P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☑ Surface-mounted package
- ☑ Low gate charge

1.2 Applications

- ☑ Motor driver appliances
- ☑ Adapter appliances
- ☑ High power inverter system

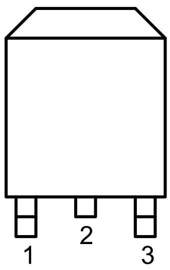
1.3 Quick reference

- ☑ BV ≦ - 100 V
- ☑ P_{tot} ≦ 50 W
- ☑ I_D ≦ - 20 A
- ☑ $R_{DS(ON)}$ ≦180 mΩ @ V_{GS} = - 10 V
- ☑ $R_{DS(ON)}$ ≦190 mΩ @ V_{GS} = - 4.5 V

2. Pin Description

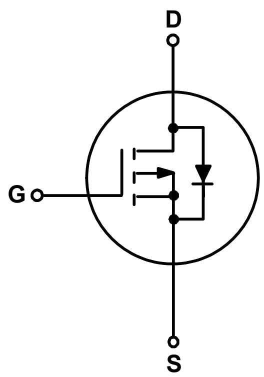
Pin	Description
1	Gate(G)
2	Drain(D)
3	Source(S)

Simplified Outline



Top View
TO-252

Symbol



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	-	- 20	A
I_{DM}*	Drain Current (Pulsed) *	T_C = 25 ℃, V_{GS} = -10 V	-	- 44	A
P_{tot}	Drain power dissipation	T_C = 25 ℃	-	35	W
T_{stg}	Storage Temperature		-55	150	℃
T_J	Junction Temperature		-	150	℃
I_S	Diode Forward Current	T_C = 25 ℃	-	- 20	A
$R_{\theta JA}$**	Thermal Resistance- Junction to Ambient		-	37	℃/W
$R_{\theta JC}$***	Thermal Resistance- Junction to Case		-	1.2	℃/W

Notes：
- * Pulse width ≤ 300 µs, duty cycle ≤ 2 %
- ** Mounted on PCB of 1 in^2 pad area
- *** Mounted on Large Heat Sink

4. Marking Information

Product Name	Marking
UP20P10K	20P10 YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
UP20P10K	TO252			2500	

Note: UOE defines "Green" as lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900 ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500 ppm by weight; Follow IEC 61249-2-21 and IPC / JEDEC J-STD-020C)

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

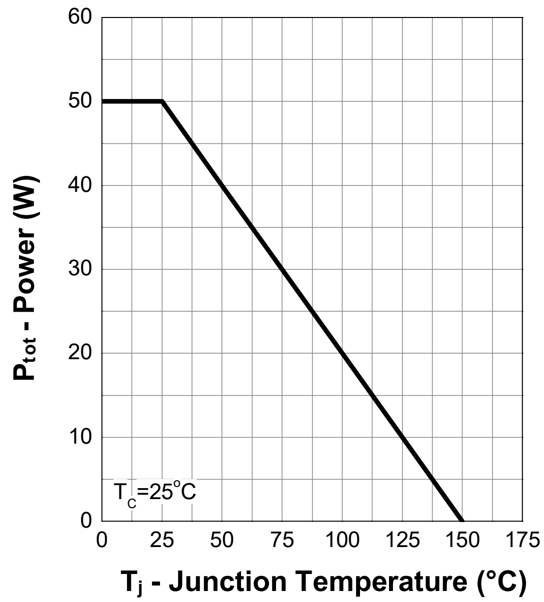
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0V, I_{DS} = - 250 μA	- 100	-	-	V
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_{DS} = - 250 μA	- 1.0	-	- 2.5	V
I_{DSS}	Drain Leakage Current	V_{DS} = - 80V, V_{GS} = 0 V	-	-	- 1.0	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} = - 2 A	-	165	180	mΩ
		V_{GS} = - 4.5 V, I_{DS} = - 1 A	-	175	190	
Diode Characteristics						
V_{SD}[a]	Diode Forward Voltage	I_{SD} = - 2 A, V_{GS} = 0 V	-	-	- 1.3	V
t_{rr}	Reverse Recovery Time	I_{SD} = - 6 A, dI_{SD} / dt = 100 A / μs	-	40	-	nS
Q_{rr}	Reverse Recovery Charge		-	28	-	nC
Dynamic Characteristics[b]						
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = - 50 V Frequency = 1 MHz	-	1545	-	pF
C_{oss}	Output Capacitance		-	37	-	
C_{rss}	Reverse Transfer Capacitance		-	25	-	
t_d(on)	Turn-on Delay Time	V_{DS} = - 50 V, V_{GEN} = - 10 V, R_G = 4.5 Ω, R_L = 25 Ω, I_{DS} = - 2 A	-	10	-	nS
t_r	Turn-on Rise Time		-	27	-	
t_d(off)	Turn-off Delay Time		-	288	-	
t_f	Turn-off Fall Time		-	88	-	
Gate Charge Characteristics[b]						
Q_g	Total Gate Charge	V_{DS} = - 50 V, V_{GS} = - 10 V, I_{DS} = - 2 A	-	27	-	nC
Q_{gs}	Gate-Source Charge		-	5.3	-	
Q_{gd}	Gate-Drain Charge		-	3.2	-	

