SI4431DY-T1-E3-VB Datasheet

P-Channel 30-V (D-S) MOSFET

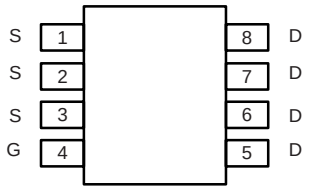
PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
- 30	0.033 at V_{GS} = - 10 V	- 5.8
	0.043 at V_{GS} = - 6 V	- 5.0
	0.056 at V_{GS} = - 4.5 V	- 4.4

FEATURES

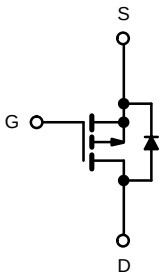
- **Halogen-free According to IEC 61249-2-21 Definition**
- Trench Power MOSFET
- Compliant to RoHS Directive 2002/95/EC

Pb-free
RoHS COMPLIANT
HALOGEN FREE Available

SO-8



Top View



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS T_A = 25 °C, unless otherwise noted					
Parameter		**Symbol**	**10 s**	**Steady State**	**Unit**
Drain-Source Voltage		V_{DS}	- 30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150 °C)[a]	T_A = 25 °C	I_D	- 5.8	- 4.1	A
	T_A = 70 °C		- 4.6	- 3.2	
Pulsed Drain Current		I_{DM}	- 30		
Continuous Source Current (Diode Conduction)[a]		I_S	- 2.3	- 1.1	
Maximum Power Dissipation[a]	T_A = 25 °C	P_D	2.5	1.3	W
	T_A = 70 °C		1.6	0.8	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150		°C

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a]	t ≤ 10 s	R_{thJA}	40	50	°C/W
	Steady State		70	95	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	24	30	

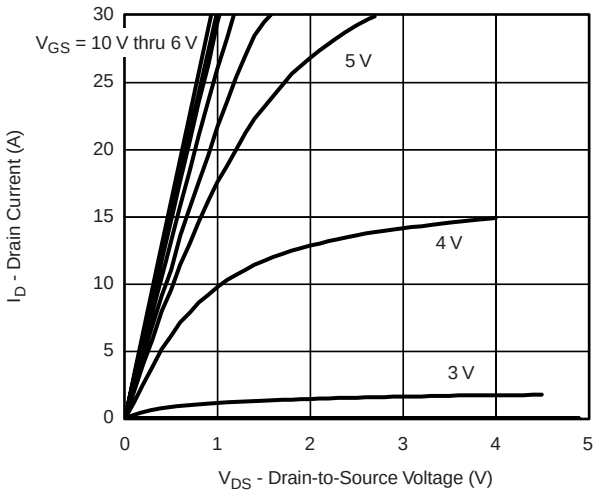
Notes:
a. Surface Mounted on 1" x 1" FR4 board.

SPECIFICATIONS T_J = 25 °C, unless otherwise noted						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.[a]**	**Max.**	**Unit**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 0.7		- 2.0	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = - 30 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 30 V, V_{GS} = 0 V, T_J = 70 °C			- 5	
On-State Drain Current[b]	$I_{D(on)}$	$V_{DS} \leq$ - 10 V, V_{GS} = - 10 V	- 20			A
		$V_{DS} \leq$ - 5 V, V_{GS} = - 4.5 V	- 5			
Drain-Source On-State Resistance[b]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 5.8 A		0.033		Ω
		V_{GS} = - 6 V, I_D = - 5 A		0.043		
		V_{GS} = - 4.5 V, I_D = - 4.4 A		0.056		
Forward Transconductance[b]	g_{fs}	V_{DS} = - 15 V, I_D = - 5.8 A		13		S
Diode Forward Voltage[b]	V_{SD}	I_S = - 2.3 A, V_{GS} = 0 V		- 0.8	- 1.1	V
Dynamic[a]						
Total Gate Charge	Q_g	V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 3.5 A		16	24	nC
Gate-Source Charge	Q_{gs}			2.3		
Gate-Drain Charge	Q_{gd}			4.5		
Gate Resistance	R_g			8.8		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 15 Ω $I_D \cong$ - 1 A, V_{GEN} = - 10 V, R_g = 6 Ω		14	25	ns
Rise Time	t_r			14	25	
Turn-Off Delay Time	$t_{d(off)}$			42	70	
Fall Time	t_f			30	50	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = - 1.2 A, dI/dt = 100 A/µs		30	60	

