

SM4307PSKPC-TRG-VB Datasheet

P-Channel 30 V (D-S) MOSFET

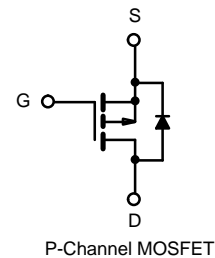
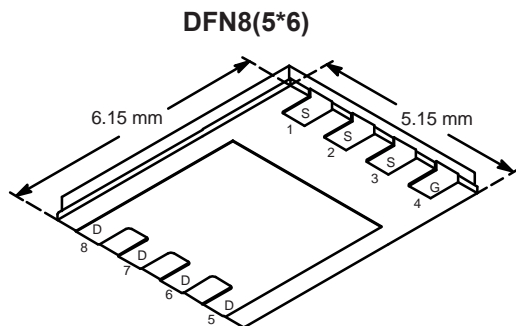
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω) Max.	I _D ^a	Q _g (Typ.)
- 30	0.0080 at V _{GS} = - 10 V	- 60	66 nC
	0.0090 at V _{GS} = - 6 V	- 53	
	0.0120 at V _{GS} = - 4.5 V	- 50	

FEATURES

- Extended V_{GS} range (± 25 V) for adaptor switch applications
- Extremely low R_{DS(on)}
- TrenchFET® Power MOSFET
- 100 % R_g and UIS Tested
- Typical ESD Performance: 4000 V (HBM)



RoHS
COMPLIANT



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter	Symbol	Limit	Unit	
Drain-Source Voltage	V _{DS}	- 30	V	
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	- 60	A
		T _C = 70 °C	- 50.7	
		T _A = 25 °C	- 47.3	
		T _A = 70 °C	- 43.9 ^{b, c}	
Pulsed Drain Current (t = 300 μs)	I _{DM}	- 150		
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C	- 58 ^{b, c}	
		T _A = 25 °C	- 46 ^{b, c}	
Single Pulse Avalanche Current	I _{AS}	- 40		
Single Pulse Avalanche Energy	E _{AS}	80	mJ	
Maximum Power Dissipation	P _D	T _C = 25 °C	75	W
		T _C = 70 °C	40	
		T _A = 25 °C	3.1 ^{b, c}	
		T _A = 70 °C	2 ^{b, c}	
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 ^{b, d}	R _{thJA}	33	40	°C/W
Maximum Junction-to-Foot (Drain)	R _{thJF}	15	17	

Notes:

- Based on T_C = 25 °C.
- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- Maximum under steady state conditions is 90 °C/W.

