

P-Channel Enhancement Mode MOSFET

1. Product Information

1.1 Features

- ☒ Surface-mounted package
- ☒ Low gate charge

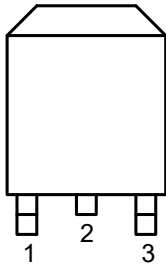
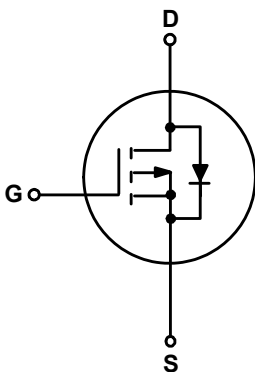
1.2 Applications

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

1.3 Quick reference

- ☒ $BV \leq -100\text{ V}$
- ☒ $P_{\text{tot}} \leq 50\text{ W}$
- ☒ $I_D \leq -20\text{ A}$
- ☒ $R_{\text{DS(ON)}} \leq 180\text{ m}\Omega @ V_{\text{GS}} = -10\text{ V}$
- ☒ $R_{\text{DS(ON)}} \leq 190\text{ m}\Omega @ V_{\text{GS}} = -4.5\text{ V}$

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	-100	-	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	-	- 20	A
I _{DM} *	Drain Current (Pulsed) *	T _C = 25 °C, V _{GS} = -10 V	-	- 44	A
P _{tot}	Drain power dissipation	T _C = 25 °C	-	35	W
T _{stg}	Storage Temperature		-55	150	°C
T _J	Junction Temperature		-	150	°C
I _S	Diode Forward Current	T _C = 25 °C	-	- 20	A
R _{θJA} **	Thermal Resistance- Junction to Ambient		-	37	°C/W
R _{θJC} ***	Thermal Resistance- Junction to Case		-	1.2	

Notes :

- * Pulse width ≤ 300 μs, duty cycle ≤ 2 %
- ** Mounted on PCB of 1 in² pad area
- *** Mounted on Large Heat Sink

4. Marking Information

Product Name	Marking
HDN20P10K	20P10 YWWXXX YWW: Date Code

5. Ordering Code

Product Name	Package	Reel Size	Tape width	Quantity	Note
HDN20P10K	TO252			2500	

Note: JSHD 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)

