N-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

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

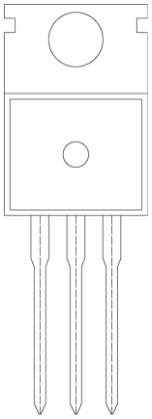
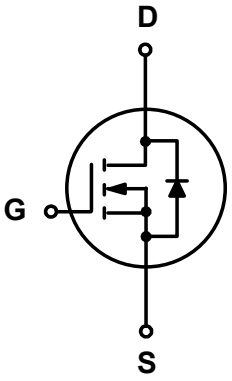
1.2 Applications

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

1.3 Quick reference

- ☑ BV ≧ 100 V
- ☑ P_{tot} ≦ 365 W
- ☑ I_D ≦ 180 A
- ☑ $R_{DS(ON)}$ ≦ 2.8 mΩ @ V_{GS} = 10 V

2. Pin Description

Pin	Description	Simplified Outline	Symbol
1	Gate (G)	 Top View TO-220-3L	
2	Drain (D)		
3	Source (S)		

3. Limiting Values

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	Drain-Source Voltage	T_C = 25 ℃	-	100	V
V_{GS}	Gate-Source Voltage	T_C = 25 ℃	-	± 20	V
I_D*	Drain Current (DC)	T_C = 25 ℃, V_{GS} = 10 V	-	180	A
		T_C = 100 ℃, V_{GS} = 10 V	-	126	A
I_{DM}*,**	Drain Current (Pulsed)	T_C = 25 ℃, V_{GS} = 10 V	-	1000	A
P_{tot}	Drain power dissipation	T_C = 25 ℃	-	365	W
T_{stg}	Storage Temperature		- 55	175	℃
T_J	Junction Temperature		-	175	℃
I_S	Continuous-Source Current	T_C = 25 ℃	-	180	A
E_{AS}*	Single Pulsed Avalanche Energy	V_{DD} = 50 V , L = 0.5mH, I_{AS}=56A	-	784	mJ
$R_{\theta JA}$*	Thermal Resistance- Junction to Ambient		-	62	℃/W
$R_{\theta JC}$	Thermal Resistance- Junction to Case		-	0.5	

Notes：

* Surface Mounted on 1 in^2 pad area, t ≤ 10 sec

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

*** Limited by bonding wire

4. Marking Information

Product Name	Marking
UP2R5N10C	**2R5N10** **YWWXXX** **YWWXXX: Date Code**

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP2R5N10C	**TO220C**			**50**	

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	100	-	-	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} = 80 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	-	-	2.8	mΩ
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	-	97	-	nS
Q_{rr}	Reverse Recovery Charge		-	138	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 50 V Frequency = 1 MHz	-	9200	-	pF
C_{oss}	Output Capacitance		-	1130	-	
C_{rss}	Reverse Transfer Capacitance		-	110	-	
t_d(on)	Turn-on Delay Time	V_{DS} = 50 V, V_{GEN} = 10 V, R_G = 3.9 Ω, R_L = 1 Ω, I_{DS} = 50 A	-	32	-	nS
t_r	Turn-on Rise Time		-	40	-	
t_d(off)	Turn-off Delay Time		-	80	-	
t_f	Turn-off Fall Time		-	35	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = 50 V, V_{GS} = 10 V, I_{DS} = 50 A	-	131	-	nC
Q_{gs}	Gate-Source Charge		-	50	-	
Q_{gd}	Gate-Drain Charge		-	24	-	