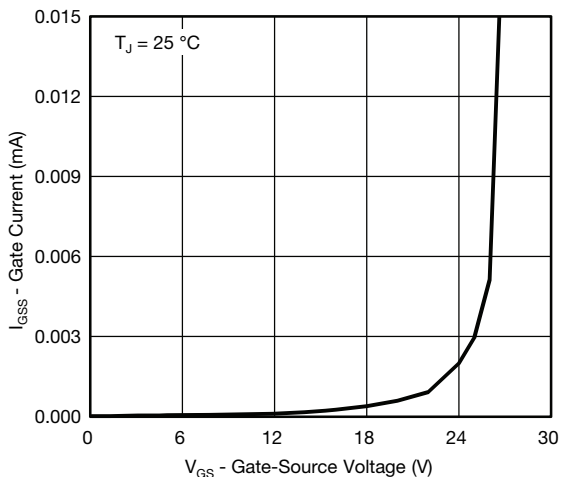
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)								
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit		
Static								
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-30			V		
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-24		mV/ $^\circ\text{C}$		
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			6				
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1.0		-2.5	V		
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 25\text{ V}$			± 150	μA		
		$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 15			
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}$			-1			
		$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10			
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	-20			A		
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -13\text{ A}$		0.0080		Ω		
		$V_{GS} = -6\text{ V}, I_D = -10\text{ A}$		0.0090				
		$V_{GS} = -4.5\text{ V}, I_D = -8\text{ A}$		0.0120				
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -13\text{ A}$		44		S		
Dynamic^b								
Input Capacitance	C_{iss}	$V_{DS} = -15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		4620		μF		
Output Capacitance	C_{oss}			880				
Reverse Transfer Capacitance	C_{rss}			820				
Total Gate Charge	Q_g	$V_{DS} = -15\text{ V}, V_{GS} = -10\text{ V}, I_D = -17.3\text{ A}$		102	153	nC		
				66	80			
Gate-Source Charge	Q_{gs}	$V_{DS} = -15\text{ V}, V_{GS} = -5\text{ V}, I_D = -17.3\text{ A}$		16				
Gate-Drain Charge	Q_{gd}			28				
Gate Resistance	R_g		$f = 1\text{ MHz}$	0.3	1.3		2.6	Ω
Turn-On Delay Time	$t_{d(on)}$		$V_{DD} = 0\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 1\text{ }\Omega$		70		105	ns
Rise Time	t_r			70	105			
Turn-Off Delay Time	$t_{d(off)}$			45	68			
Fall Time	t_f			27	41			
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong -10\text{ A}, V_{GEN} = -10\text{ V}, R_g = 1\text{ }\Omega$		18	30			
Rise Time	t_r			15	25			
Turn-Off Delay Time	$t_{d(off)}$			52	80			
Fall Time	t_f			14	25			
Drain-Source Body Diode Characteristics								
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			-5.8	A		
Pulse Diode Forward Current	I_{SM}				-60			
Body Diode Voltage	V_{SD}	$I_S = -10\text{ A}, V_{GS} = 0\text{ V}$		-0.78	-1.2	V		
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		35	53	ns		
Body Diode Reverse Recovery Charge	Q_{rr}			25	38	nC		
Reverse Recovery Fall Time	t_a			19		ns		
Reverse Recovery Rise Time	t_b			16				

Notes:

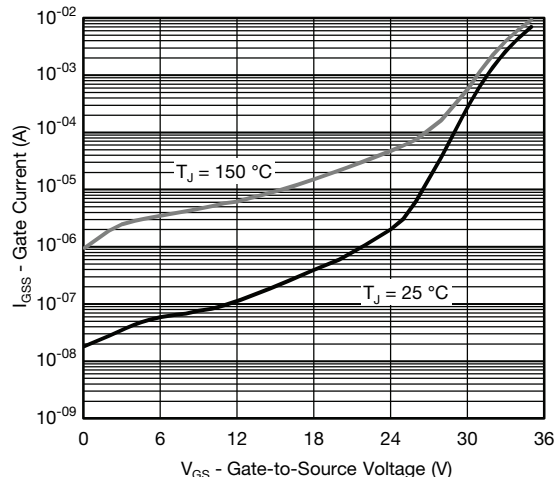
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
 b. Guaranteed by design, not subject to production testing.

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.

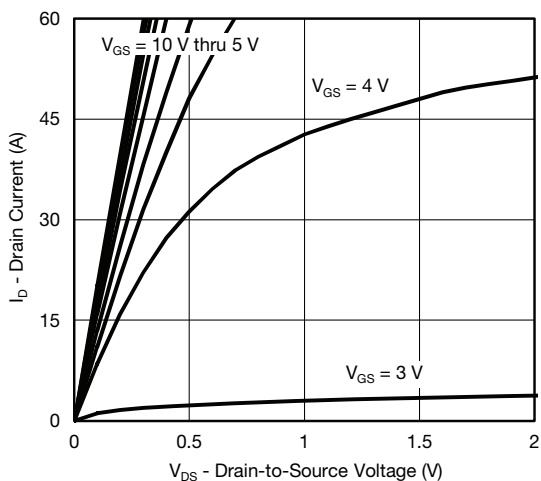
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