Notes：

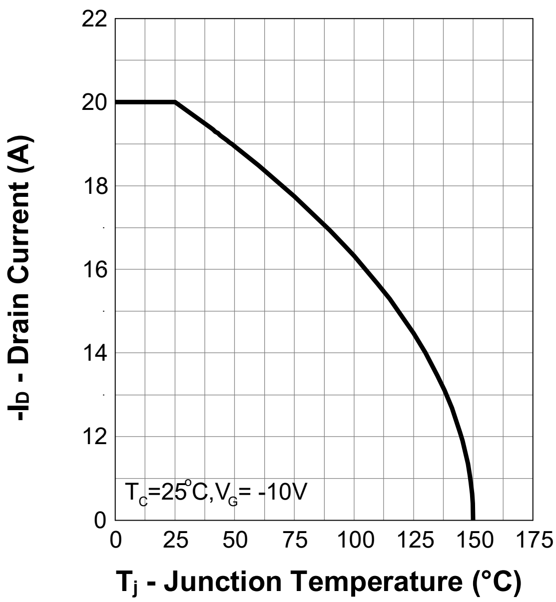
a: Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2%
b: Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

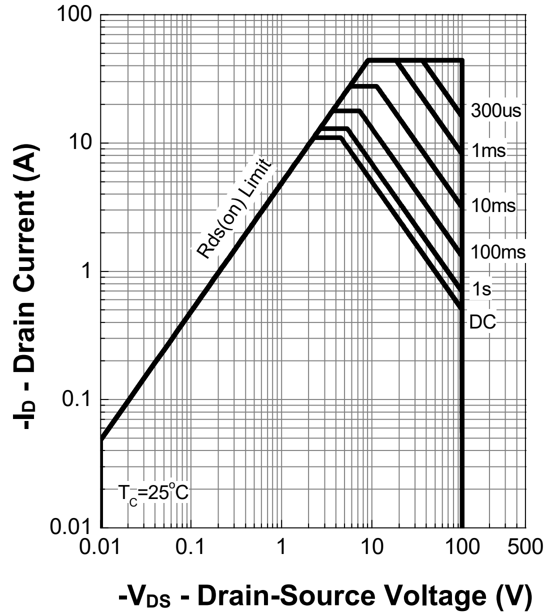
Power Capability



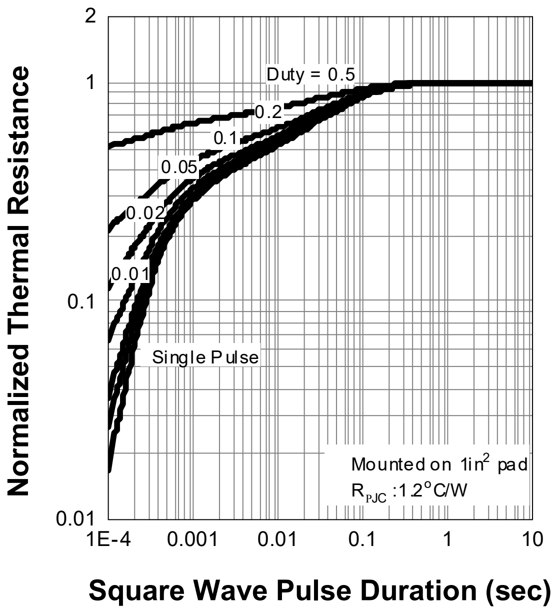
