

N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

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

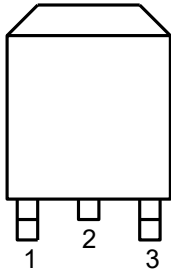
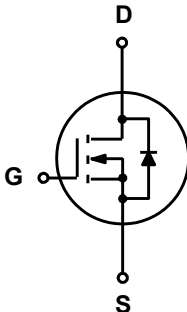
1.2 Applications

- ☒ MB and NB
- ☒ Half – bridge Drivers
- ☒ Motor drivers

1.3 Quick reference

- ☒ $BV \geq 200 \text{ V}$
- ☒ $P_{\text{tot}} \leq 41 \text{ W}$
- ☒ $I_D \leq 6 \text{ A}$
- ☒ $R_{\text{DS(ON)}} \leq 430 \text{ m}\Omega @ V_{\text{GS}} = 10 \text{ V}$
- ☒ $R_{\text{DS(ON)}} \leq 500 \text{ m}\Omega @ V_{\text{GS}} = 6 \text{ V}$

2. Pin Description

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

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	200	V
V_{GS}	Gate-Source Voltage	$T_C = 25\text{ }^{\circ}\text{C}$	-	± 20	V
I_D	Drain Current (DC)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	6	A
		$T_C = 100\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	3.7	A
I_{DM}^{**}	Drain Current (Pulsed)	$T_C = 25\text{ }^{\circ}\text{C}, V_{GS} = 10\text{ V}$	-	8	A
P_{tot}	Drain power dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	-	41	W
T_{stg}	Storage Temperature		-55	150	$^{\circ}\text{C}$
T_J	Junction Temperature		-	150	$^{\circ}\text{C}$
I_S	Continuous-Source Current	$T_C = 25\text{ }^{\circ}\text{C}$	-	6	A
E_{AS}	Single Pulsed Avalanche Energy	$V_{DD}=50\text{ V}, L=1.0\text{ mH}$	-	23	mJ
$R_{\theta JA}^{*}$	Thermal Resistance- Junction to Ambient		-	35	$^{\circ}\text{C/W}$
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	3	

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
UP06N20K	06N20 YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP06N20K	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	200	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = 250 μA	2	-	4	V
I _{DSS}	Drain Leakage Current	V _{DS} = 160 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} = 3 A	-	388	430	mΩ
		V _{GS} = 6 V, I _{DS} = 2 A	-	416	500	
Diode Characteristics						
V _{SD} ^a	Diode Forward Voltage	I _{SD} = 3 A, V _{GS} = 0 V	-	-	1.3	V
t _{rr}	Reverse Recovery Time	I _{DS} = 3 A, V _{GS} = 0 V dI _{SD} /dt = 100 A/μs	-	47	-	nS
Q _{rr}	Reverse Recovery Charge		-	97	-	nC
Dynamic Characteristics ^b						
C _{iss}	Input Capacitance	V _{GS} = 0 V, V _{DS} = 100 V Frequency = 1 MHz	-	214	-	pF
C _{oss}	Output Capacitance		-	18	-	
C _{rss}	Reverse Transfer Capacitance		-	11	-	
t _{d(on)}	Turn-on Delay Time	V _{DS} = 100 V, V _{GEN} = 10 V, R _G = 3.9 Ω, R _L = 33 Ω, I _{DS} = 3 A	-	4	-	nS
t _r	Turn-on Rise Time		-	1.5	-	
t _{d(off)}	Turn-off Delay Time		-	6.7	-	
t _f	Turn-off Fall Time		-	7	-	
Gate Charge Characteristics ^b						
Q _g	Total Gate Charge	V _{DS} = 100 V, V _{GS} = 10 V, I _{DS} = 3 A	-	5	-	nC
Q _{gs}	Gate-Source Charge		-	1.8	-	
Q _{gd}	Gate-Drain Charge		-	1.3	-	