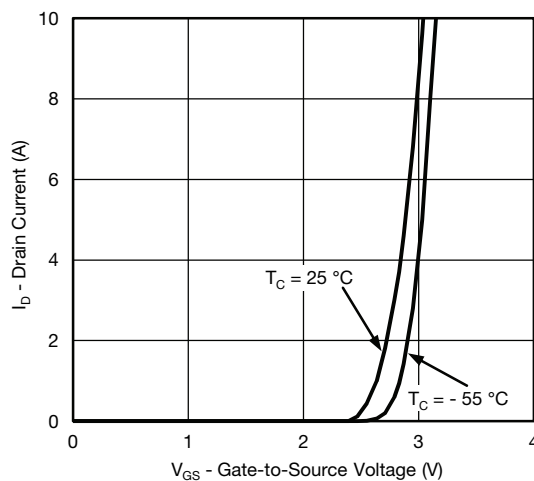
Gate Current vs. Gate-Source Voltage



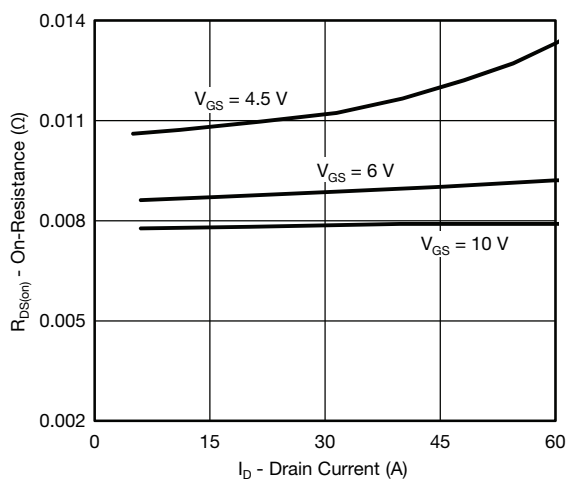
Gate Current vs. Gate-Source Voltage



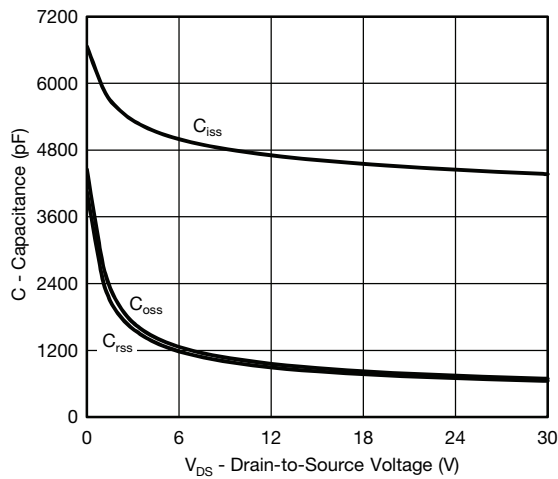
Output Characteristics



Transfer Characteristics

