N-Channel 75 V (D-S) MOSFET

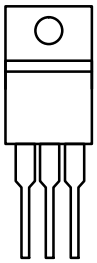
PRODUCT SUMMARY			
$V_{(BR)DSS}$ (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
75	0.0082 at V_{GS} = 10 V	90[d]	58

FEATURES

- TrenchFET® Power MOSFET
- 175 °C Junction Temperature
- 100 % R_g and UIS Tested
- Material categorization:
  For definitions of compliance please see www.vishay.com/doc?99912

RoHS COMPLIANT

TO-220AB

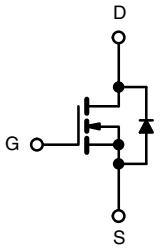


Top View

Ordering Information: SUP90N08-8m2P-E3 (Lead (Pb)-free)

APPLICATIONS

- Power Supply
  - Secondary Synchronous Rectification
- Industrial



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise noted)				
Parameter		**Symbol**	**Limit**	**Unit**
Drain-Source Voltage		V_{DS}	75	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 175 °C)	T_C = 25 °C	I_D	90[d]	A
	T_C = 70 °C		79[d]	
Pulsed Drain Current		I_{DM}	200	
Avalanche Current		I_{AS}	50	
Single Avalanche Energy[a]	L = 0.1 mH	E_{AS}	125	mJ
Maximum Power Dissipation[a]	T_C = 25 °C	P_D	150[b]	W
	T_A = 25 °C[c]		3.75	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS			
Parameter	**Symbol**	**Limit**	**Unit**
Junction-to-Ambient (PCB Mount)[c]	R_{thJA}	40	°C/W
Junction-to-Case (Drain)	R_{thJC}	1	

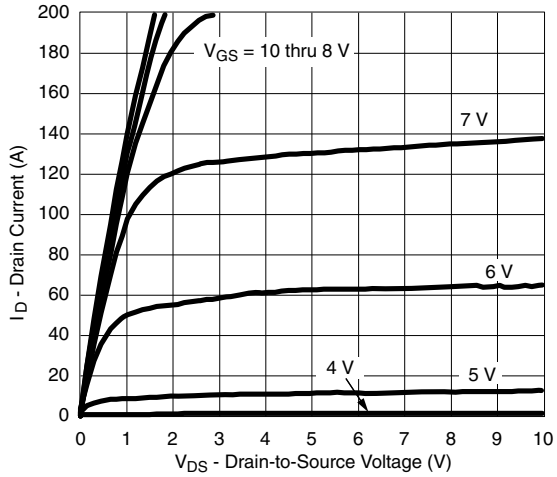
Notes:
a. Duty cycle ≤ 1 %.
b. See SOA curve for voltage derating.
c. When Mounted on 1" square PCB (FR-4 material).
d. Package limited.

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{DS} = 0 V, I_D = 250 µA	75			V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2.8		4.8	
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 250	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 = 150 °C			250	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≥ 10 V, V_{GS} = 10 V	70			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 20 A		0.0069	0.0082	Ω
		V_{GS} = 10 V, I_D = 20 A, T_J = 125 °C		0.0116	0.014	
Forward Transconductance[a]	g_{fs}	V_{DS} = 15 V, I_D = 30 A		55		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 30 V, f = 1 MHz		3528		pF
Output Capacitance	C_{oss}			470		
Reverse Transfer Capacitance	C_{rss}			178		
Total Gate Charge[c]	Q_g	V_{DS} = 38 V, V_{GS} = 10 V, I_D = 15 A		58	90	nC
Gate-Source Charge[c]	Q_{gs}			21		
Gate-Drain Charge[c]	Q_{gd}			16		
Gate Resistance	R_g	f = 1 MHz		1.8	3.5	Ω
Turn-On Delay Time[c]	$t_{d(on)}$	V_{DD} = 38 V, R_L = 3.1 Ω, I_D ≅ 12.5 A, V_{GEN} = 10 V, R_g = 1 Ω		21	35	ns
Rise Time[c]	t_r			15	25	
Turn-Off Delay Time[c]	$t_{d(off)}$			32	55	
Fall Time[c]	t_f			10	20	
Source-Drain Diode Ratings and Characteristics T_C = 25 °C[b]						
Continuous Current	I_S				83	A
Pulsed Current	I_{SM}				200	
Forward Voltage[a]	V_{SD}	I_F = 30 A, V_{GS} = 0 V		0.85	1.5	V
Reverse Recovery Time	t_{rr}	I_F = 75 A, di/dt = 100 A/µs		61	100	ns
Peak Reverse Recovery Current	$I_{RM(REC)}$			2.7	4.5	A
Reverse Recovery Charge	Q_{rr}			83	140	nC

