



**THE DATASHEET OF  
SUM110P08-11L-E3**



## P-Channel 80 V (D-S) MOSFET

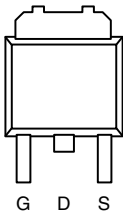
### PRODUCT SUMMARY

$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A) <sup>b</sup>	$Q_g$ (Typ)
- 80	0.0112 at $V_{GS} = - 10$ V	- 110	85 nC
	0.0145 at $V_{GS} = - 4.5$ V	- 109	

### FEATURES

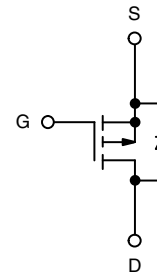
- TrenchFET<sup>®</sup> Power MOSFET
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

**TO-263**


Top View

Drain Connected to Tab

**Ordering Information:** SUM110P08-11L-E3 (Lead (Pb)-free)


P-Channel MOSFET

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25$ °C, unless otherwise noted)

Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	$V_{DS}$	- 80	V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	$T_C = 25$ °C	- 110 <sup>a</sup>	
		$T_C = 125$ °C	- 71	
		$T_A = 25$ °C	- 23.5 <sup>b, c</sup>	
		$T_A = 125$ °C	- 13.6 <sup>b, c</sup>	
Pulsed Drain Current	$I_{DM}$	- 120	A	
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25$ °C		- 110
		$T_A = 25$ °C		- 9 <sup>b, c</sup>
Avalanche Current	$I_{AS}$	- 75	mJ	
Single-Pulse Avalanche Energy	$E_{AS}$	281		
Maximum Power Dissipation	$P_D$	$T_C = 25$ °C	375	
		$T_C = 125$ °C	125	
		$T_A = 25$ °C	13.6 <sup>b, c</sup>	
		$T_A = 125$ °C	4.5 <sup>b, c</sup>	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C	

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient <sup>b, d</sup>	$R_{thJA}$	8	11	°C/W
Maximum Junction-to-Case (Drain)	$R_{thJC}$	0.33	0.4	

Notes:

a. Package limited.

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

 c.  $t = 10$  s.

d. Maximum under steady state conditions is 40 °C/W.

SPECIFICATIONS ( $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	- 80			V
$V_{DS}$ Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -1\text{ }\mu\text{A}$		- 85		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	- 1		- 3	V
Gate-Source Leakage	$I_{GSS}$	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}$			- 1	$\mu\text{A}$
		$V_{DS} = -80\text{ V}, V_{GS} = 0\text{ V}, T_J = 175\text{ }^\circ\text{C}$			- 500	
On-State Drain Current <sup>a</sup>	$I_{D(on)}$	$V_{DS} \geq 10\text{ V}, V_{GS} = -10\text{ V}$	- 120			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -20\text{ A}$		0.0093	0.0112	$\Omega$
		$V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$		0.0120	0.0145	
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = -15\text{ V}, I_D = -20\text{ A}$		85		S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = -40\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		10850		pF
Output Capacitance	$C_{oss}$			800		
Reverse Transfer Capacitance	$C_{rss}$			700		
Total Gate Charge	$Q_g$	$V_{DS} = -40\text{ V}, V_{GS} = -10\text{ V}, I_D = -110\text{ A}$		180	270	nC
				85	130	
Gate-Source Charge	$Q_{gs}$	$V_{DS} = -40\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -110\text{ A}$		35		
Gate-Drain Charge	$Q_{gd}$			42		
Gate Resistance	$R_g$	$f = 1\text{ MHz}$		3.6		$\Omega$
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -40\text{ V}, R_L = 0.36\text{ }\Omega$ $I_D \approx -110\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		20	30	ns
Rise Time	$t_r$			330	500	
Turn-Off Delay Time	$t_{d(off)}$			135	205	
Fall Time	$t_f$			550	825	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Source-Drain Diode Current	$I_S$	$T_C = 25\text{ }^\circ\text{C}$			- 110	A
Pulse Diode Forward Current <sup>a</sup>	$I_{SM}$				- 120	
Body Diode Voltage	$V_{SD}$	$I_S = -20\text{ A}$		- 0.8	- 1.5	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = -20\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		65	100	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$			135	205	nC
Reverse Recovery Fall Time	$t_a$			43		ns
Reverse Recovery Rise Time	$t_b$			22		