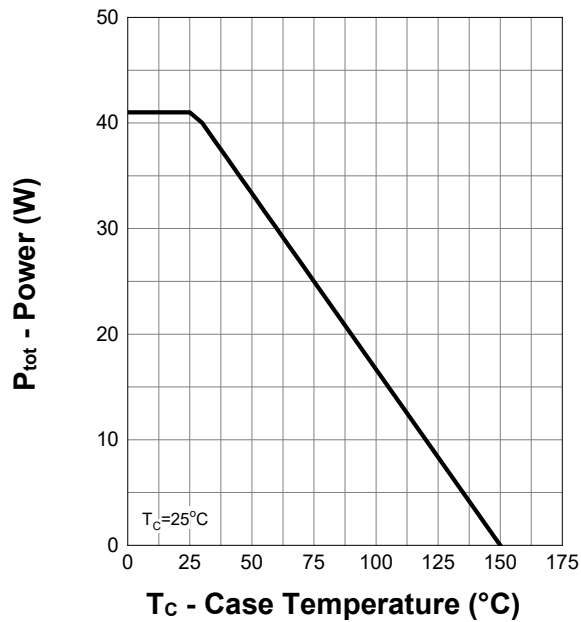
Notes :

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

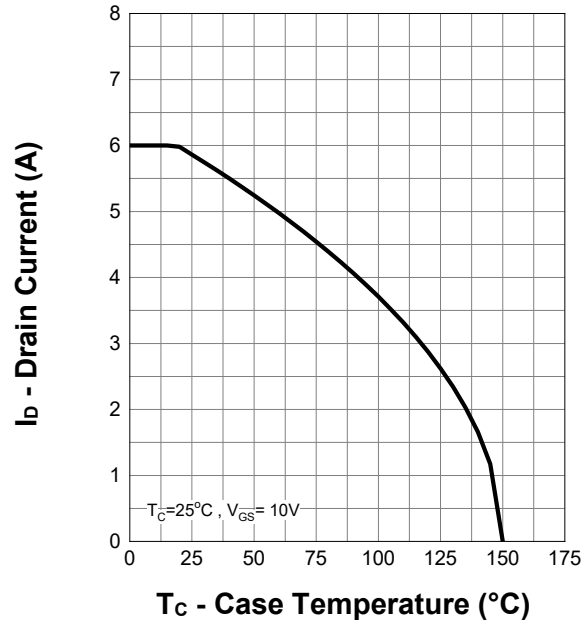
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