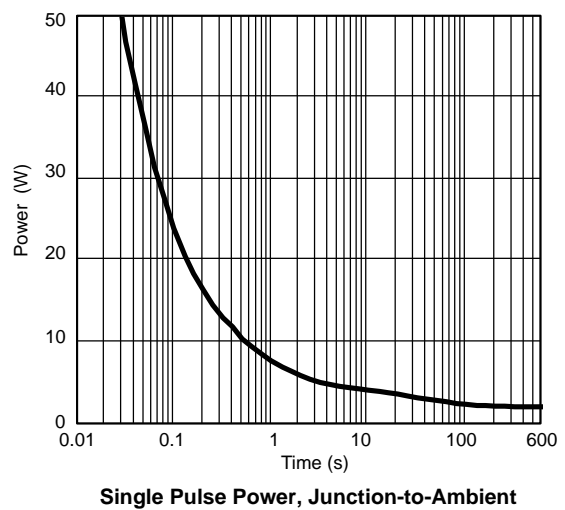
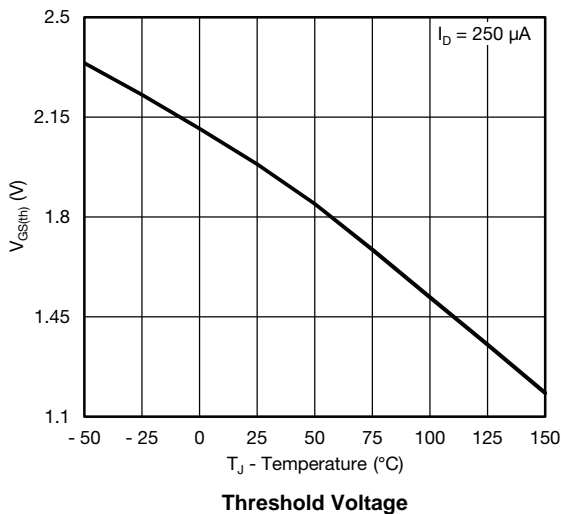
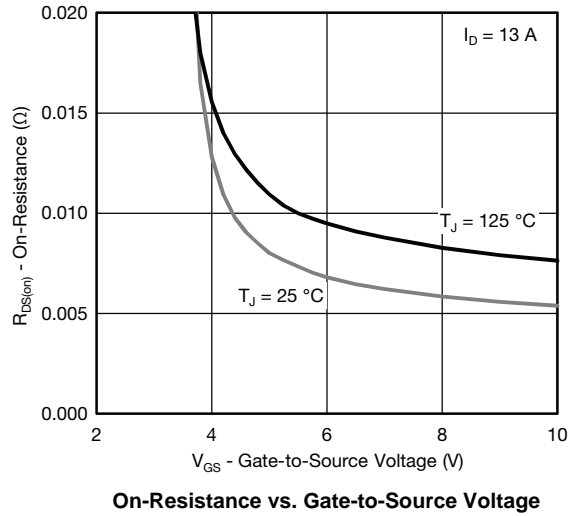
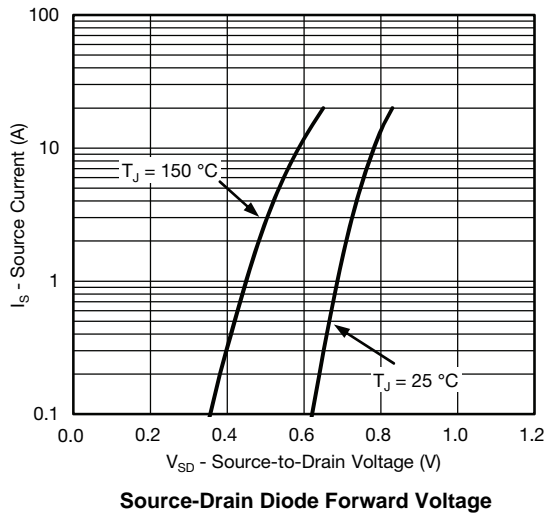
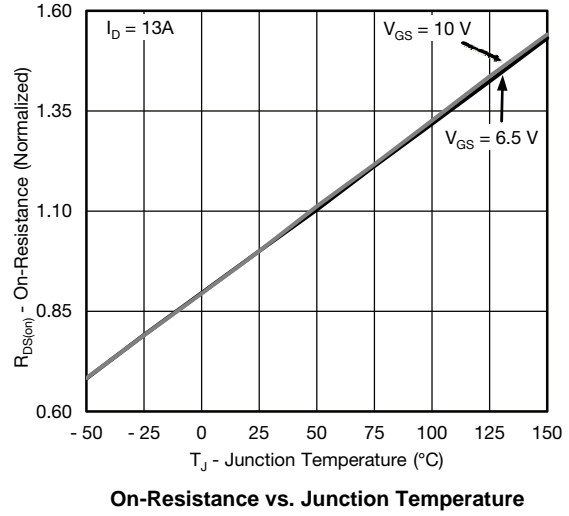
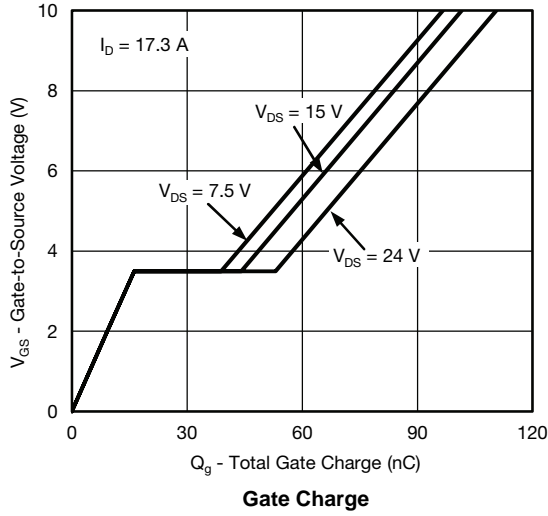