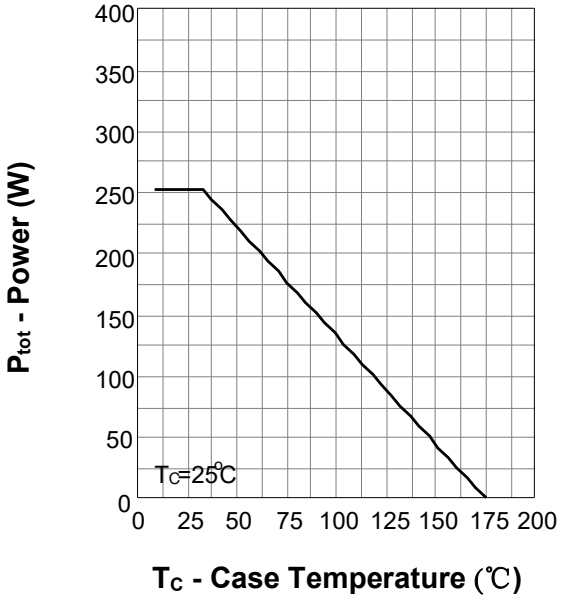
Notes :

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

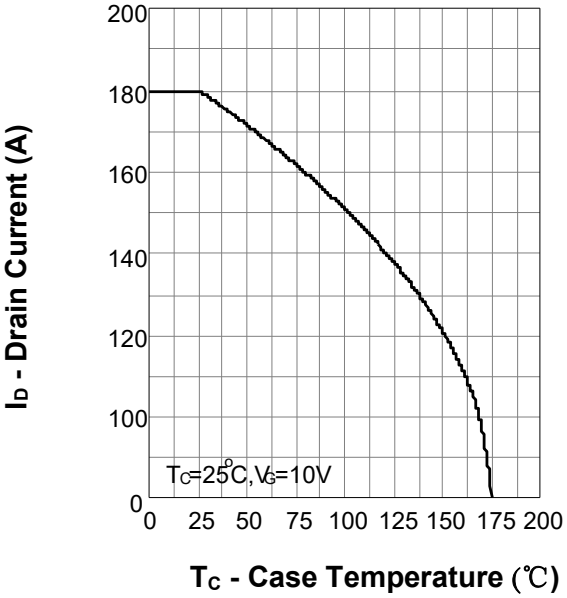
b : Guaranteed by design, not subject to production testing

