

HUFA76439S3ST-VB Datasheet

N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS}	60	V
$R_{DS(on)} V_{GS} = 10\text{ V}$	11	$m\Omega$
$R_{DS(on)} V_{GS} = 4.5\text{ V}$	12	$m\Omega$
I_D	75	A
Configuration	Single	

FEATURES

- 175 °C Junction Temperature
- Trench Power MOSFET


RoHS
 COMPLIANT


N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_C = 25\text{ }^\circ\text{C}$, unless otherwise noted)

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175\text{ }^\circ\text{C}$) ^b	I_D	75	A
		50 ^a	
Pulsed Drain Current	I_{DM}	200	
Continuous Source Current (Diode Conduction)	I_S	50 ^a	
Avalanche Current	I_{AS}	50	
Single Avalanche Energy (Duty Cycle $\leq 1\%$)	E_{AS}	125	mJ
Maximum Power Dissipation	P_D	136	W
		3 ^b , 8.3 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	$^\circ\text{C}$

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	R_{thJA}	15	18	$^\circ\text{C/W}$
		40	50	
Maximum Junction-to-Case	R_{thJC}	0.85	1.1	

Notes:

a. Package limited.

b. Surface mounted on 1" x 1" FR4 board.

c. $t \leq 10\text{ s}$.

SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ. ^a	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	60			V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	1		3	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 60 V, V _{GS} = 0 V			1	μA
		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	
On-State Drain Current ^b	I _{D(on)}	V _{DS} = 5 V, V _{GS} = 10 V	60			A
Drain-Source On-State Resistance ^b	R _{DS(on)}	V _{GS} = 10 V, I _D = 20 A		0.011		Ω
		V _{GS} = 10 V, I _D = 20 A, T _J = 125 °C		0.016		
		V _{GS} = 10 V, I _D = 20 A, T _J = 175 °C		0.020		
		V _{GS} = 4.5 V, I _D = 15 A		0.012		
Forward Transconductance ^b	g _{fs}	V _{DS} = 15 V, I _D = 20 A		60		S
Dynamic						
Input Capacitance	C _{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		4300		pF
Output Capacitance	C _{oss}			470		
Reverse Transfer Capacitance	C _{rss}			225		
Total Gate Charge ^c	Q _g	V _{DS} = 30 V, V _{GS} = 10 V, I _D = 50 A		47		nC
Gate-Source Charge ^c	Q _{gs}			10		
Gate-Drain Charge ^c	Q _{gd}			12		
Turn-On Delay Time ^c	t _{d(on)}	V _{DD} = 30 V, R _L = 0.6 Ω I _D ≅ 50 A, V _{GEN} = 10 V, R _g = 2.5 Ω		10	20	ns
Rise Time ^c	t _r			15	25	
Turn-Off Delay Time ^c	t _{d(off)}			35	50	
Fall Time ^c	t _f			20	30	
Source-Drain Diode Ratings and Characteristics (T _C = 25 °C)						
Pulsed Current	I _{SM}				60	A
Diode Forward Voltage	V _{SD}	I _F = 20 A, V _{GS} = 0 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 $\leq 300\text{ }\mu\text{s}$, 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



Transfer Characteristics



Transconductance



$R_{DS(on)}$ vs. Drain Current



Capacitance



Gate Charge

TYPICAL CHARACTERISTICS (25 °C unless noted)