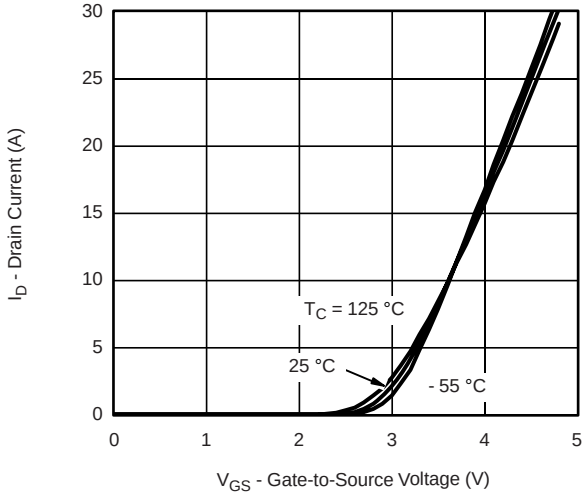
Notes:
a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

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.

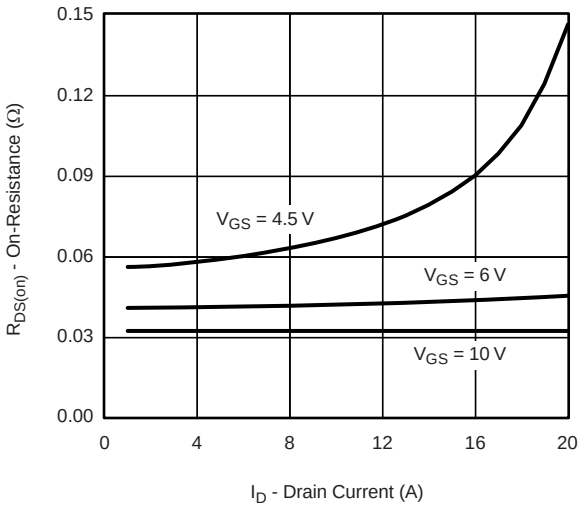
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