7. Typical Characteristics

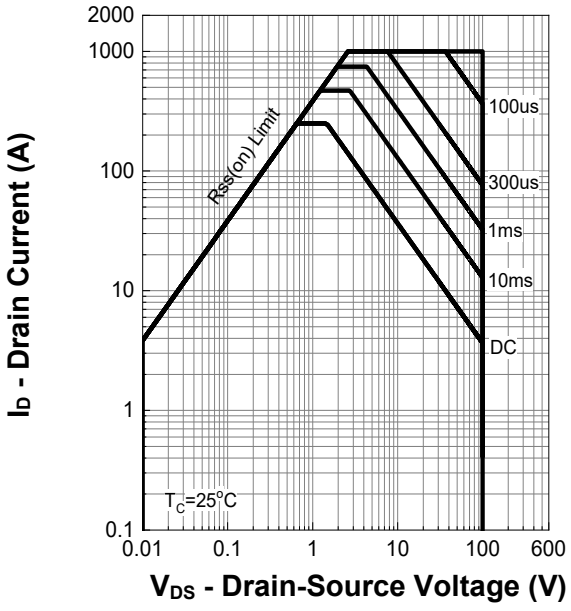
Power Capability



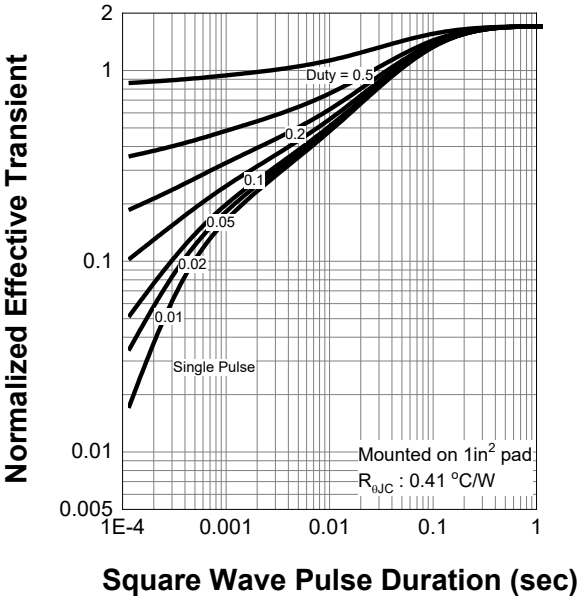
Current Capability



Safe Operation Area

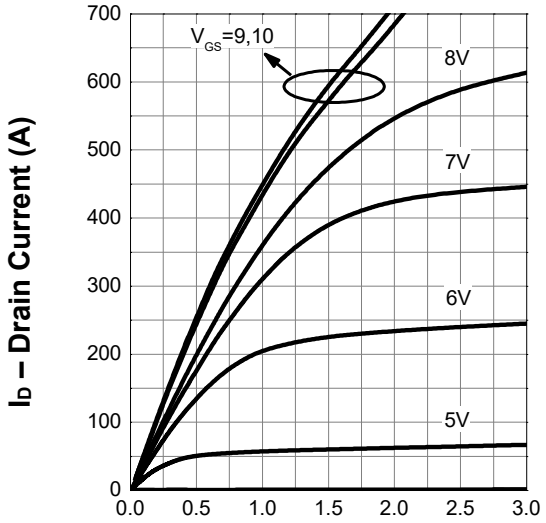


Thermal Transient Impedance

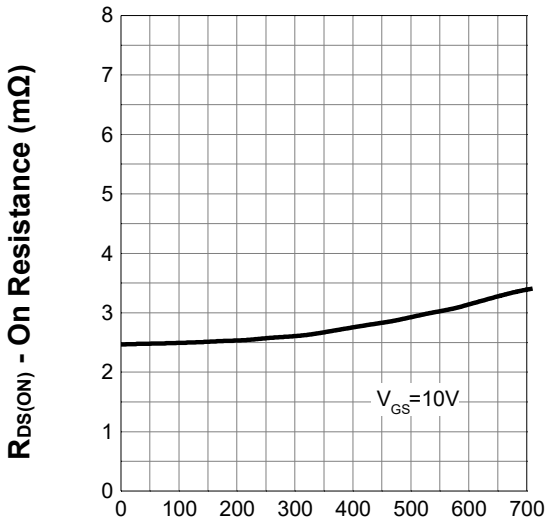


7. Typical Characteristics (cont.)

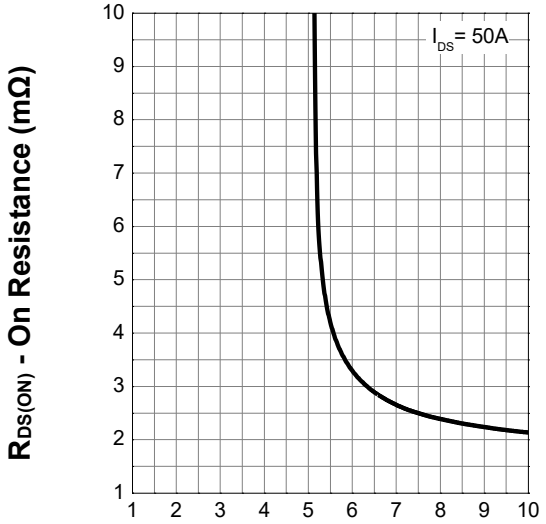
Output Characteristics