On-Resistance vs. Junction Temperature

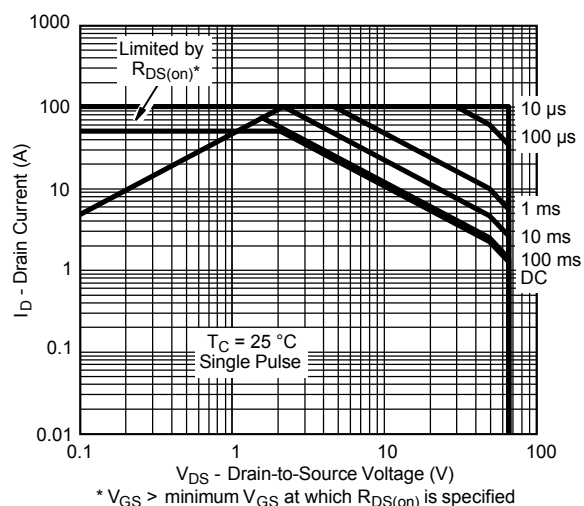


Source-Drain Diode Forward Voltage

THERMAL RATINGS



Maximum Drain Current vs. Ambient Temperature



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

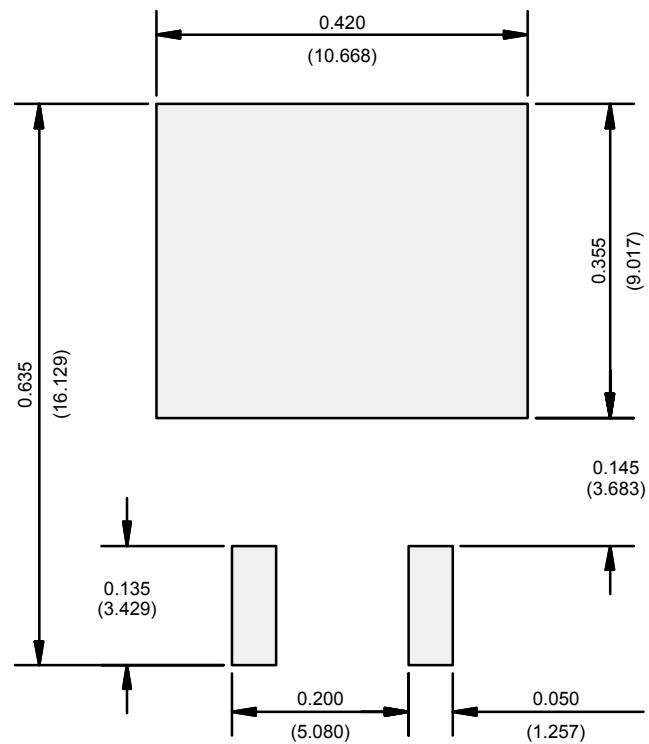
Technical drawing of a lead tip assembly, showing multiple views and annotations:

- Main View (Top Left):** Shows the lead tip assembly with dimensions E , $L1$, D , H , and $L2$. Features include two lead tips (1, 2) and two mounting holes (3, 4). Datum A is indicated. Surface texture symbols (triangles with numbers 3, 4, 5) are present.
- Detail A (Top Right):** A magnified view of the lead tip assembly, showing dimensions A , $c2$, and c . It includes a circular feature with a center line and a dimension c .
- Seating Plane View (Middle Right):** A side view of the lead tip assembly, showing the gauge plane, seating plane, and dimensions $L3$, $L4$, and $A1$. It includes a note: "Detail 'A' Rotated 90° CW scale 8:1".
- Section B - B and C - C (Bottom Center):** A cross-sectional view of the lead tip assembly, showing the plating, base metal, and dimensions $b1$, $b3$, $c1$, and $(b, b2)$. It includes a note: "Section B - B and C - C Scale: none".
- View A - A (Bottom Right):** A side view of the lead tip assembly, showing dimensions E , $D1$, and $E1$. It includes a note: "View A - A".
- Lead Tip (Bottom Left):** A small detail view of the lead tip, showing the lead tip and dimensions $2 \times b2$, $2 \times b$, and $2 \times e$.
- Annotations:**
 - Feature Control Frames: $\phi 0.010 \text{ M } A \text{ M } B$ and $\text{Surface Texture } \sqrt{\sqrt{\pm 0.004 \text{ M } B}}$.
 - Surface Texture Symbols: Triangles with numbers 3, 4, and 5.
 - Dimension Lines: Indicate various lengths and diameters.
 - Section Lines: Indicate the cross-section of the lead tip assembly.

	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.
4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
5. Dimension b1 and c1 apply to base metal only.
6. Datum A and B to be determined at datum plane H.
7. Outline conforms to JEDEC outline to TO-263AB.

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead



Recommended Minimum Pads
Dimensions in Inches/(mm)

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