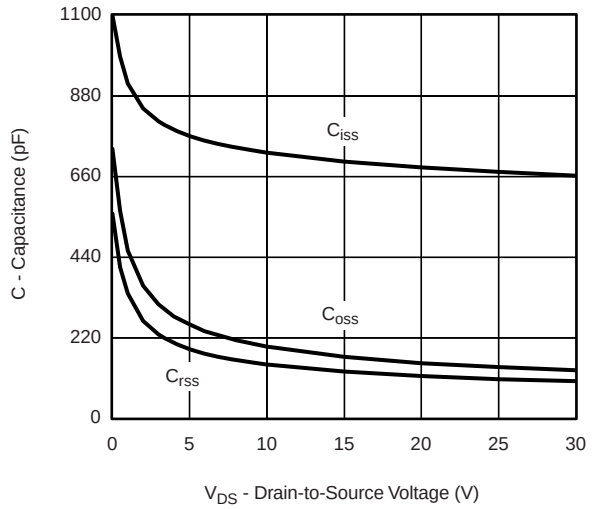
Output Characteristics



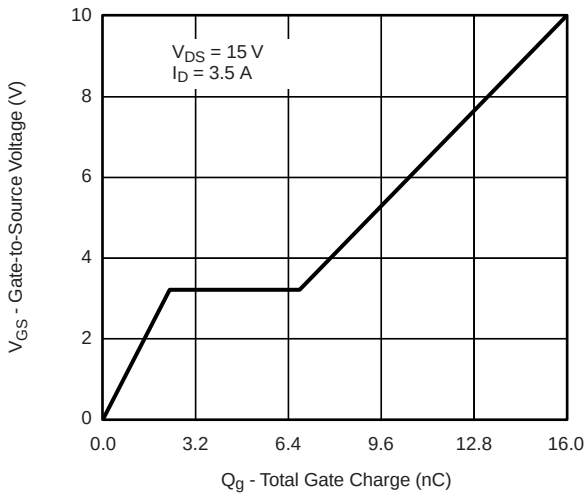
Transfer Characteristics



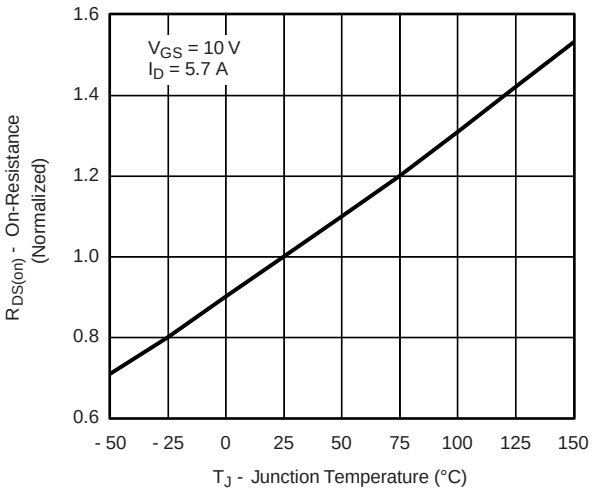
On-Resistance vs. Drain Current



Capacitance

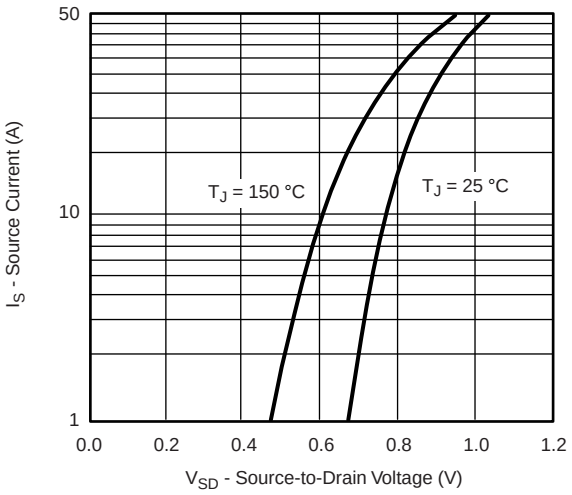


Gate Charge

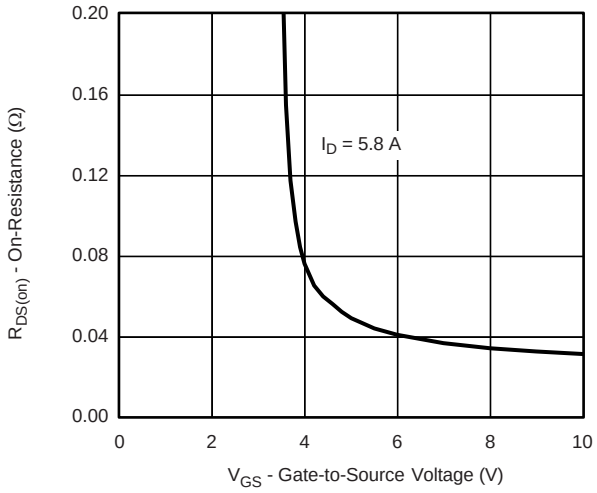


On-Resistance vs. Junction Temperature

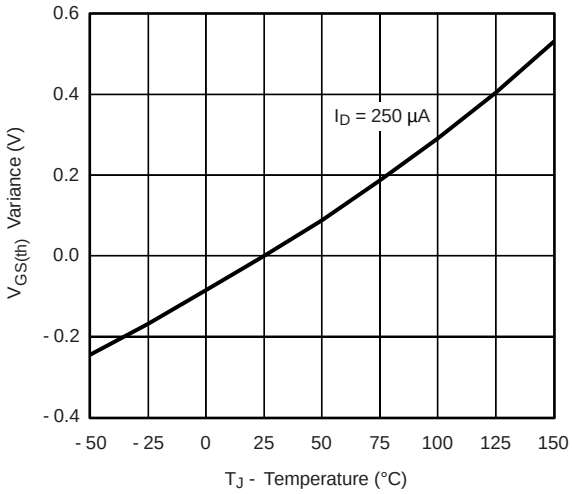
TYPICAL CHARACTERISTICS 25 C, unless otherwise noted