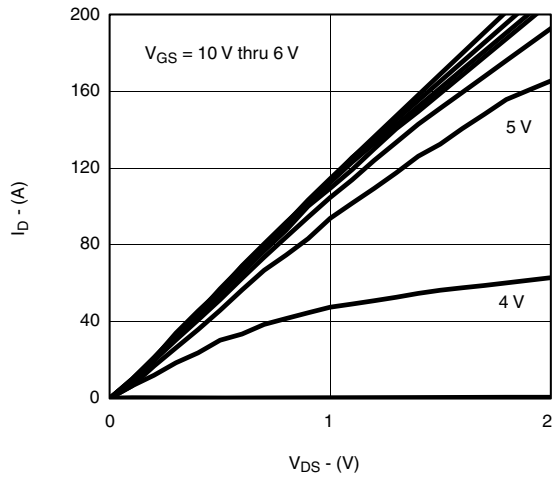
## Notes:

- a. Pulse test; pulse width  $\leq 300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

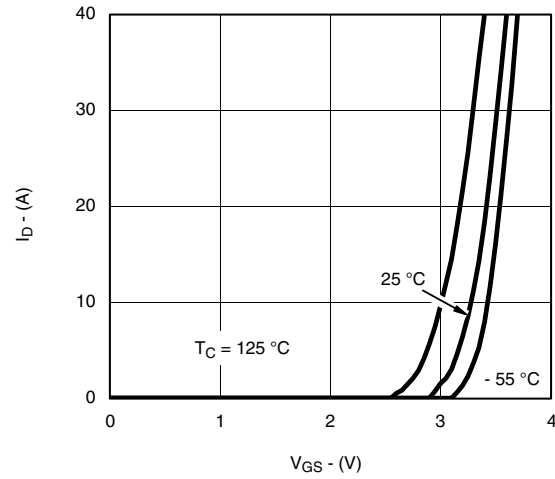
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



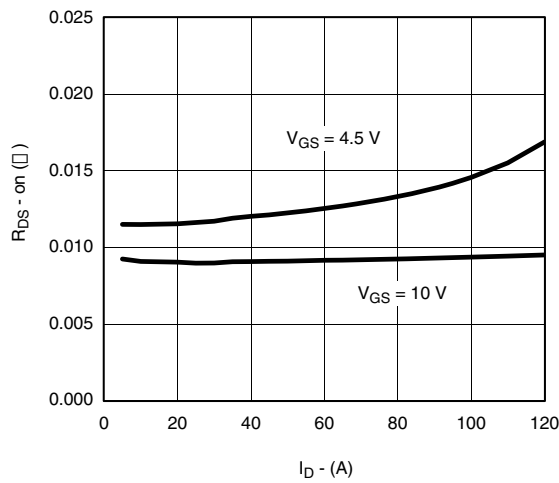
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



