
t _{rr}	Reverse Recovery Time	I _{DS} = - 5 A, dI _{SD} /dt = 100 A/μs	-	15	-	nS
Q _{rr}	Reverse Recovery Charge		-	14	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = - 30 V Frequency = 1 MHz	-	929	-	pF
C _{oss}	Output Capacitance		-	44	-	
C _{rss}	Reverse Transfer Capacitance		-	37	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = - 30 V, V _{GEN} = - 10 V, R _G = 3.9 Ω, R _L = 6 Ω, I _{DS} = - 5 A	-	6.4	-	nS
t _r	Turn-on Rise Time		-	11	-	
t _{d(off)}	Turn-off Delay Time		-	22	-	
t _f	Turn-off Fall Time		-	18	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = - 30 V, V _{GS} = - 10 V, I _{DS} = - 5 A	-	16	-	nC
Q _{gs}	Gate-Source Charge		-	4.4	-	
Q _{gd}	Gate-Drain Charge		-	2	-	

Notes :

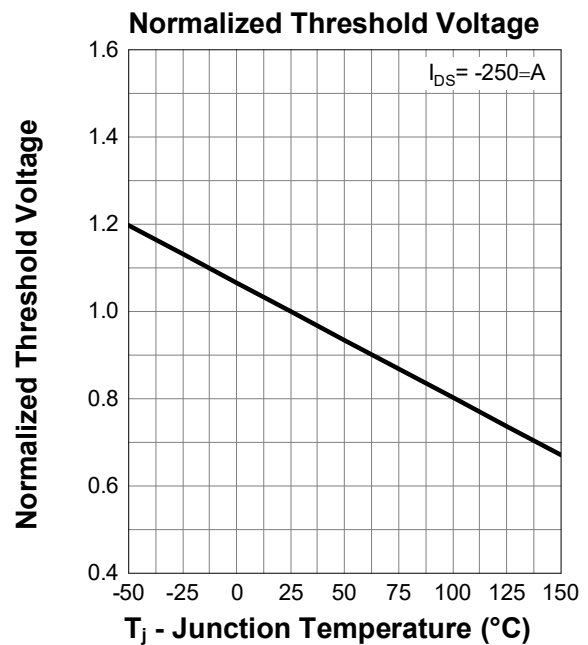
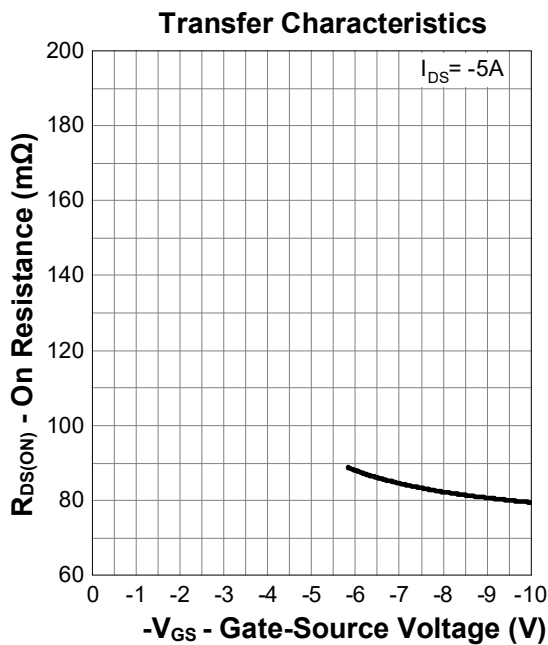
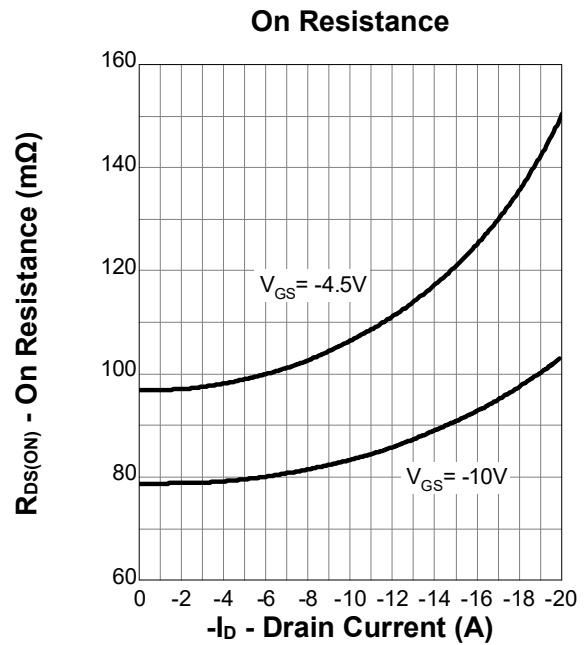
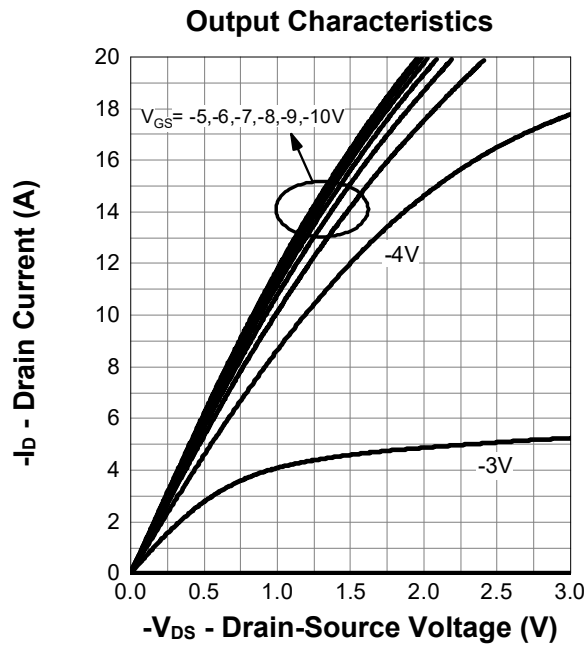
a : Pulse test ; pulse width $\leq$ 300 μ s, duty cycle $\leq$ 2%