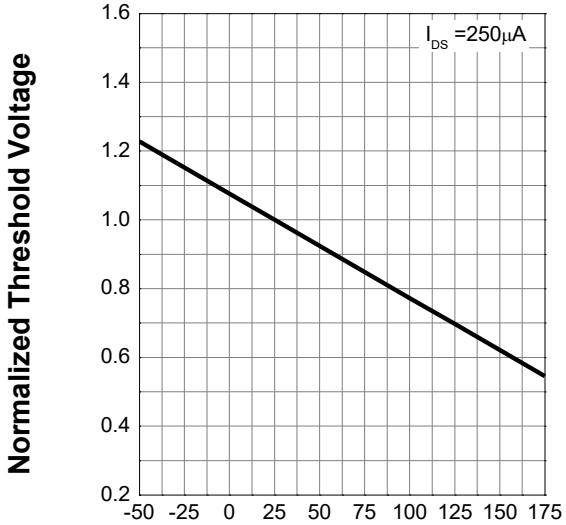
Drain-Source On Resistance



Transfer Characteristics

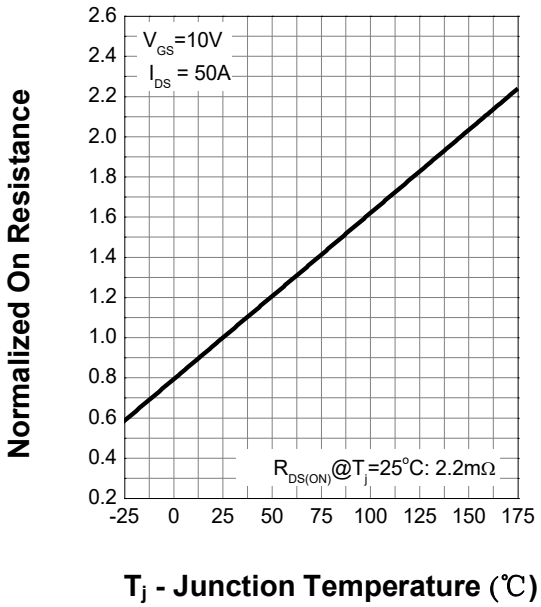


Gate Threshold Voltage

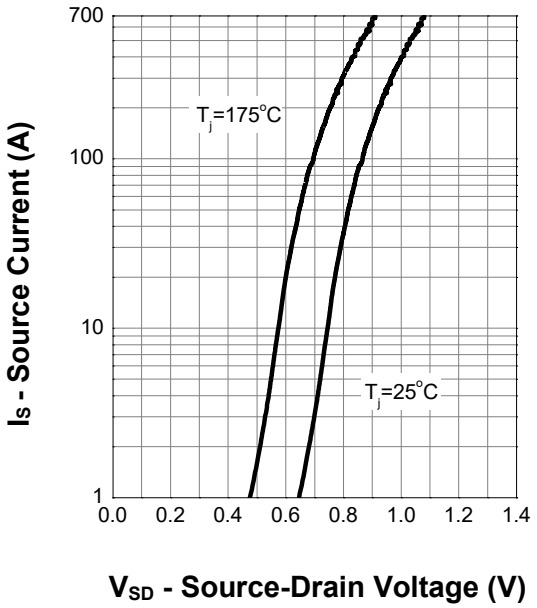


7. Typical Characteristics (cont.)

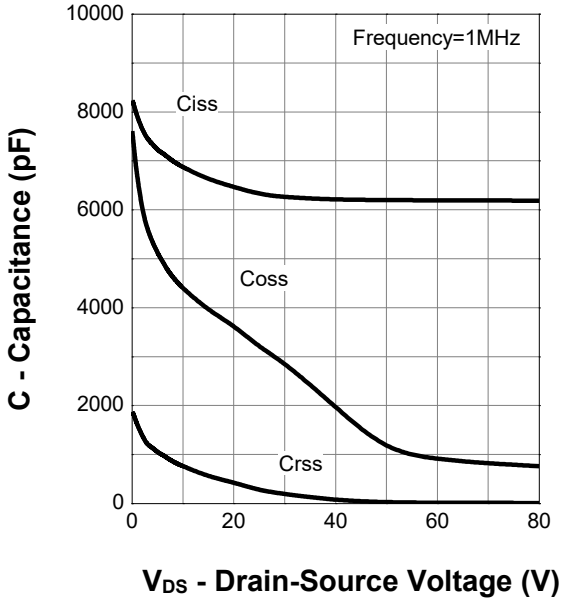
Drain-Source On Resistance



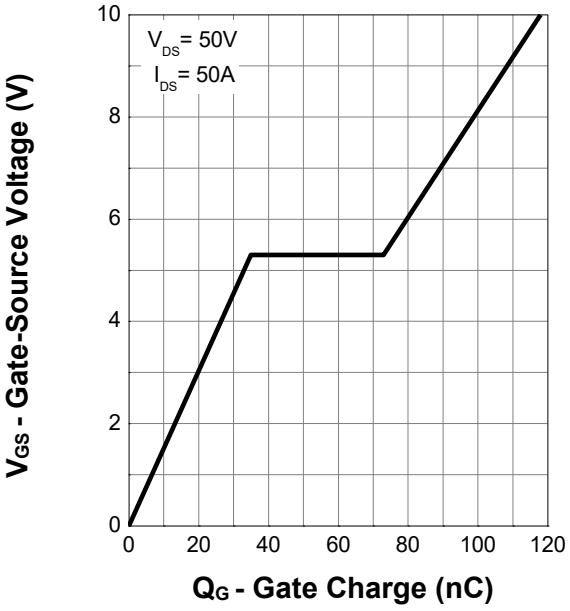
Body Diode Characteristics



