

HUF76439P3-VB Datasheet N-Channel 60-V (D-S) MOSFET

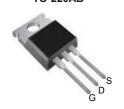
PRODUCT	DDUCT SUMMARY			
V _{DS} (V)	$R_{DS(on)}\left(\Omega\right)$	I _D (A) ^a		
60	0.011 at V _{GS} = 10 V	60		
60	0.013 at V _{GS} = 4.5 V	50		

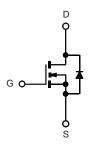
FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET
- Material categorization:









N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T _C = 25	c°C, unless other	wise noted)		
Parameter		Symbol	Limit	Unit
Gate-Source Voltage		V _{GS}	± 20	V
Continuous Prain Current /T = 175 °C\h	T _C = 25 °C	I _D	60	
Continuous Drain Current (T _J = 175 °C) ^b	T _C = 100 °C	טי	50ª	
Pulsed Drain Current	it I _{DM} 200		A	
Continuous Source Current (Diode Conduction)		I _S	50ª	
Avalanche Current		I _{AS}	50	1
Single Avalanche Energy (Duty Cycle ≤ 1 %)	L = 0.1 mH	E _{AS}	125	mJ
Maximum Power Dissipation	T _C = 25 °C	P _D	136	W
iviaximum rowei Dissipation	T _A = 25 °C] 'D [3 ^b , 8.3 ^{b, c}	
Operating Junction and Storage Temperature Range	<u>.</u>	T _J , T _{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
Marrian Instanta A Auchinuta	t ≤ 10 sec	P	15	18	
Maximum Junction-to-Ambient ^a	Steady State	R _{thJA}	40	50	°C/W
Maximum Junction-to-Case		R _{thJC}	0.85	1.1	

Notes:

- a. Package limited.
- b. Surface mounted on 1" x 1" FR4 board.
- $c.\ t \leq 10\ s.$



Parameter	Symbol	Test Conditions	Min.	Typ.a	Max.	Unit	
Static							
Drain-Source Breakdown Voltage	V _{DS}	$V_{GS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	60			V	
Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_D = 250 \mu A$	1		3	V	
Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			± 100	nA	
		V _{DS} = 60 V, V _{GS} = 0 V			1	μA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V, T _J = 125 °C			50		
		V _{DS} = 60 V, V _{GS} = 0 V, T _J = 175 °C			250	1	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	60			Α	
		V _{GS} = 10 V, I _D = 20 A		0.011			
	D	V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.014		Ω	
Drain-Source On-State Resistance ^b	DS(on)	V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.018			
		V _{GS} = 4.5 V, I _D = 15 A		0.013			
Forward Transconductance ^b	9 _{fs}	V _{DS} = 15 V, I _D = 20 A		60		S	
Dynamic							
Input Capacitance	C _{iss}			4200			
Output Capacitance	C _{oss}	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		570		pF	
Reverse Transfer Capacitance	C _{rss}			325		pF	
Total Gate Charge ^c	Qg			47			
Gate-Source Charge ^c	$R_{DS(on)} = \begin{array}{c} V_{GS} = 10 \text{ V}, I_{D} = 20 \text{ A} \\ V_{GS} = 10 \text{ V}, I_{D} = 20 \text{ A}, T_{J} = 125 \text{ °C} \\ V_{GS} = 10 \text{ V}, I_{D} = 20 \text{ A}, T_{J} = 175 \text{ °C} \\ V_{GS} = 10 \text{ V}, I_{D} = 20 \text{ A}, T_{J} = 175 \text{ °C} \\ V_{GS} = 4.5 \text{ V}, I_{D} = 15 \text{ A} \\ V_{DS} = 15 \text{ V}, I_{D} = 20 \text{ A} \\ \hline \\ C_{iss} \\ C_{oss} \\ C_{rss} \\ \hline \\ Q_{g} \\ Q_{gs} \\ V_{DS} = 30 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz} \\ \hline \\ Q_{gd} \\ \hline \\ V_{DS} = 30 \text{ V}, V_{GS} = 10 \text{ V}, I_{D} = 50 \text{ A} \\ \hline \\ Q_{gd} \\ \hline \\ t_{d(on)} \\ \hline \\ t_{r} \\ \hline \end{array}$	10		nC			
Gate-Drain Charge ^c	Q_{gd}			12			
Turn-On Delay Time ^c	t _{d(on)}			10	20		
Rise Time ^c		V_{DD} = 30 V, R_L = 0.6 Ω		15	25		
Turn-Off Delay Time ^c	t _{d(off)}	$I_D \cong 50 \text{ A}, V_{GEN}$ = 10 V, R_g = 2.5 Ω		35	50	ns	
Fall Time ^c	t _f			20	30		
Source-Drain Diode Ratings and Cha	aracteristics (T _C = 25 °C)					
Pulsed Current	I _{SM}				60	Α	
Diode Forward Voltage	V _{SD}	$I_F = 20 \text{ A}, V_{GS} = 0 \text{ V}$		1	1.5	V	
Reverse Recovery Time	t _{rr}	I _F = 20 A, di/dt = 100 A/μs		45	100	ns	

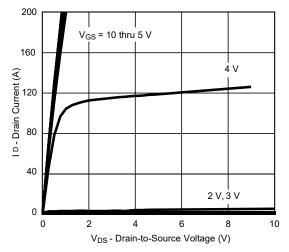
Notes:

- a. For design aid only; not subject to production testing.
- b. Pulse test; pulse width \leq 300 µs, duty cycle \leq 2 %.
- c. Independent of operating temperature.