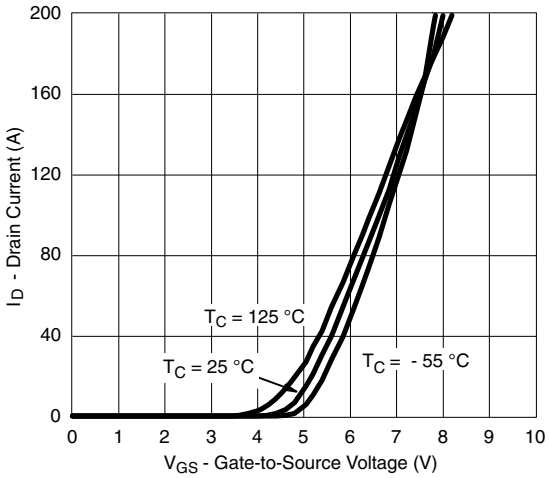
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

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.

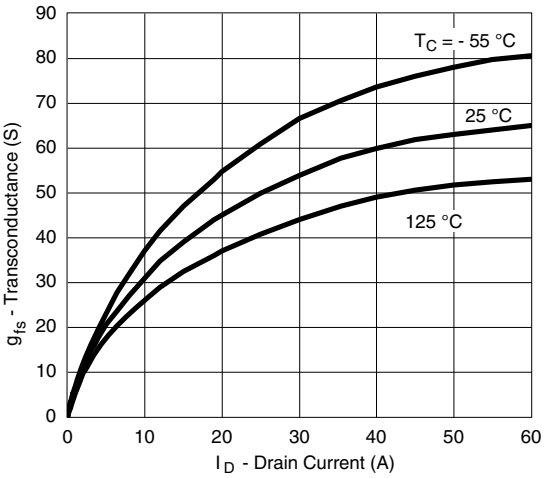
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