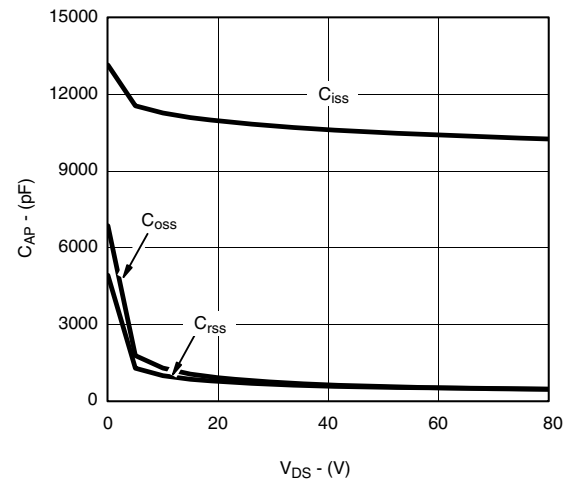
**Output Characteristics**



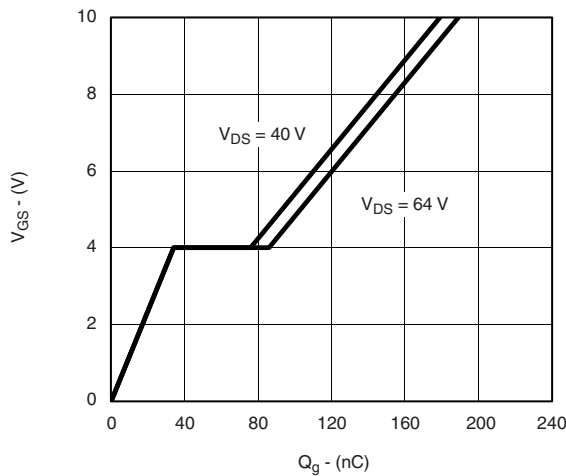
**Transfer Characteristics**



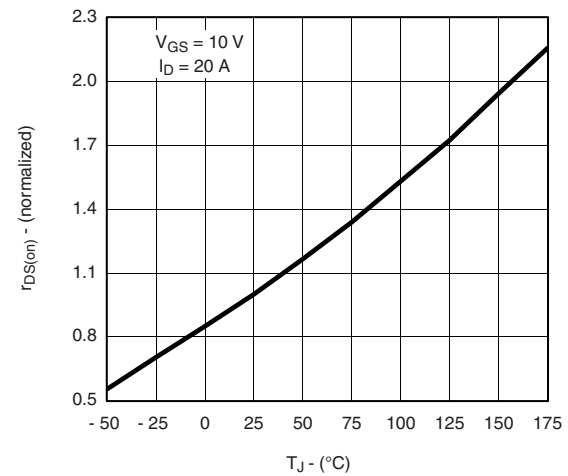
**On-Resistance vs. Drain Current**



**Capacitance**



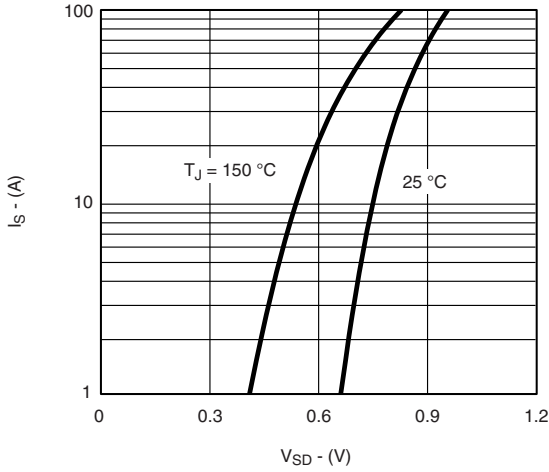
**Gate Charge**



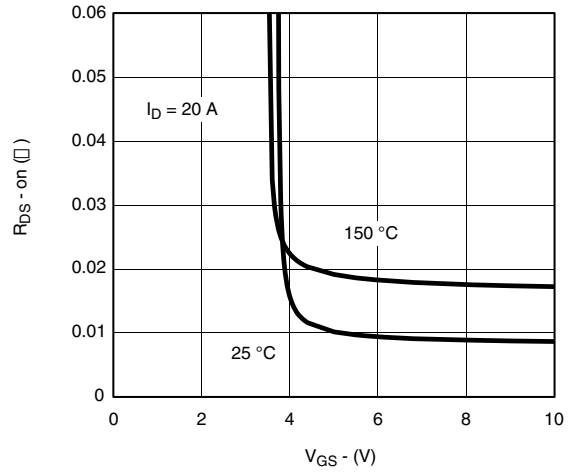
**On-Resistance vs. Junction Temperature**



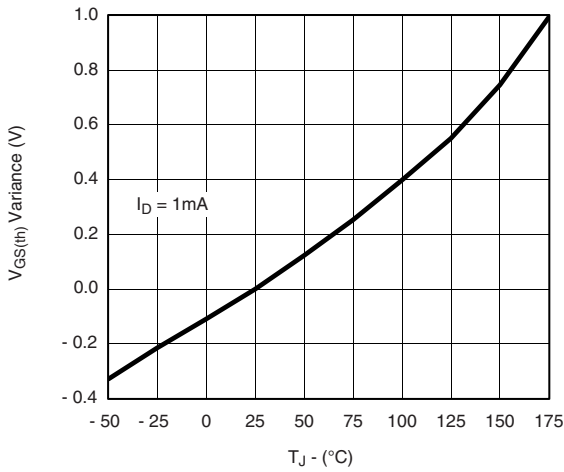
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