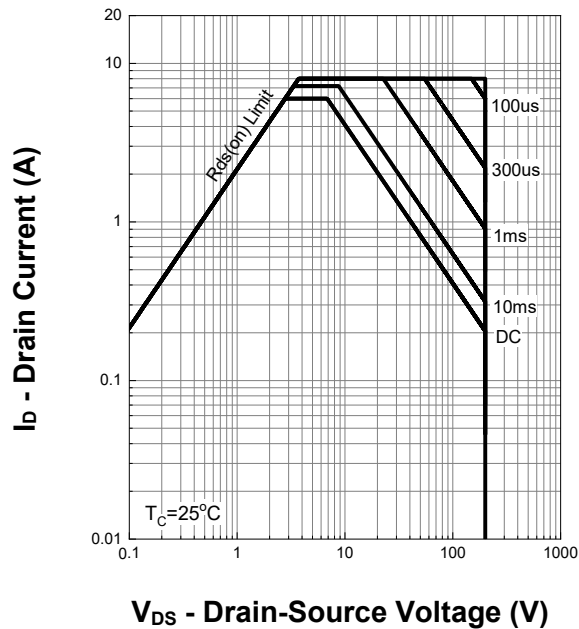
Power Capability



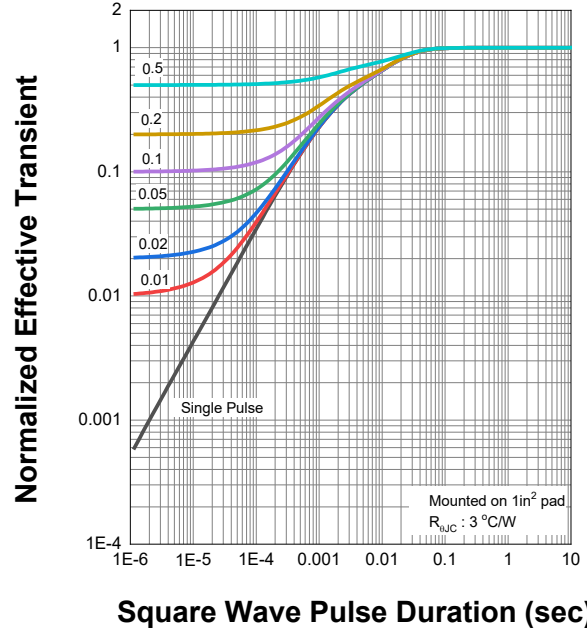
Current Capability



Safe Operating Area

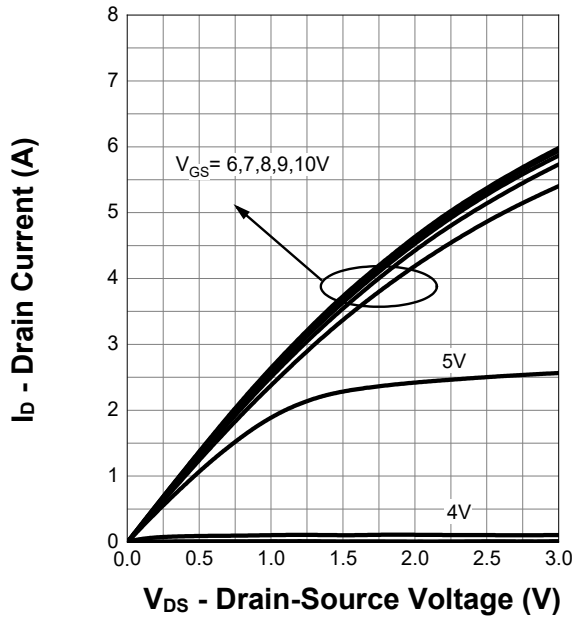


Transient Thermal Impedance

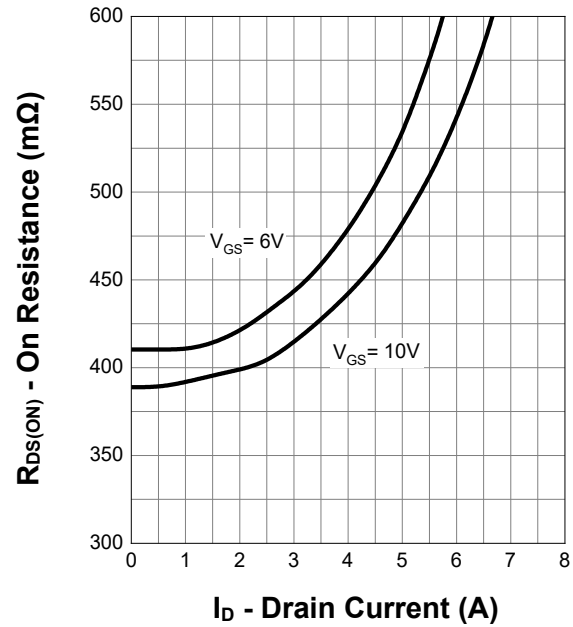


7. Typical Characteristics (cont.)

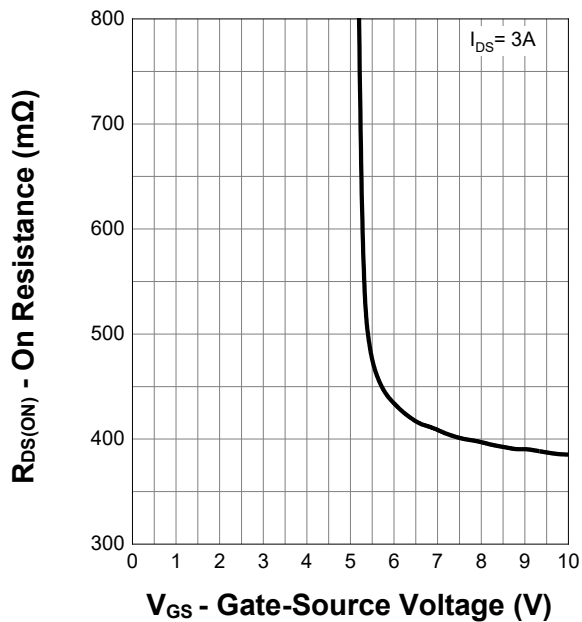