On-Resistance vs. Drain Current

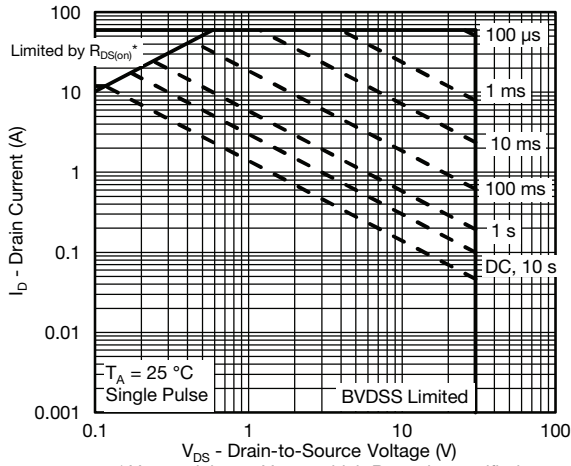


Capacitance

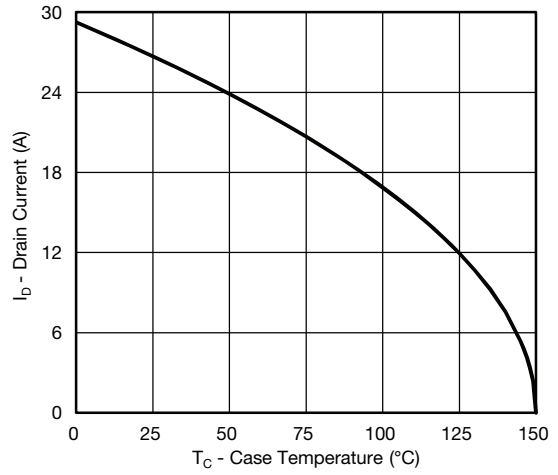
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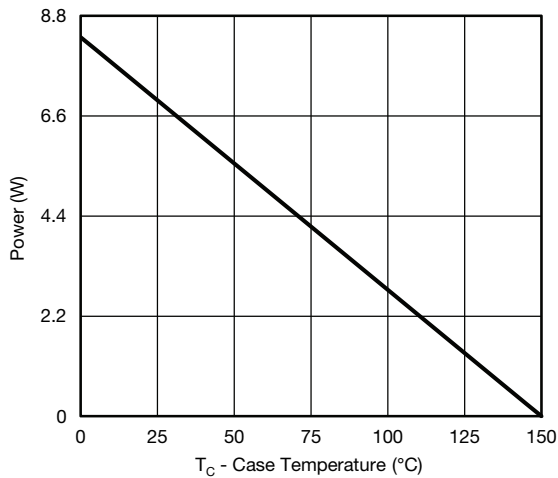
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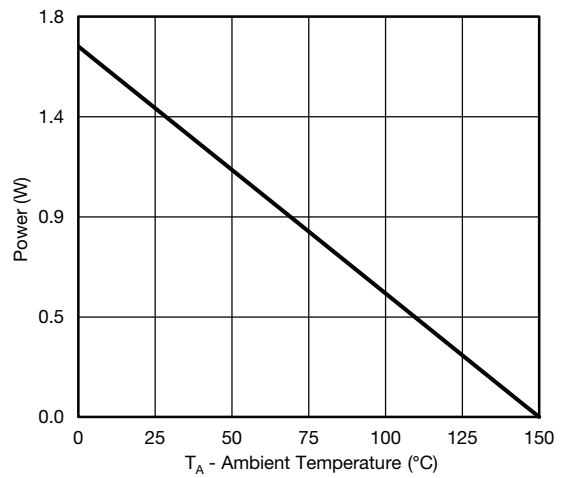
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified
Safe Operating Area, Junction-to-Ambient