Current Capability



Safe Operation Area

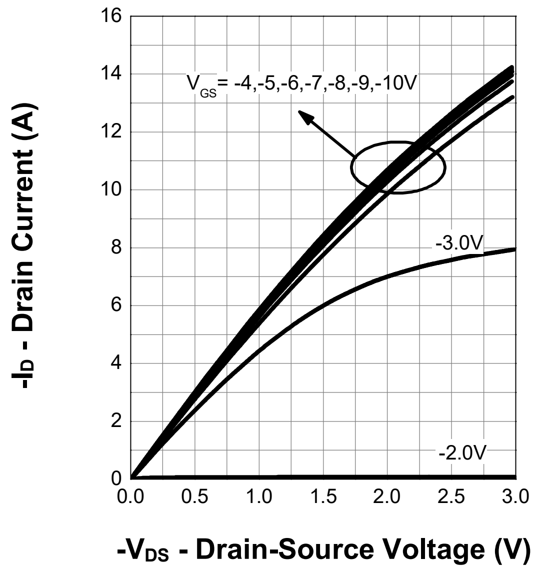


Transient Thermal Impedance

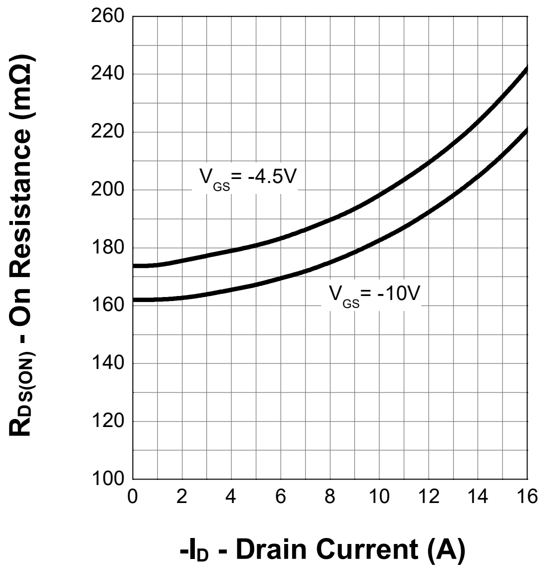


7. Typical Characteristics (Cont.)

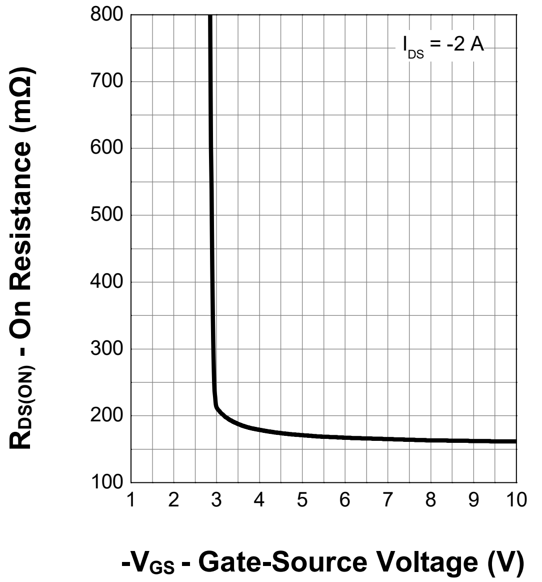