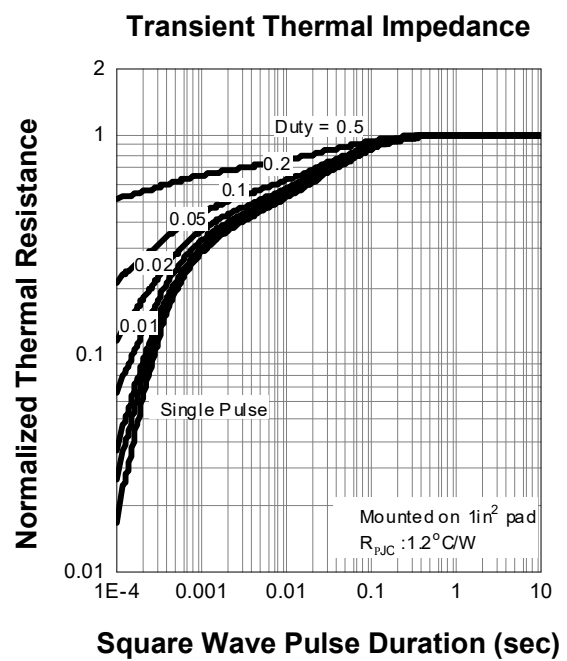
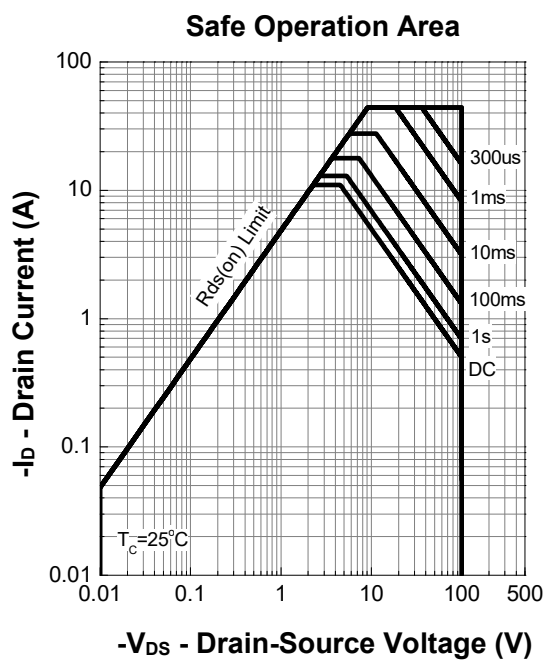
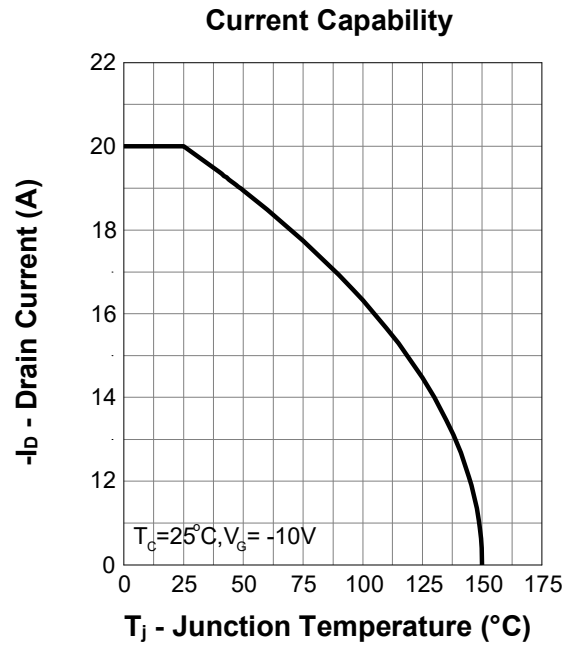
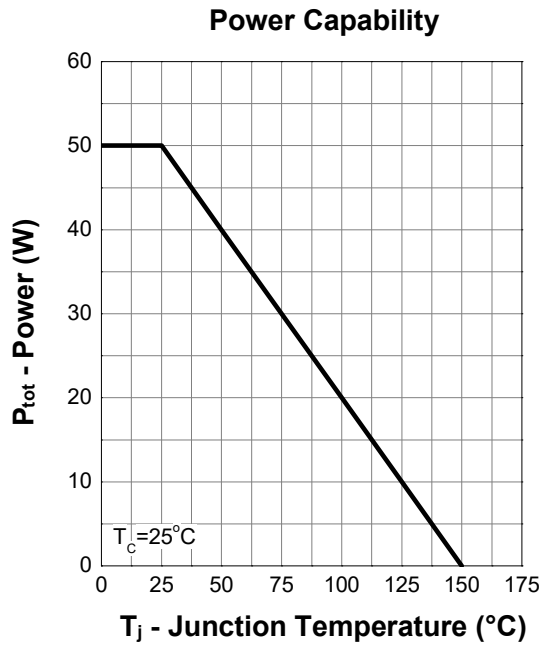
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _{DS} = - 250 μA	- 100	-	-	V
V _{GS(th)}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _{DS} = - 250 μA	- 1.0	-	- 2.5	V
I _{DSS}	Drain Leakage Current	V _{DS} = - 80V, 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%

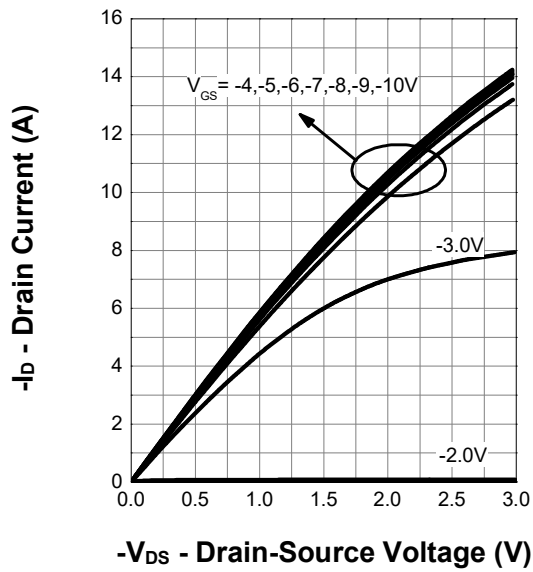
b: Guaranteed by design, not subject to production testing