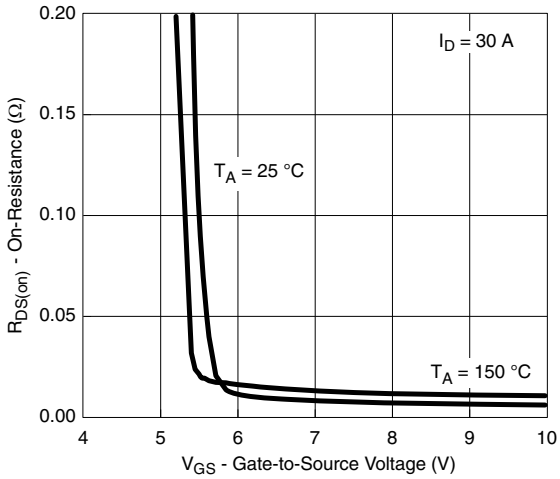
Output Characteristics



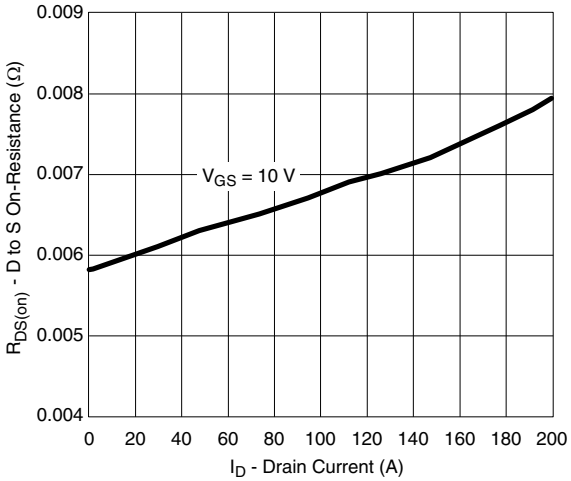
Transfer Characteristics



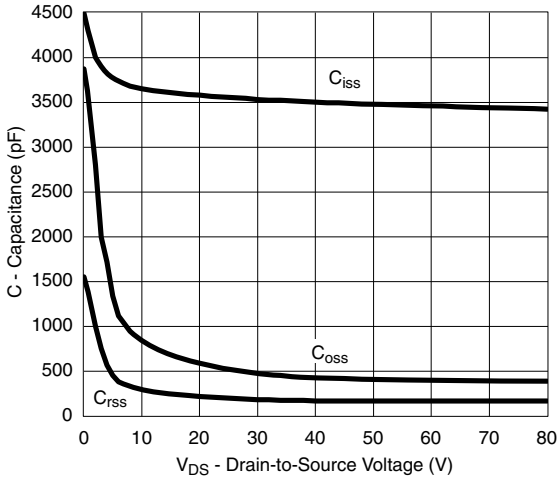
Transconductance



On-Resistance vs. Gate-to-Source Voltage vs.Temperature

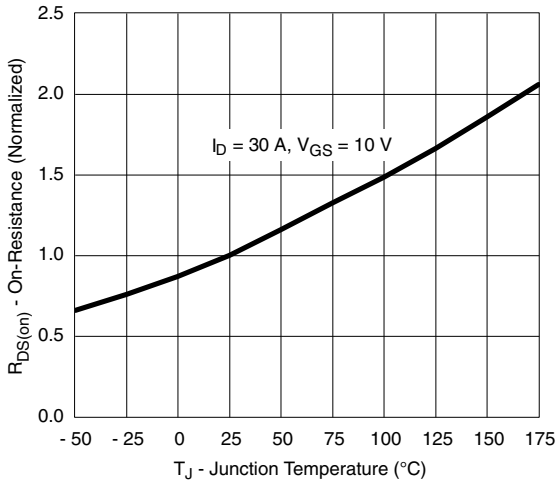


On-Resistance vs. Drain Current

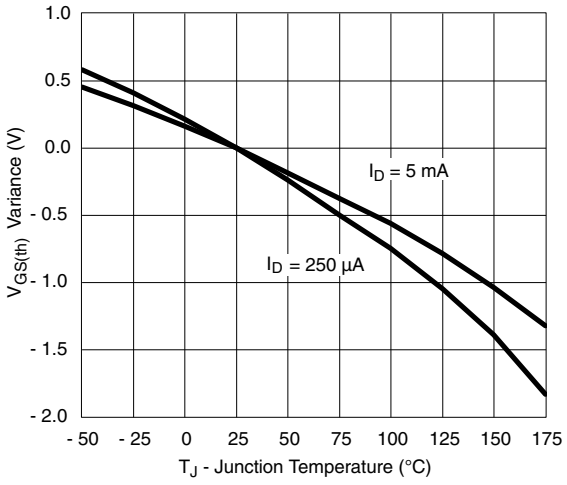


Capacitance

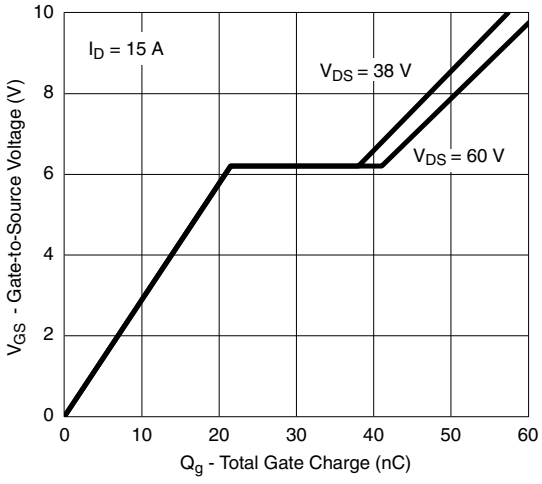
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