Output Characteristics



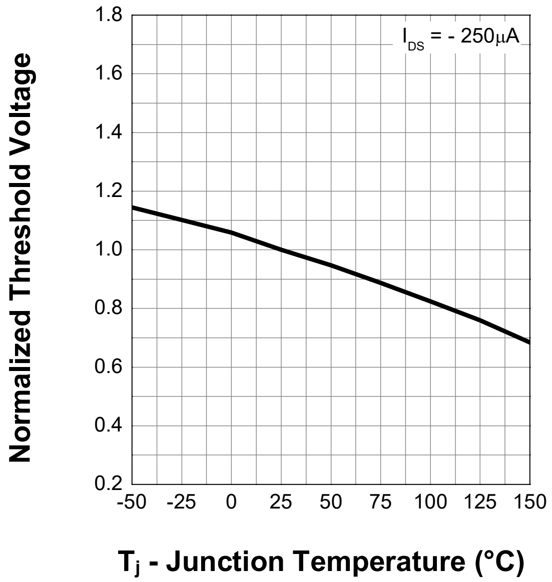
Drain-Source On Resistance



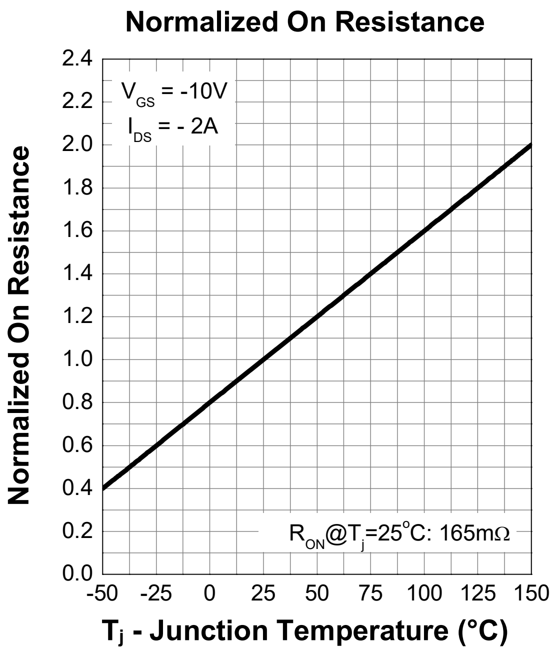
Transfer Characteristics

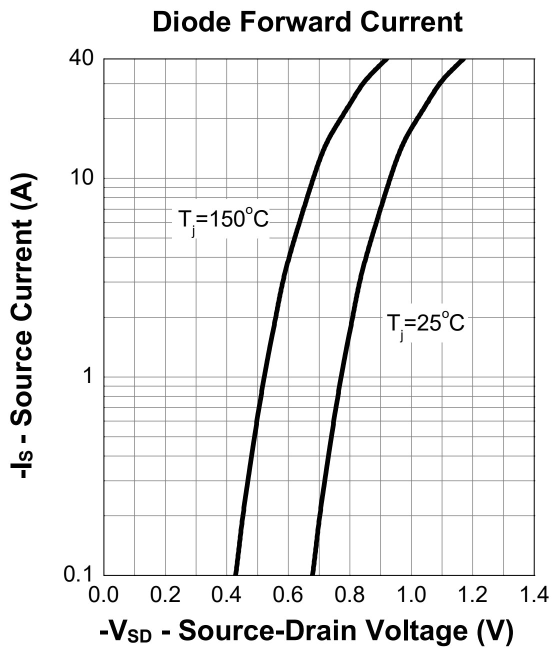


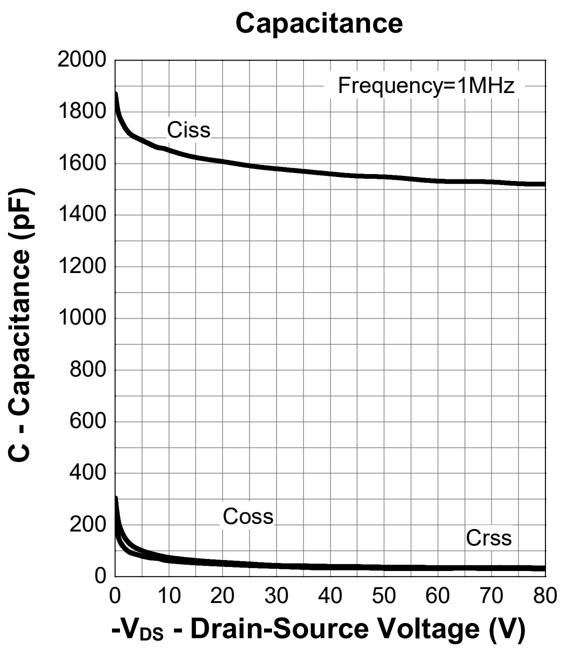