b : Guaranteed by design, not subject to production testing

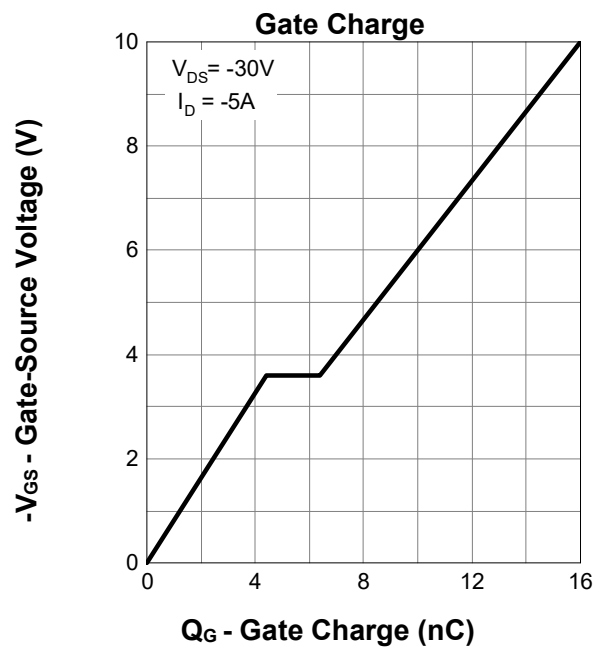
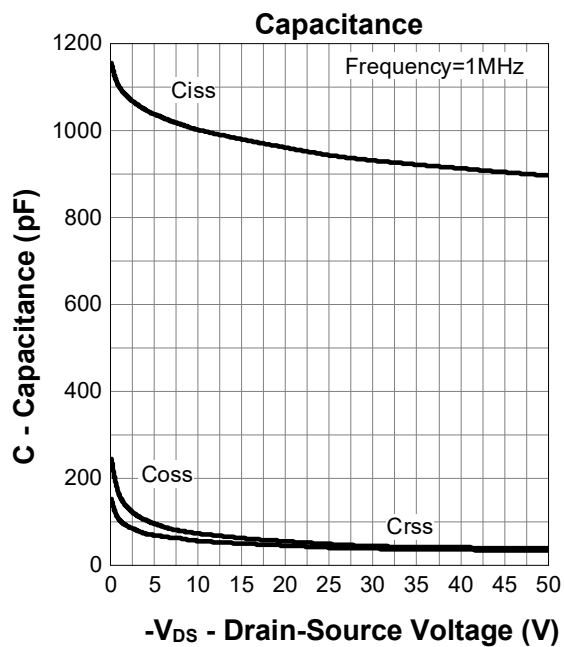
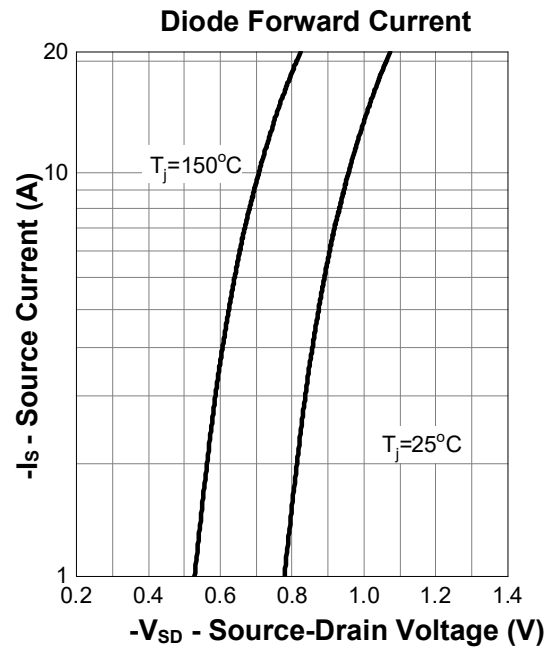
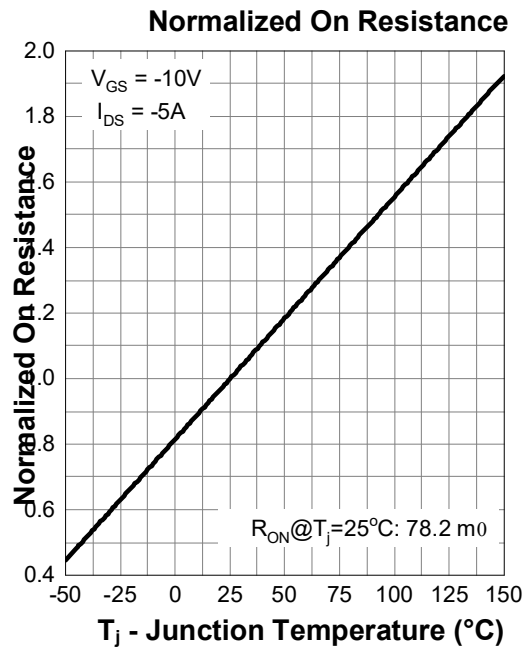
