

SPD08P06P-VB Datasheet

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

PRODUCT SUMMARY					
V _{DS} (V)	R_{DS(on)} (Ω)	I _D (A)	Q _g (Typ)		
- 60	0.061 at V _{GS} = - 10 V	- 30	10		
- 00	0.072 at V _{GS} = - 4.5 V	- 25	10		

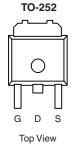
FEATURES

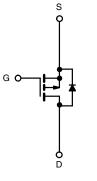
- Trench Power MOSFET
- 100 % UIS Tested

APPLICATIONS

Load Switch







P-Channel MOSFET

Parameter	Symbol	Limit	Unit		
Gate-Source Voltage	V _{GS}	± 20	V		
Continuous Drain Current ($T_1 = 175 \text{ °C}$)	T _C = 25 °C	1_	- 30		
Commutous Drain Current (1) = 175 C)	T _C = 100 °C	I _D	- 25	1	
Pulsed Drain Current	I _{DM}	- 30	А		
Continuing Source Current (Diode Conduction)	I _S	- 20			
Avalanche Current	I _{AS}	- 20	1		
Single Pulse Avalanche Energy	L = 0.1 mH	E _{AS}	7.2	mJ	
Maximum Dawar Dissinction	T _C = 25 °C	Р	34 ^a	W	
Maximum Power Dissipation	T _A = 25 °C	P _D	4 ^b		
Operating Junction and Storage Temperature Range		T _J , T _{stg}	- 55 to 175	°C	

THERMAL RESISTANCE RATINGS					
Parameter		Symbol	Typical	Maximum	Unit
hundling to Anching b	t ≤ 10 sec	D	20	25	
Junction-to-Ambient ^D	Steady State	R _{thJA}	62	75	°C/W
Junction-to-Case		R _{thJC}	5	6	

Notes:

a. See SOA curve for voltage derating.

b. Surface Mounted on 1" x 1" FR-4 boad.