7. Typical Characteristics (Cont.)

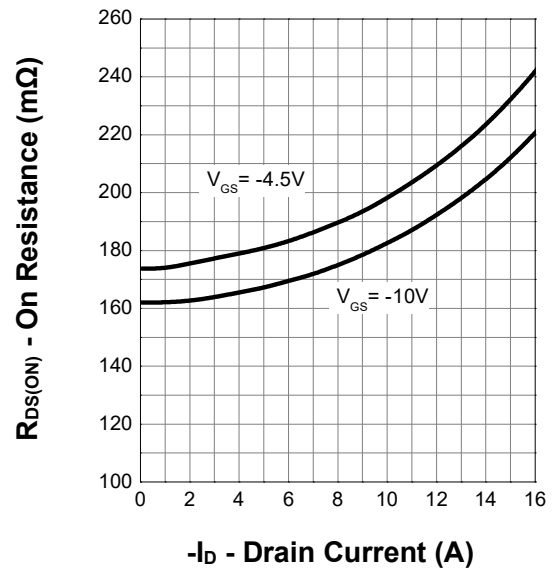


7. Typical Characteristics (Cont.)

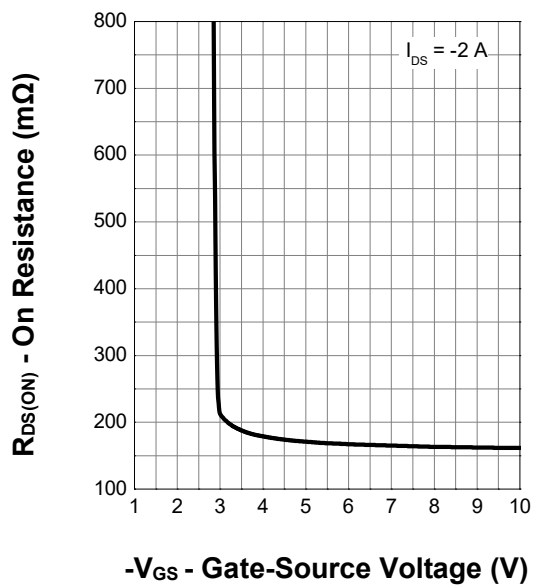
Output Characteristics



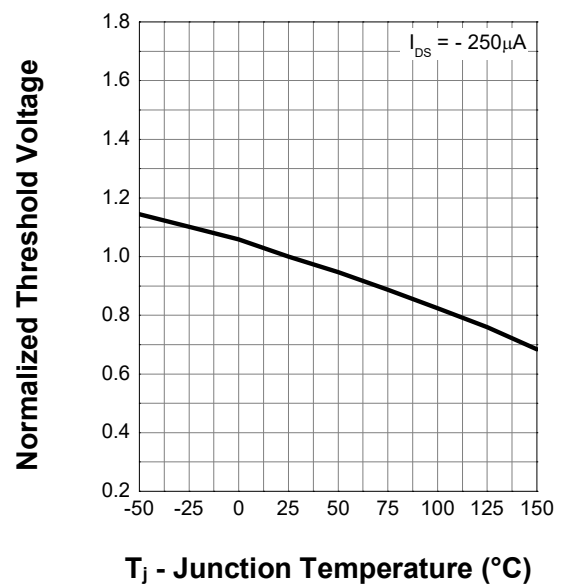
Drain-Source On Resistance



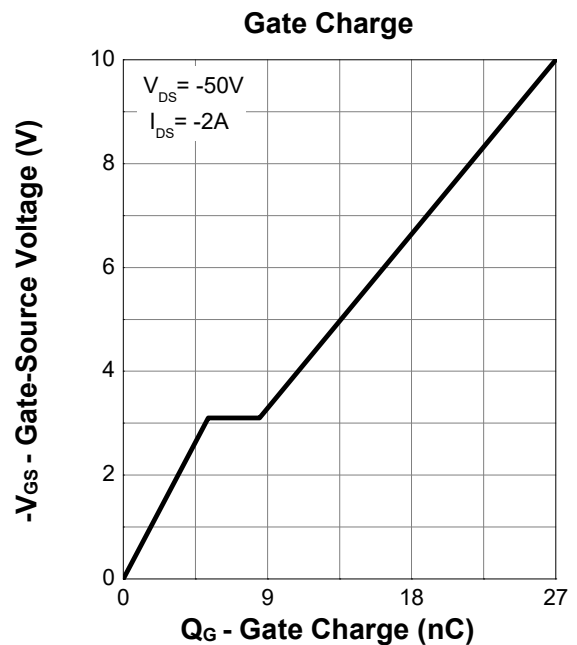
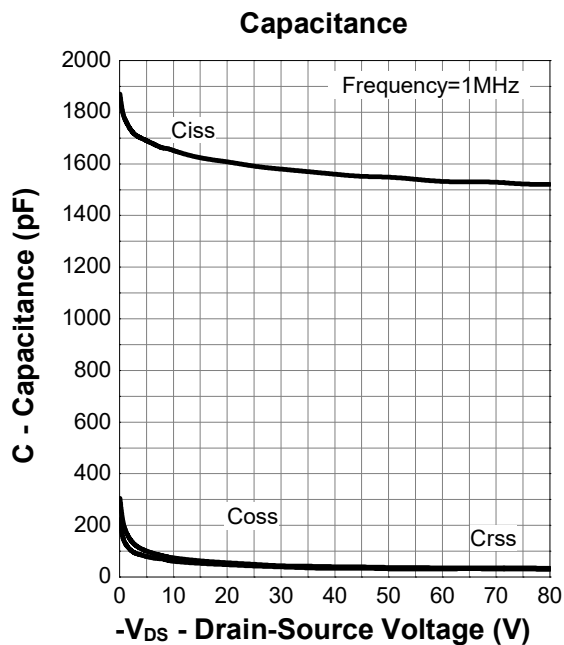