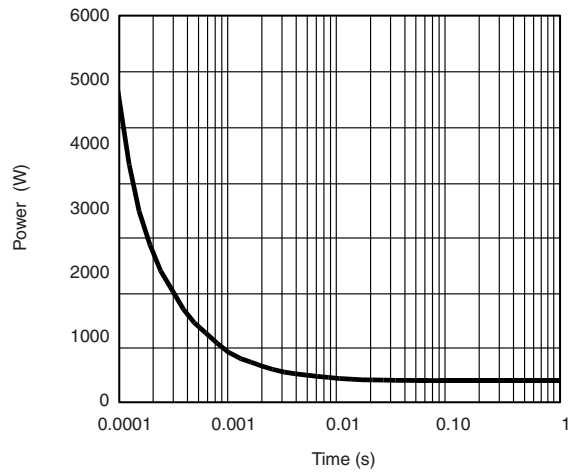
Source-Drain Diode Forward Voltage



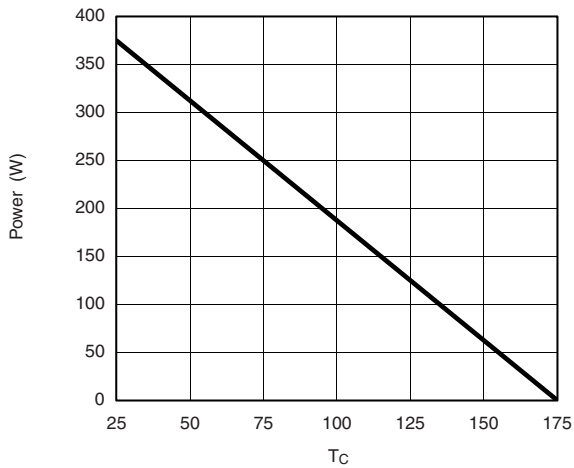
On-Resistance vs. Gate-to-Source Voltage



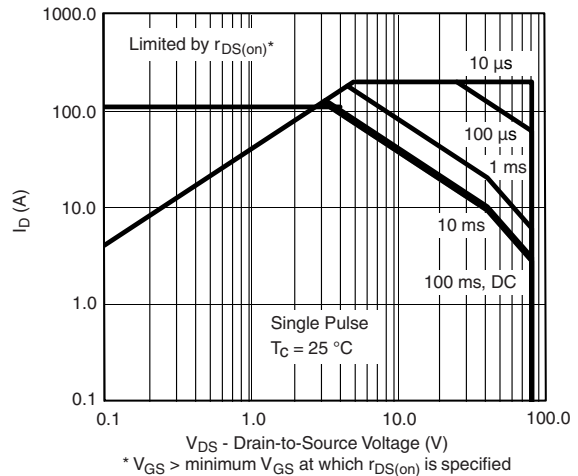
Threshold Voltage



Single Pulse Power, Junction-to-Case ( $T_C = 25\text{ }^\circ\text{C}$ )