Capacitance

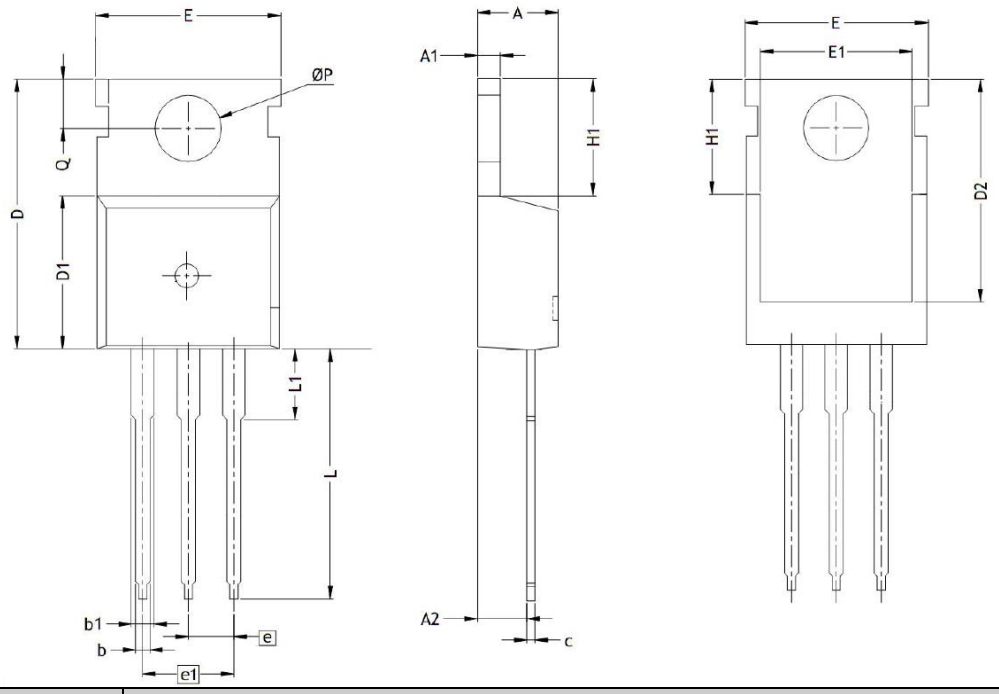


Gate Charge



8. Package Dimensions

TO-220-3L



Symbol	Dimensions In Millimeters	
	MIN.	MAX.
A	4.25	4.65
A1	1.25	1.35
A2	2.35	2.55
b	0.7	0.9
b1	1.15	1.75
c	0.45	0.61
D	14.35	16.51
D1	8.58	9.50
D2	13.05	13.65
E	9.90	10.50
E1	7.85	8.89
e	2.54BSC	
e1	5.08BSC	
H1	6.30	6.65
L	12.85	13.50
L1	2.85	3.25
ΦP	3.53	4.09
Q	2.70	2.93