Current Derating*



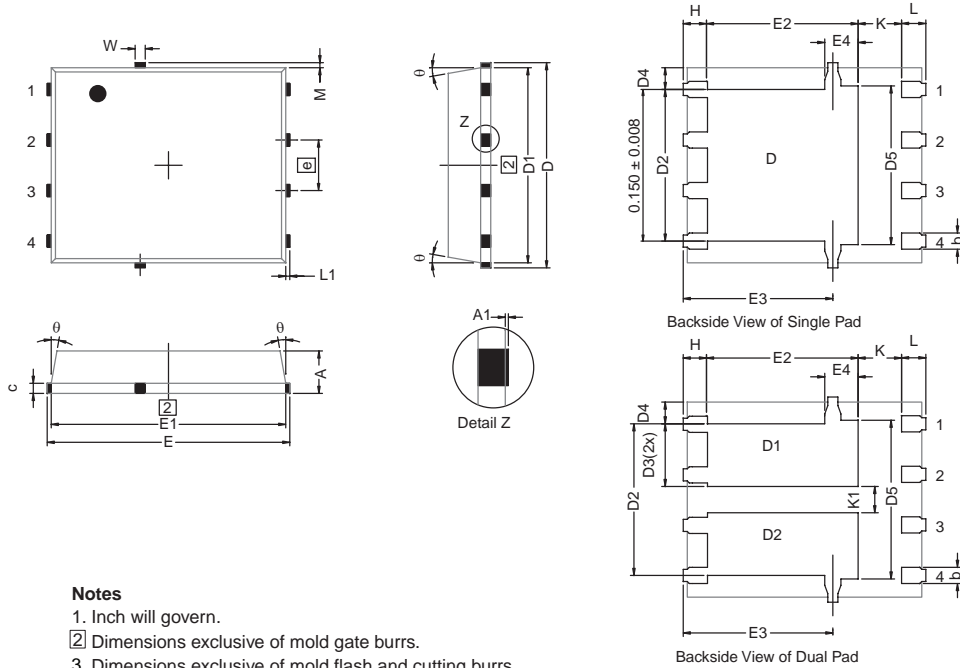
Power Junction-to-Foot



Power Junction-to-Ambient

* The power dissipation P_D is based on $T_{J(max.)} = 150^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

PowerPAK SO-8, (SINGLE/DUAL)



- Notes**
1. Inch will govern.
 2. Dimensions exclusive of mold gate burrs.
 3. Dimensions exclusive of mold flash and cutting burrs.

DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.97	1.04	1.12	0.038	0.041	0.044
A1	0.00	-	0.05	0.000	-	0.002
b	0.33	0.41	0.51	0.013	0.016	0.020
c	0.23	0.28	0.33	0.009	0.011	0.013
D	5.05	5.15	5.26	0.199	0.203	0.207
D1	4.80	4.90	5.00	0.189	0.193	0.197
D2	3.56	3.76	3.91	0.140	0.148	0.154
D3	1.32	1.50	1.68	0.052	0.059	0.066
D4	0.57 TYP.			0.0225 TYP.		
D5	3.98 TYP.			0.157 TYP.		
E	6.05	6.15	6.25	0.238	0.242	0.246
E1	5.79	5.89	5.99	0.228	0.232	0.236
E2	3.48	3.66	3.84	0.137	0.144	0.151
E3	3.68	3.78	3.91	0.145	0.149	0.154
E4	0.75 TYP.			0.030 TYP.		
Ⓢ	1.27 BSC			0.050 BSC		
K	1.27 TYP.			0.050 TYP.		
K1	0.56	-	-	0.022	-	-
H	0.51	0.61	0.71	0.020	0.024	0.028
L	0.51	0.61	0.71	0.020	0.024	0.028
L1	0.06	0.13	0.20	0.002	0.005	0.008
θ	0°	-	12°	0°	-	12°
W	0.15	0.25	0.36	0.006	0.010	0.014
M	0.125 TYP.			0.005 TYP.		

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DWG: 5881

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