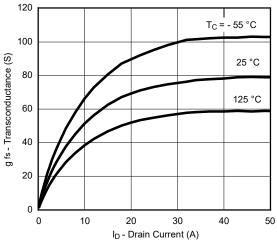
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



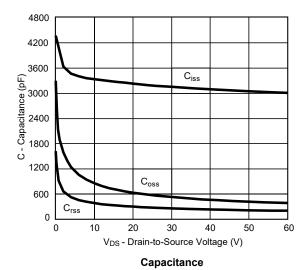
TYPICAL CHARACTERISTICS (25 °C unless noted)

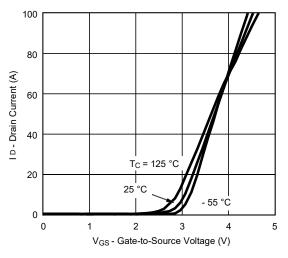


Output Characteristics

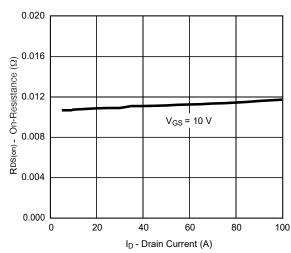


Transconductance

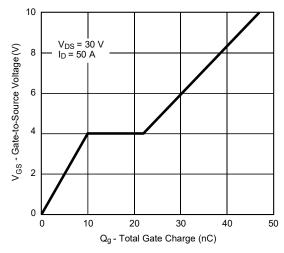




Transfer Characteristics



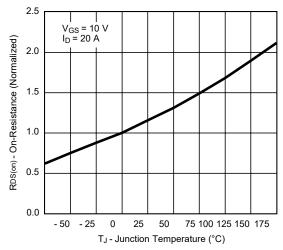
On-Resistance vs. Drain Current



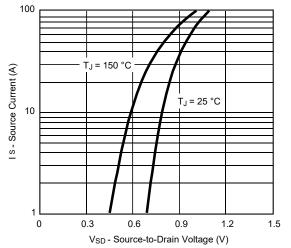
Gate Charge



TYPICAL CHARACTERISTICS (25 °C unless noted)



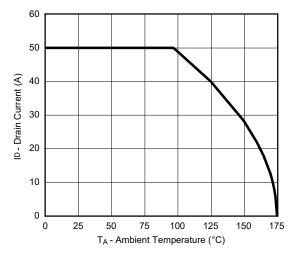
On-Resistance vs. Junction Temperature

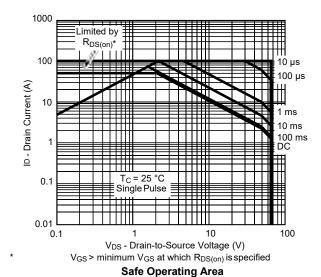


Source-Drain Diode Forward Voltage

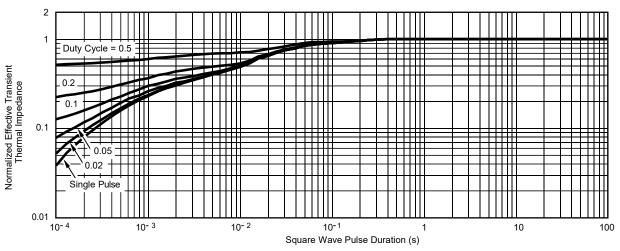


THERMAL RATINGS





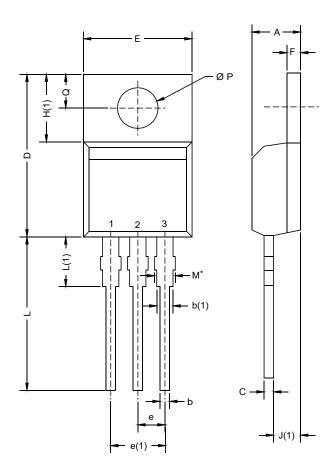
Maximum Drain Current vs. Ambient Temperature



Normalized Thermal Transient Impedance, Junction-to-Case



TO-220AB



DIM.	MILLIM	IETERS	INCHES		
	MIN.	MAX.	MIN.	MAX.	
Α	4.24	4.65	0.167	0.183	
b	0.69	1.02	0.027	0.040	
b(1)	1.14	1.78	0.045	0.070	
С	0.36	0.61	0.014	0.024	
D	14.33	15.85	0.564	0.624	
E	9.96	10.52	0.392	0.414	
е	2.41	2.67	0.095	0.105	
e(1)	4.88	5.28	0.192	0.208	
F	1.14	1.40	0.045	0.055	
H(1)	6.10	6.71	0.240	0.264	
J(1)	2.41	2.92	0.095	0.115	
L	13.36	14.40	0.526	0.567	
L(1)	3.33	4.04	0.131	0.159	
ØР	3.53	3.94	0.139	0.155	
Q	2.54	3.00	0.100	0.118	

Note

• M* = 0.052 inches to 0.064 inches (dimension including protrusion), heatsink hole for HVM



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