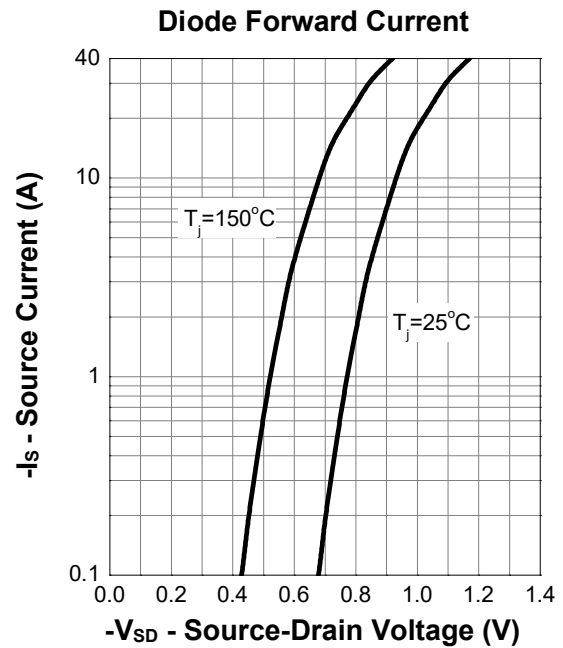
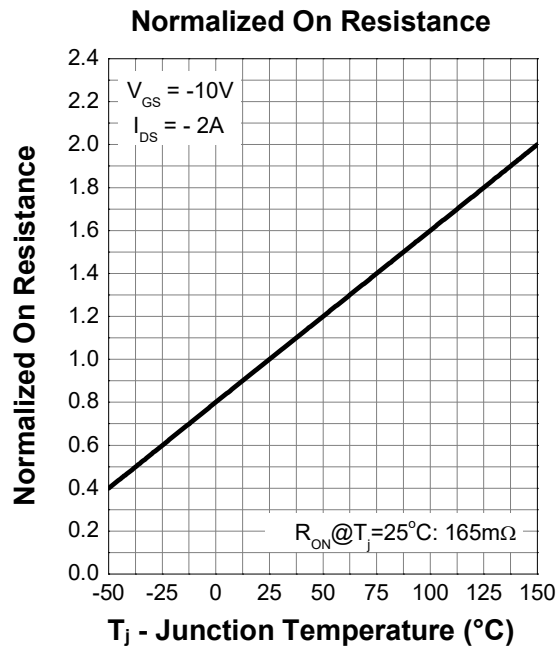
Transfer Characteristics



Normalized Threshold Voltage

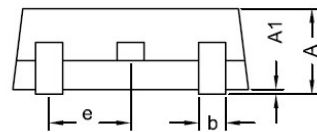
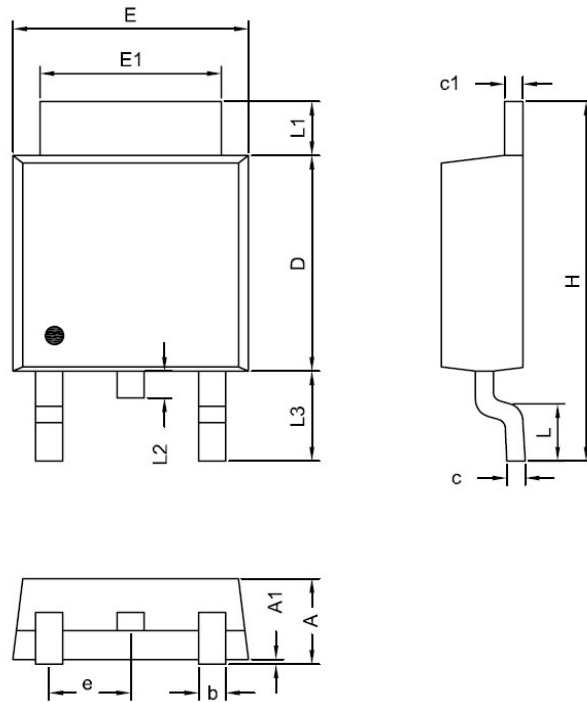


7. Typical Characteristics (Cont.)



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