Output Characteristics



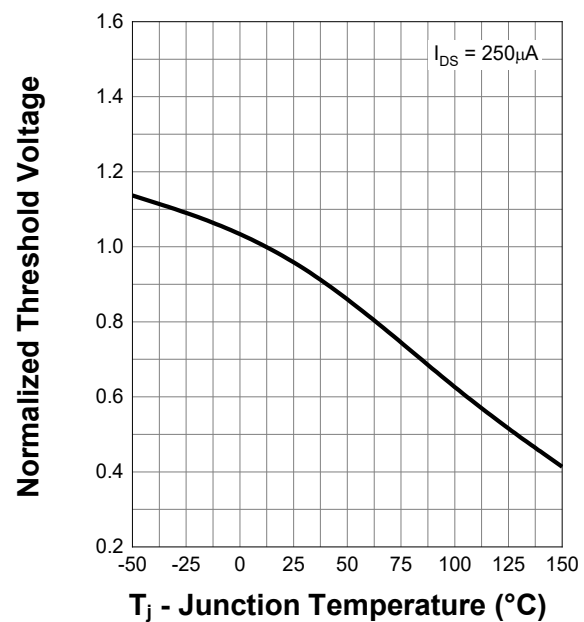
On Resistance



Transfer Characteristics

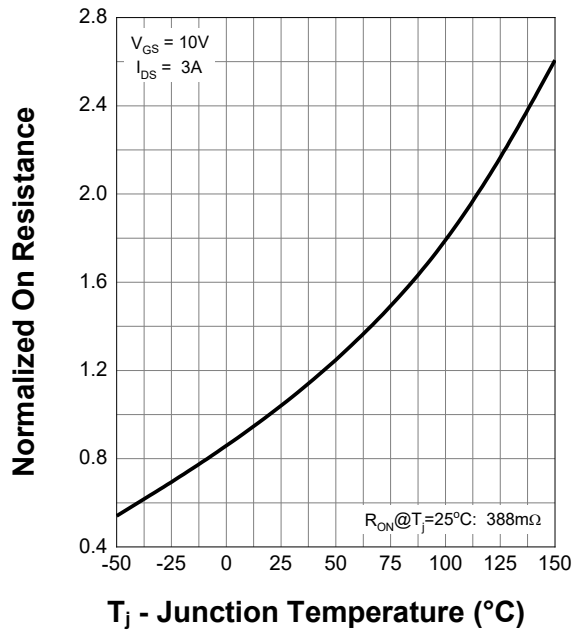


Normalized Threshold Voltage

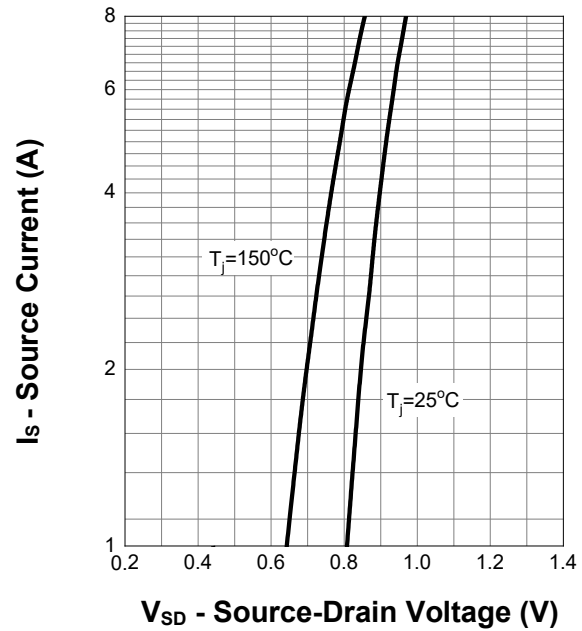


7. Typical Characteristics (cont.)

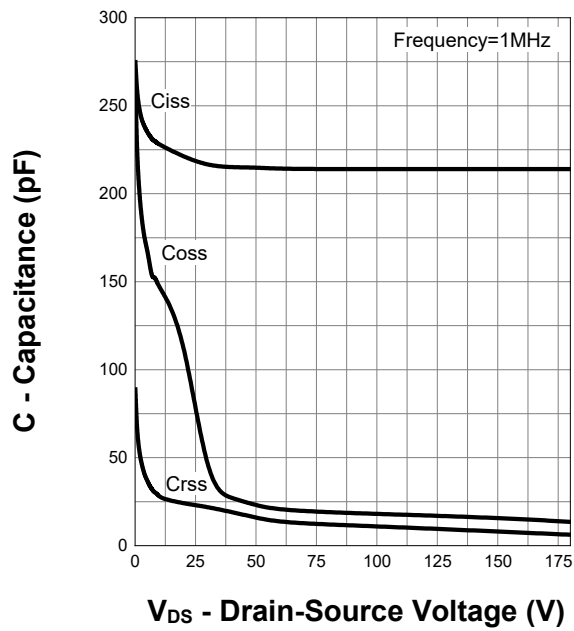
Normalized On Resistance