$\begin{array}{ c c c c c } \hline Parameter & Symbol & Test Conditions & Min & Typ^8 & Max & Unit \\ \hline Static & & & & & & & & & & & & & & & & & & &$	SPECIFICATIONS $T_J = 25$	°C, unless	otherwise noted					
$\begin{array}{c c c c c c c } \hline Drain-Source Breakdown Voltage $V_{(BR)DSS}$ & V_{GS} = 0 V, I_{D} = -250 \ \mu A & -60 & & V \\ \hline Gate Threshold Voltage $V_{GS(th)}$ & V_{DS} = V_{GS}, I_{D} = -250 \ \mu A & -1.0 & -2.0 & -3.0 \\ \hline Gate-Body Leakage I_{GSS} & V_{DS} = 0 V, V_{GS} = 2 V & & \pm 100 & nA \\ \hline V_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 125 \ C & & -1.1 \\ \hline V_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 125 \ C & & -1.1 \\ \hline V_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 125 \ C & & -1.50 \\ \hline V_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 175 \ C & & -1.50 \\ \hline \end{array} \\ \hline \begin{array}{c} P_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 175 \ C & & -1.50 \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 175 \ C & & -1.50 \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{DS} = -60 V, V_{GS} = 0 V, T_{J} = 175 \ C & & 0.100 \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{DS} = -50 V, V_{GS} = -10 V & -10 & & A \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{DS} = -50 V, V_{GS} = -10 V & -10 & & A \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{OS} = -10 V, I_{D} = -5 A, T_{J} = 125 \ C & & 0.100 \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{CS} = -10 V, I_{D} = -5 A, T_{J} = 175 \ C & & 0.150 \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{OS} = -10 V, I_{D} = -5 A, T_{J} = 175 \ C & & 0.150 \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \begin{array}{c} P_{OS} = -10 V, I_{D} = -5 A & B & B \\ \hline \end{array} \\ \hline \begin{array}{c} P_{OS} = V_{OS} = -15 \ V, I_{D} = -5 A \\ \hline \end{array} \\ \hline $ \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline \end{array} \\ \hline	Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit	
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	Static							
$ \begin{array}{c c c c c c c } \hline \mbox{Gate Threshold Voltage} & V_{GS}(h) & V_{DS} = V_{GS}, h = -250 \ \mu \mbox{A} & -1.0 & -2.0 & -3.0 \\ \hline \mbox{Gate-Body Leakage} & l_{GSS} & V_{DS} = 0 \ V, V_{GS} = 20 \ V & 1 & 100 & nA \\ \hline \mbox{VDS} = -60 \ V, V_{GS} = 0 \ V, T_{J} = 125 \ ^{\circ}C & -1 & -50 \\ \hline \mbox{VDS} = -60 \ V, V_{GS} = 0 \ V, T_{J} = 125 \ ^{\circ}C & -150 \\ \hline \mbox{VDS} = -60 \ V, V_{GS} = 0 \ V, T_{J} = 125 \ ^{\circ}C & -150 \\ \hline \mbox{VDS} = -60 \ V, V_{GS} = 0 \ V, T_{J} = 175 \ ^{\circ}C & -10 & A \\ \hline \mbox{VDS} = -60 \ V, V_{GS} = 0 \ V, T_{J} = 175 \ ^{\circ}C & 0.100 & -160 \\ \hline \mbox{VDS} = -10 \ V, l_{D} = -5 \ A & 0.061 & -160 \\ \hline \mbox{VDS} = -10 \ V, l_{D} = -5 \ A, T_{J} = 125 \ ^{\circ}C & 0.100 & -160 \\ \hline \mbox{VDS} = -10 \ V, l_{D} = -5 \ A, T_{J} = 125 \ ^{\circ}C & 0.100 & -160 \\ \hline \mbox{VDS} = -10 \ V, l_{D} = -5 \ A, T_{J} = 125 \ ^{\circ}C & 0.100 & -160 \\ \hline \mbox{VDS} = -15 \ V, l_{D} = -5 \ A & 0.061 & -160 \\ \hline \mbox{VDS} = -15 \ V, l_{D} = -5 \ A & 0.072 & -160 \\ \hline \mbox{VDS} = -15 \ V, l_{D} = -5 \ A & 0.072 & -160 \\ \hline \mbox{VDS} = -15 \ V, l_{D} = -5 \ A & 8 & S \\ \hline \mbox{Dynamic} & -100 \ V_{DS} = -25 \ V, V_{GS} = 0 \ V, f = 1 \ MHz & 1000 & -160 \\ \hline \mbox{VDS} = -25 \ V, V_{GS} = 0 \ V, f = 1 \ MHz & 120 \ -160 \ -160 \ -160 \\ \hline \mbox{Data charge} \ \mbox{Dg} & -25 \ V, V_{GS} = -10 \ V, l_{D} = -8.4 \ A \ -100 \ -160 \ -$	Drain-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0 V, I_D = -250 \mu A$	- 60			V	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Gate Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}$, $I_D = -250 \ \mu A$	- 1.0	- 2.0	- 3.0	v	