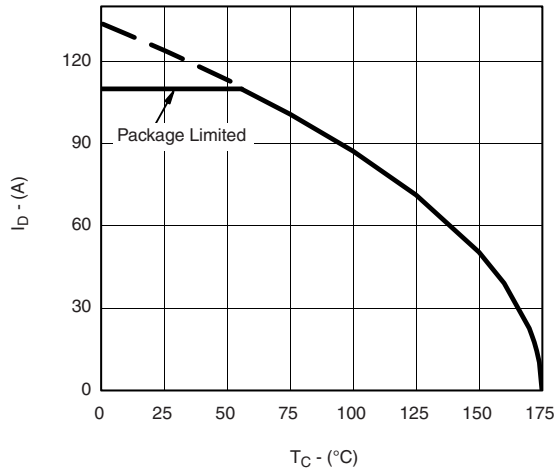
Power Derating, Junction-to-Case



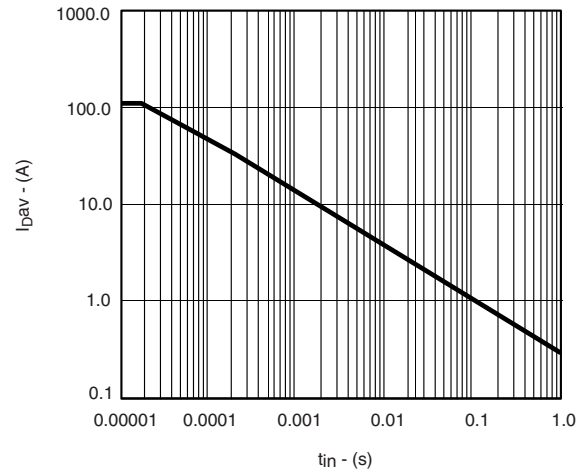
Safe Operating Area



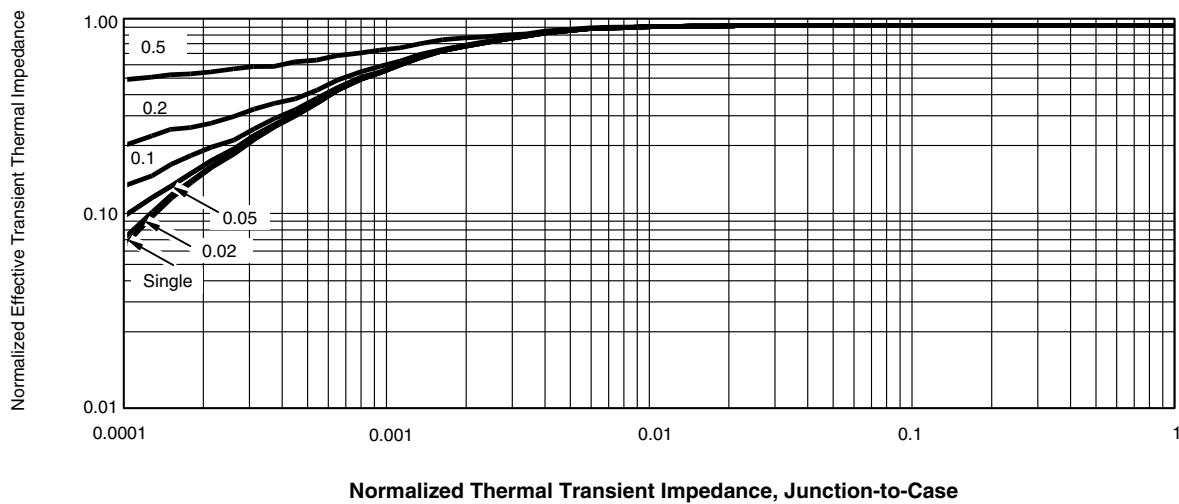
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)



**Max. Avalanche and Drain Current vs. Case Temperature**



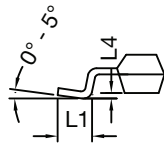
**Avalanche Current vs. Time**



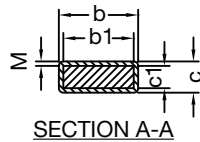
**Normalized Thermal Transient Impedance, Junction-to-Case**

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### TO-263 (D<sup>2</sup>PAK): 3-LEAD



DETAIL A (ROTATED 90°)



SECTION A-A

DIM.	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	0.160	0.190	4.064	4.826	
b	0.020	0.039	0.508	0.990	
b1	0.020	0.035	0.508	0.889	
b2	0.045	0.055	1.143	1.397	
c*	Thin lead	0.013	0.018	0.330	0.457
	Thick lead	0.023	0.028	0.584	0.711
c1	Thin lead	0.013	0.017	0.330	0.431
	Thick lead	0.023	0.027	0.584	0.685
c2	0.045	0.055	1.143	1.397	
D	0.340	0.380	8.636	9.652	
D1	0.220	0.240	5.588	6.096	
D2	0.038	0.042	0.965	1.067	
D3	0.045	0.055	1.143	1.397	
D4	0.044	0.052	1.118	1.321	
E	0.380	0.410	9.652	10.414	
E1	0.245	-	6.223	-	
E2	0.355	0.375	9.017	9.525	
E3	0.072	0.078	1.829	1.981	
e	0.100 BSC		2.54 BSC		
K	0.045	0.055	1.143	1.397	
L	0.575	0.625	14.605	15.875	
L1	0.090	0.110	2.286	2.794	
L2	0.040	0.055	1.016	1.397	
L3	0.050	0.070	1.270	1.778	
L4	0.010 BSC		0.254 BSC		
M	-	0.002	-	0.050	
ECN: T13-0707-Rev. K, 30-Sep-13					
DWG: 5843					

**Notes**

- Plane B includes maximum features of heat sink tab and plastic.
- No more than 25 % of L1 can fall above seating plane by max. 8 mils.
- Pin-to-pin coplanarity max. 4 mils.
- \*: Thin lead is for SUB, SYB.  
Thick lead is for SUM, SYM, SQM.
- Use inches as the primary measurement.
- This feature is for thick lead.

**RECOMMENDED MINIMUM PADS FOR D<sup>2</sup>PAK: 3-Lead**



Recommended Minimum Pads  
Dimensions in Inches/(mm)

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