7. Typical Characteristics



7. Typical Characteristics (cont.)

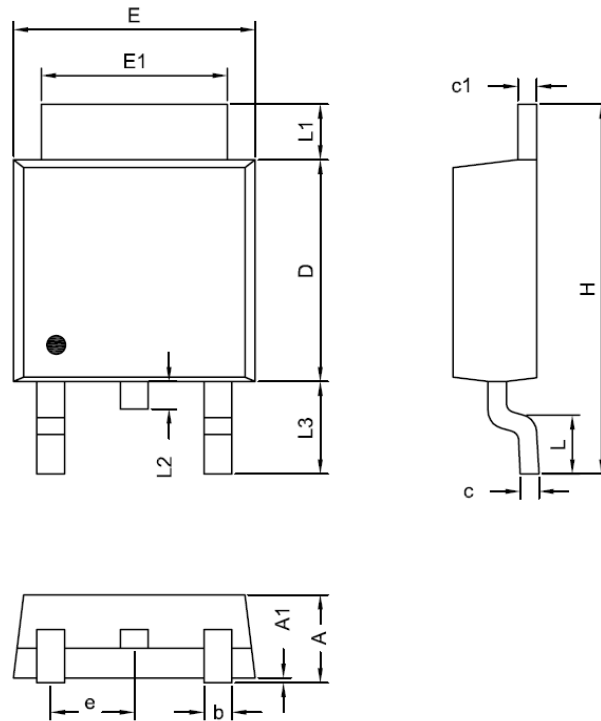


7. Typical Characteristics (cont.)



8.Package Dimensions

TO-252



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