	Gate-Body Leakage	I _{GSS}	$V_{DS} = 0 V, V_{GS} = \pm 20 V$			± 100	nA	
$ \begin{array}{ c c c c c c } \hline V_{DS} = -60 \ V, \ V_{GS} = 0 \ V, \ T_J = 175 \ ^{\circ} C & & & & -150 \\ \hline V_{DS} = -50 \ V, \ V_{GS} = -10 \ V & & & -10 & & & A \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A & & & 0.061 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A & & & 0.061 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A & T_J = 125 \ ^{\circ} C & & 0.100 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A, \ T_J = 125 \ ^{\circ} C & & 0.150 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A, \ T_J = 175 \ ^{\circ} C & & 0.150 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A, \ T_J = 175 \ ^{\circ} C & & 0.150 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A, \ T_J = 175 \ ^{\circ} C & & 0.150 & & \\ \hline V_{GS} = -10 \ V, \ I_D = -5 \ A & & & & & & & \\ \hline V_{GS} = -15 \ V, \ I_D = -5 \ A & & & & & & & \\ \hline Drain \ C \ T_{CS} \ & & & & & & & & \\ \hline Drain \ C \ T_{CS} \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & & \\ \hline Drain \ C \ & & & & & & & \\ \hline Drain \ C \ & & & & & & & \\ \hline Drain \ C \ & & & & & & & \\ \hline Drain \ C \ & & & & & & & \\ \hline Drain \ C \ & & & & & & \\ \hline Drain \ C \ & & & & & \\ \hline Drain \ C \ & & & & & \\ \hline Drain \ C \ & & & & \\ \hline Drain \ C \ & & & & \\ \hline Drain \ C \ & & & & \\ \hline Drain \ C \ & & & \\ \hline Drain \ C \ & & & \\ \hline Drain \ C \ & & & \\ \hline Drain \ C \ & & & \\ \hline Drain \ C \ & & & \\ \hline Drain \ C \ & & & \\ \hline Drain \ C \ & & \\ \hline Drain \ & & \\ \hline Drain \ C \ & & \\ \hline Drain \ & & \\ \hline Drain \ C \ & & \\ \hline Drain \ & & \\ \hline Drain$			$V_{DS} = -60 \text{ V}, \text{ V}_{GS} = 0 \text{ V}$			- 1		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Zero Gate Voltage Drain Current	I _{DSS}	V_{DS} = - 60 V, V_{GS} = 0 V, T_{J} = 125 °C			- 50	μΑ	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			V_{DS} = - 60 V, V_{GS} = 0 V, T_{J} = 175 °C			- 150		
$ \begin{array}{ c c c c c c } \mbox{Drain-Source On-State Resistance}^b & V_{GS} = -10 \ V, \ I_{D} = -5 \ A, \ T_{J} = 125 \ ^{\circ}{\rm C} & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.100 & 0.072 $	On-State Drain Current ^b	I _{D(on)}	V _{DS} = - 5 V, V _{GS} = - 10 V	- 10			А	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			V _{GS} = - 10 V, I _D = - 5 A		0.061			
$ \begin{array}{ c c c c c c } \hline V_{GS} = -10 \ V, \ I_D = -5 \ A, \ I_J = 175 \ C & 0.150 \\ \hline V_{GS} = -45 \ V, \ I_D = -2 \ A & 0.072 \\ \hline V_{GS} = -45 \ V, \ I_D = -2 \ A & 0.072 \\ \hline V_{GS} = -45 \ V, \ I_D = -2 \ A & 8 & S \\ \hline \hline Dynamic & & & & & & & & & & & & & \\ \hline Dynamic & & & & & & & & & & & & & & & \\ \hline Dut Capacitance & C_{iss} & & & & & & & & & & & & & & & & & & $	Duain Courses On State Desistance ^b	(DOL)	V_{GS} = - 10 V, I_D = - 5 A, T_J = 125 °C		0.100			
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Drain-Source On-State Resistance	'DS(on)			0.150		Ω	
Dynamic 100 1000 pF Input Capacitance C_{iss} $V_{DS} = -25 \text{ V}, V_{GS} = 0 \text{ V}, f = 1 \text{ MHz}$ 1000 pF Reverse Transfer Capacitance C_{rss} 100 100 pF Total Gate Charge Q_g 100 100 nC Gate-Source Charge Q_{gd} $V_{DS} = -30 \text{ V}, V_{GS} = -10 \text{ V}, I_D = -8.4 \text{ A}$ 2.1 nC Gate-Drain Charge Q_{gd} $V_{DS} = -30 \text{ V}, V_{GS} = -10 \text{ V}, I_D = -8.4 \text{ A}$ 2.1 nC Gate Resistance R_g $f = 1 \text{ MHz}$ 8.0 Ω Turn-On Delay Time ^C $t_d(on)$ $I_D = -30 \text{ V}, R_L = 3.57 \Omega$ 115 ns Fail Time ^C t_f $I_D = -8.4 \text{ A}, V_{GEN} = -10 \text{ V}, R_G = 2.5 \Omega$ 16 ns Source-Drain Diode Ratings and Characteristics $(T_C = 25 \text{ °C})^b$ -300 A A Pulsed Current IsM -300 A -300 A -300 A Forward Voltage ^b V_{SD} $I_F = -2 \text{ A}, V_{GS} = 0 \text{ V}$ -0.9 - 1.3 V			V _{GS} = - 4.5 V, I _D = - 2 A		0.072			