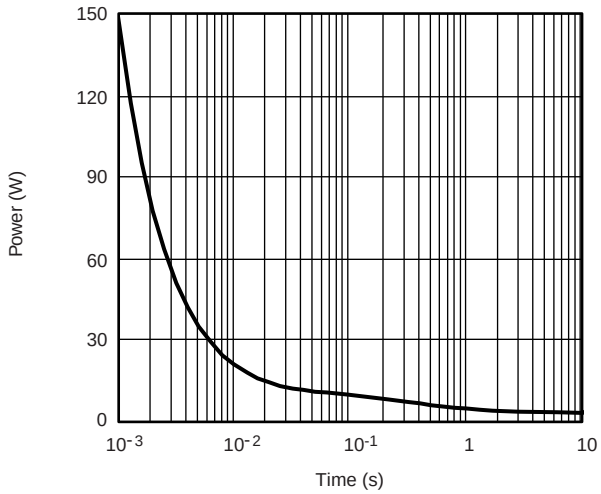
Source-Drain Diode Forward Voltage



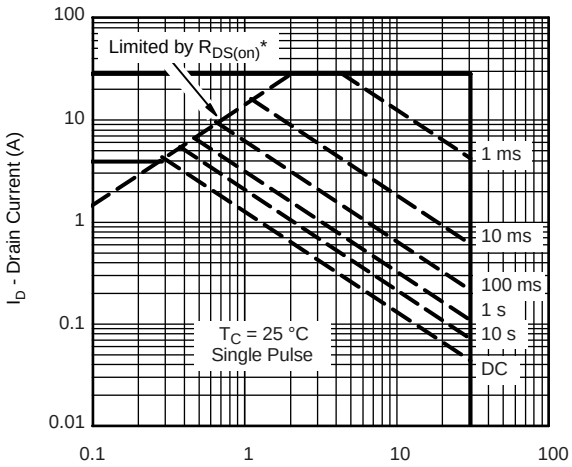
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



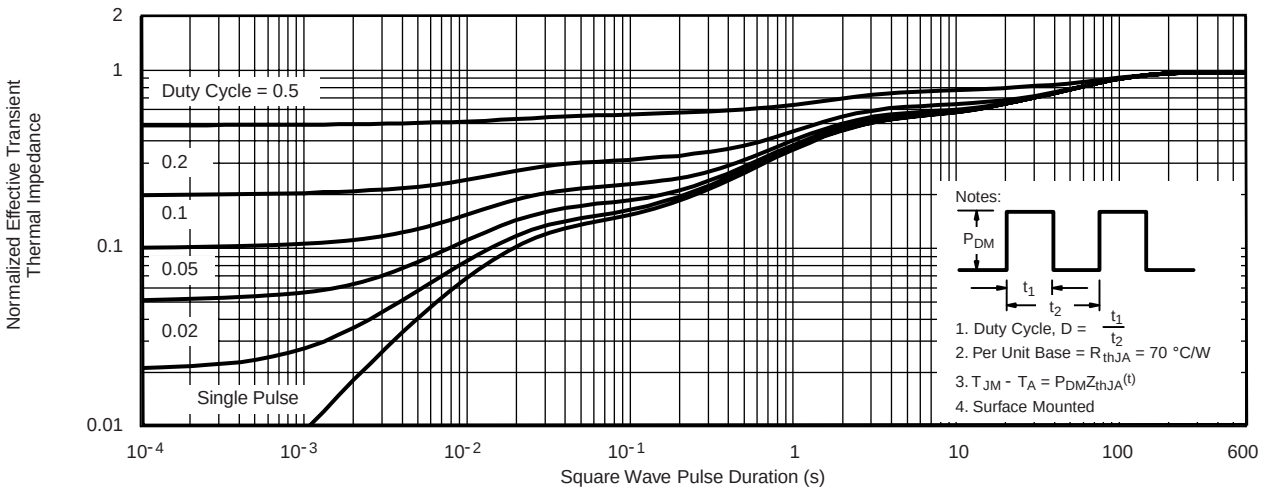
Single Pulse Power, Junction-to-Ambient



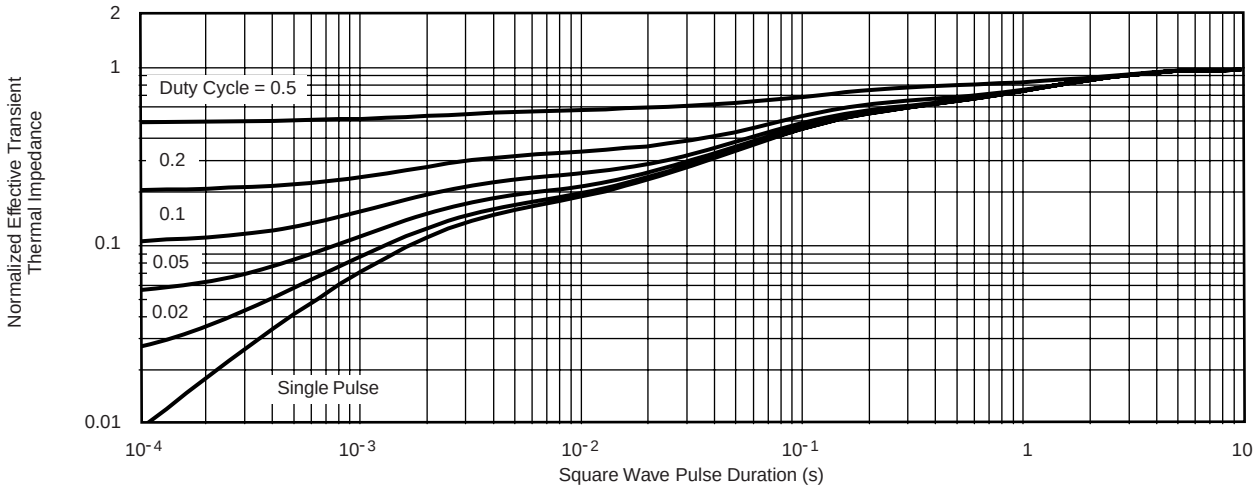
* V_{DS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Foot