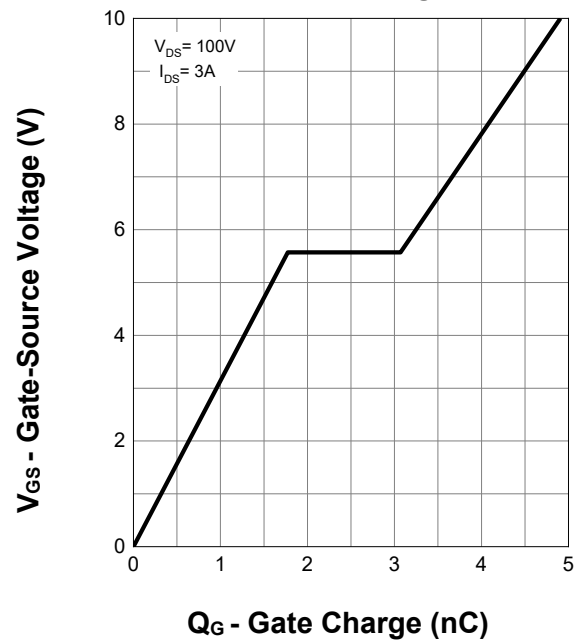
Diode Forward Current



Capacitance

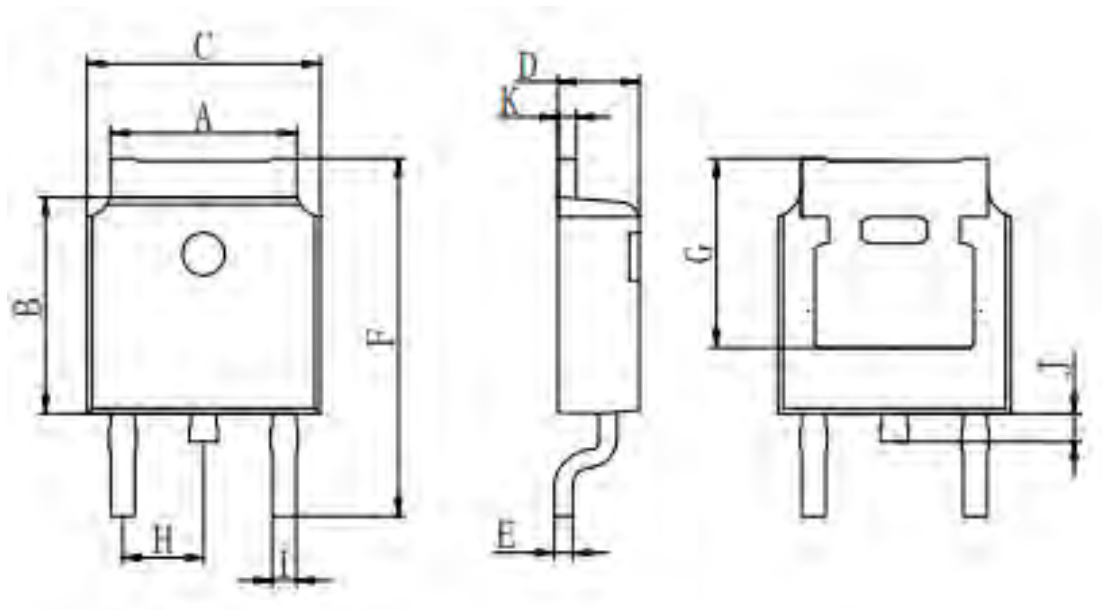


Gate Charge



8.Package Dimensions

TO-252-3L



SYMBOL	Dimension in mm	
	MIN.	MAX.
A	5.05	5.65
B	5.80	6.40
C	6.25	6.85
D	2.08	2.48
E	0.40	0.61
F	9.56	10.46
G	5.05	5.65
H	2.09	2.50
I	0.66	0.90
J	0.50	1.20
K	0.40	0.61