Normalized Threshold Voltage

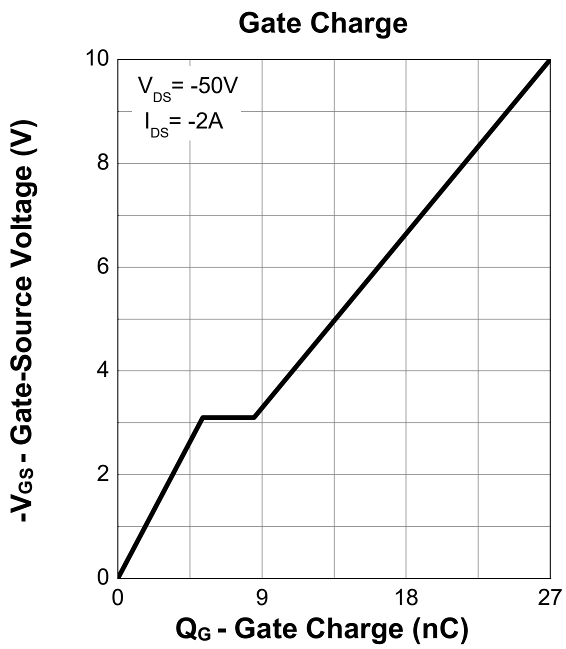


7. Typical Characteristics (Cont.)



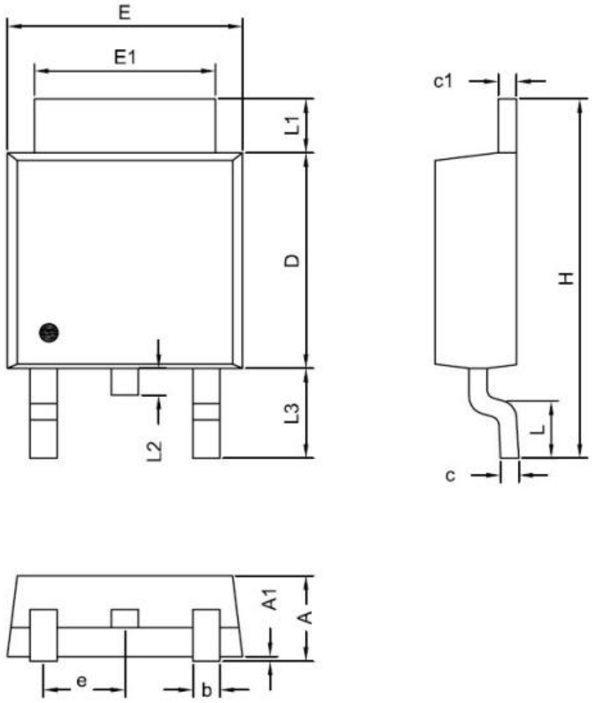






8. Package Dimensions

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