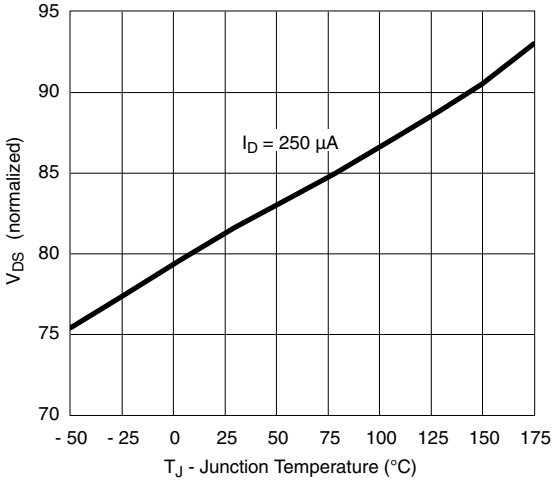
On-Resistance vs. Junction Temperature



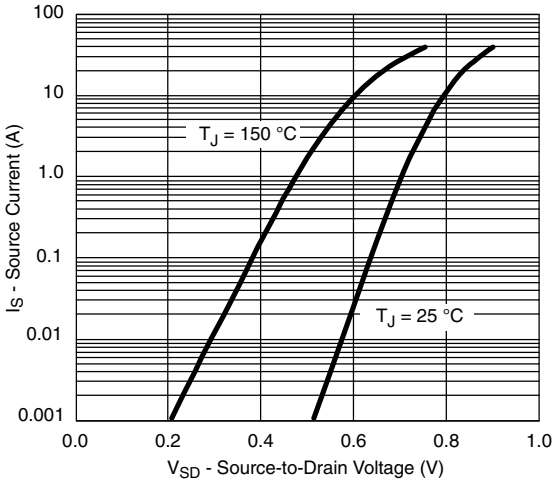
Threshold Voltage



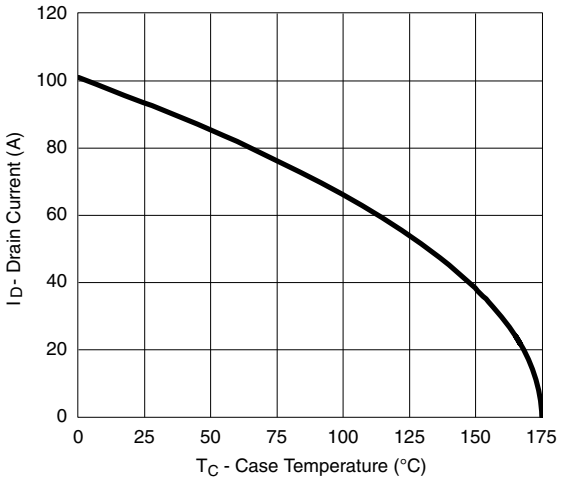
Gate Charge



Drain Source Breakdown vs. Junction Temperature

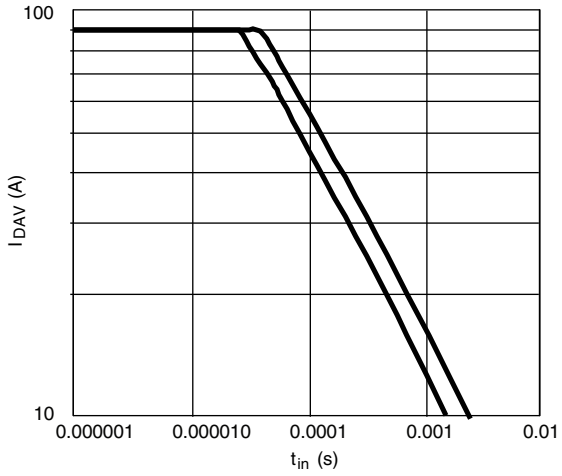