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

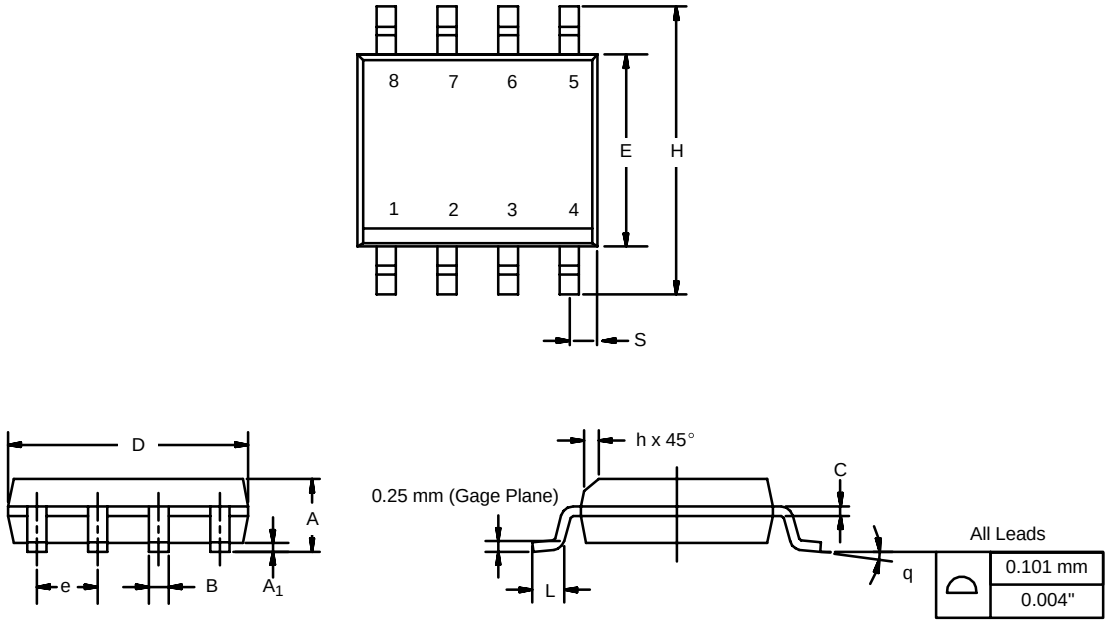


Normalized Thermal Transient Impedance, Junction-to-Ambient



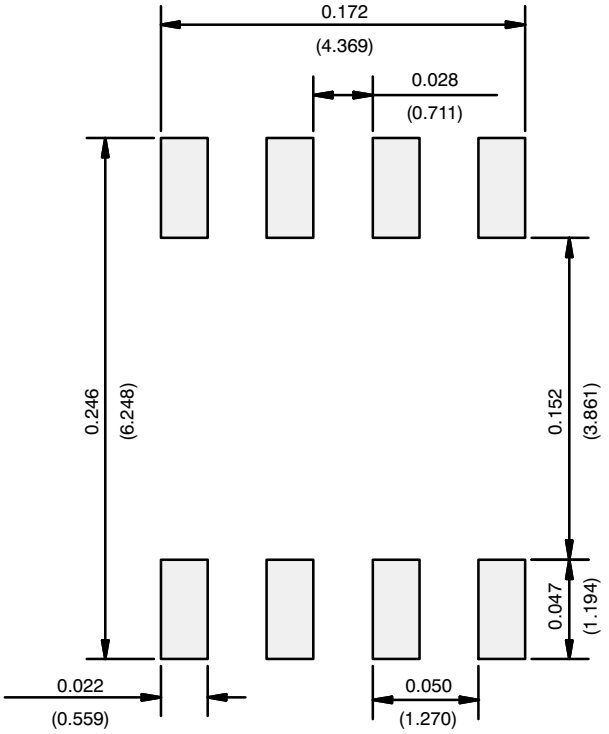
Normalized Thermal Transient Impedance, Junction-to-Foot

SOIC (NARROW): 8-LEAD
JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A_1	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026
ECN: C-06527-Rev. I, 11-Sep-06 DWG: 5498				

RECOMMENDED MINIMUM PADS FOR SO-8



Recommended Minimum Pads
Dimensions in Inches/(mm)

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