Source-Drain Diode Forward Voltage

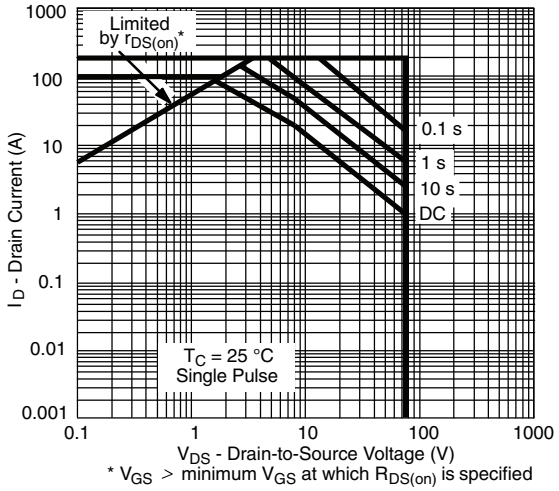


Maximum Drain Current vs. Case Temperature

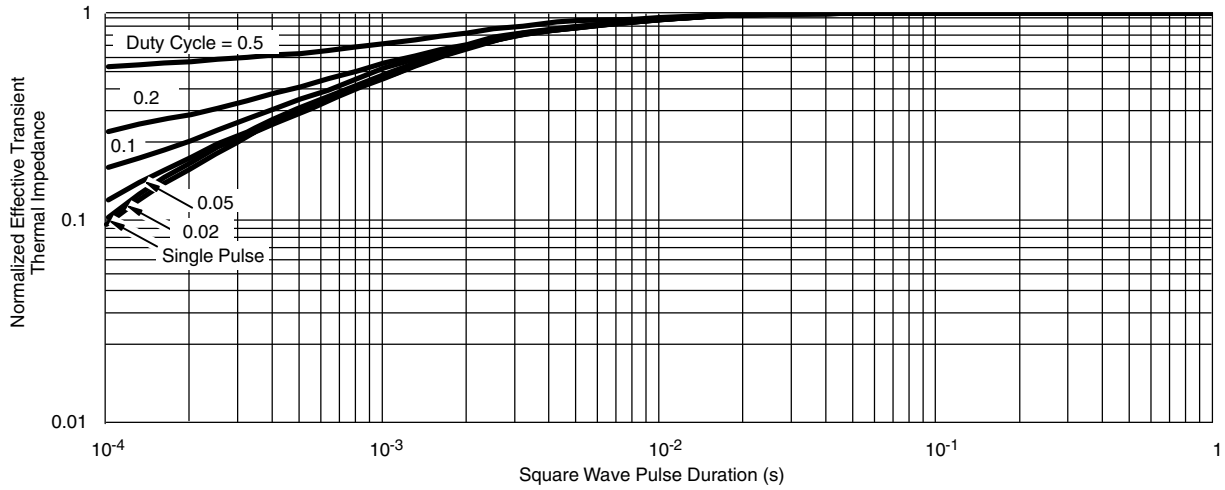
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Single Pulse Avalanche Current Capability vs. Time



Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

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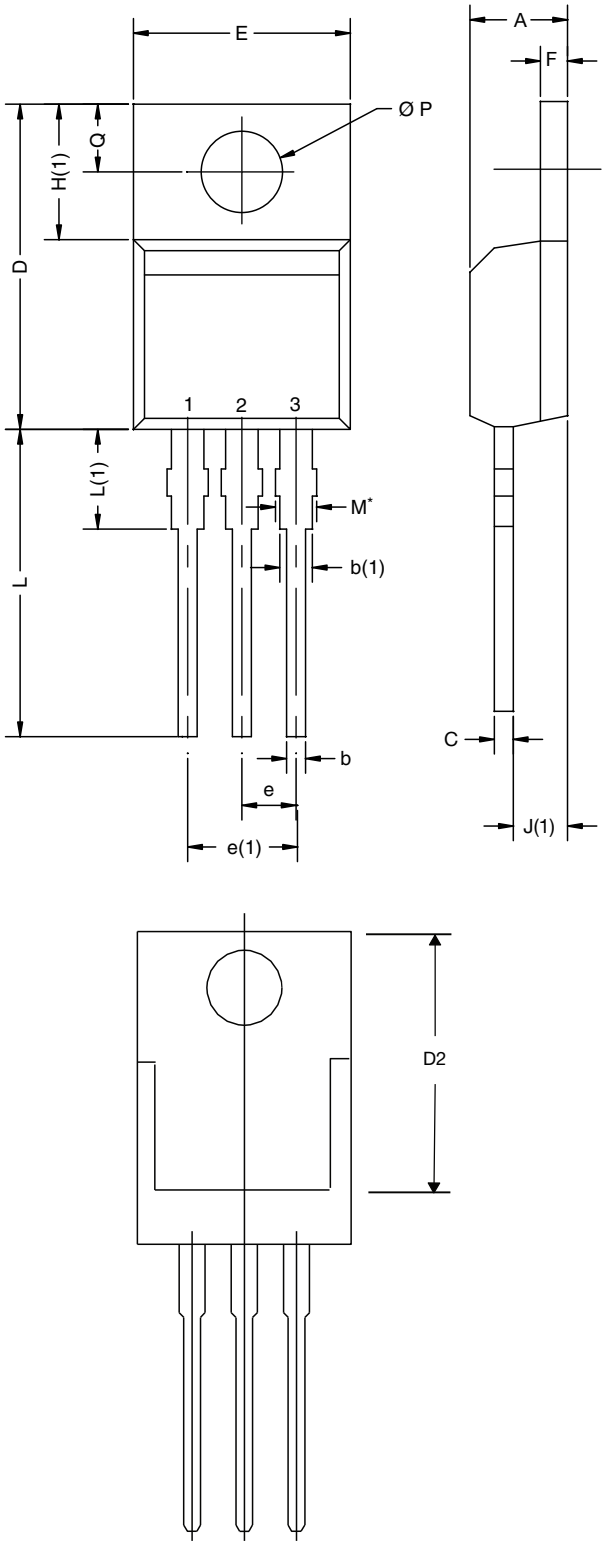

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.25	4.65	0.167	0.183
b	0.69	1.01	0.027	0.040
b(1)	1.20	1.73	0.047	0.068
c	0.36	0.61	0.014	0.024
D	14.85	15.49	0.585	0.610
D2	12.19	12.70	0.480	0.500
E	10.04	10.51	0.395	0.414
e	2.41	2.67	0.095	0.105
e(1)	4.88	5.28	0.192	0.208
F	1.14	1.40	0.045	0.055
H(1)	6.09	6.48	0.240	0.255
J(1)	2.41	2.92	0.095	0.115
L	13.35	14.02	0.526	0.552
L(1)	3.32	3.82	0.131	0.150
Ø P	3.54	3.94	0.139	0.155
Q	2.60	3.00	0.102	0.118
ECN: T14-0413-Rev. P, 16-Jun-14 DWG: 5471				

Note

* M = 1.32 mm to 1.62 mm (dimension including protrusion) Heatsink hole for HVM

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