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Forward Transconductance ^b	9 _{fs}	V _{DS} = - 15 V, I _D = - 5 A		8		S	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Dynamic							
$ \begin{array}{c c c c c c c c c c } \hline Reverse Transfer Capacitance & C_{rss} & 100 & 10$	Input Capacitance	C _{iss}			1000			
$ \begin{array}{c c c c c c c c } \hline Total Gate Charge & Q_g \\ \hline Gate-Source Charge & Q_{gs} \\ \hline Gate-Drain Charge & Q_{gd} \\ \hline Gate Resistance & R_g & f = 1 \text{MHz} & 2.1 & & \\ \hline & 3.2 & & \\ \hline & 10 & & \\ \hline & 10 & & \\ \hline & 1$	Output Capacitance	C _{oss}	V_{DS} = - 25 V, V_{GS} = 0 V, f = 1 MHz		120		pF	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	Reverse Transfer Capacitance	C _{rss}			100			
$ \begin{array}{c c c c c c c c c } \hline Gate-Drain Charge & Q_{gd} & & & & & & & & & & & & & & & & & & &$	Total Gate Charge				10			
$ \begin{array}{c c c c c c c c } \hline Gate Resistance & R_g & f = 1 \ \text{MHz} & 8.0 & \Omega \\ \hline Turn-On Delay Time^{\text{C}} & t_{d(on)} & & & & & & & & & & & & & & & & & & &$	Gate-Source Charge	Q _{gs}	$V_{DS} = -30$ V, $V_{GS} = -10$ V, $I_{D} = -8.4$ A		2.1		nC	
$ \begin{array}{c c c c c c c } \hline Turn-On \ Delay \ Time^{\circ} & t_{d(on)} \\ \hline Rise \ Time^{\circ} & t_{r} \\ \hline Turn-Off \ Delay \ Time^{\circ} & t_{d(off)} \\ \hline Fall \ Time^{\circ} & t_{f} \\ \hline \hline Source-Drain \ Diode \ Ratings \ and \ Characteristics \\ \hline Pulsed \ Current & I_{SM} \\ \hline Forward \ Voltage^{b} & V_{SD} & I_{F} = -2 \ A, \ V_{GS} = 0 \ V \\ \hline \hline I_{F} = -8 \ A, \ di/dt = 100 \ A/us \\ \hline \hline \hline Source \ T_{rr} \\ \hline \hline I_{SM} & I_{F} = -8 \ A, \ di/dt = 100 \ A/us \\ \hline $	Gate-Drain Charge	Q _{gd}			3.2			
$\begin{array}{c c c c c c c } \hline Rise Time^{C} & t_{r} \\ \hline Turn-Off Delay Time^{C} & t_{d(off)} \\ \hline Fall Time^{C} & t_{f} \\ \hline $	Gate Resistance	Rg	f = 1 MHz		8.0		Ω	
$\begin{tabular}{ c c c c c c c c c c c c c c c c c c c$	Turn-On Delay Time ^c	t _{d(on)}			6			
$\begin{tabular}{ c c c c c c } \hline Turn-Off Delay Time^c & t_{d(off)} & t_D \cong -8.4 \text{ A}, V_{GEN} = -10 \text{ V}, H_G = 2.5 \Omega & 16 & 16 & 16 & 16 & 16 & 16 & 16 & $	Rise Time ^c	t _r	V_{DD} = - 30 V, R_L = 3.57 Ω		15		n 0	
Source-Drain Diode Ratings and Characteristics $(T_C = 25 \ ^{\circ}C)^b$ Pulsed CurrentI_SM- 30AForward Voltage ^b V_SDI_F = -2 A, V_GS = 0 V- 0.9- 1.3VReverse Recovery Time t_{rr} I_E = -8 A, di/dt = 100 A/us50ns	Turn-Off Delay Time ^c	t _{d(off)}	$\text{I}_{\text{D}}\cong$ - 8.4 A, V_{GEN} = - 10 V, R_{G} = 2.5 Ω		16		115	
Pulsed CurrentI SMI Forward Voltageb- 30AForward VoltagebV SDIF = - 2 A, VGS = 0 V- 0.9- 1.3VReverse Recovery Time t_{rr} IF = - 8 A, di/dt = 100 A/us50ns	Fall Time ^c	t _f			8			
Forward Voltageb V_{SD} $I_F = -2 \text{ A}, V_{GS} = 0 \text{ V}$ -0.9 -1.3 V Reverse Recovery Time t_{rr} $I_F = -8 \text{ A}, di/dt = 100 \text{ A/us}$ 50 ns	Source-Drain Diode Ratings and Cha	aracteristics	(T _C = 25 °C) ^b					
Reverse Recovery Time t_{rr} $I_{F} = -8 \text{ A}$, di/dt = 100 A/us50ns	Pulsed Current	I _{SM}				- 30	А	
$I_{\rm E} = -8$ A, di/dt = 100 A/us	Forward Voltage ^b	V _{SD}	I _F = - 2 A, V _{GS} = 0 V		- 0.9	- 1.3	V	
Reverse Recovery Time Q _{rr} 80 nC	Reverse Recovery Time	t _{rr}	I= = = 8 A di/dt = 100 A/us		50		ns	
	Reverse Recovery Time	Q _{rr}	$r_{\rm F} = -0.7$, $u_0 u_1 = -00.70 \mu_0$		80		nC	

Notes:

a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width \leq 300 $\mu s,$ 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.

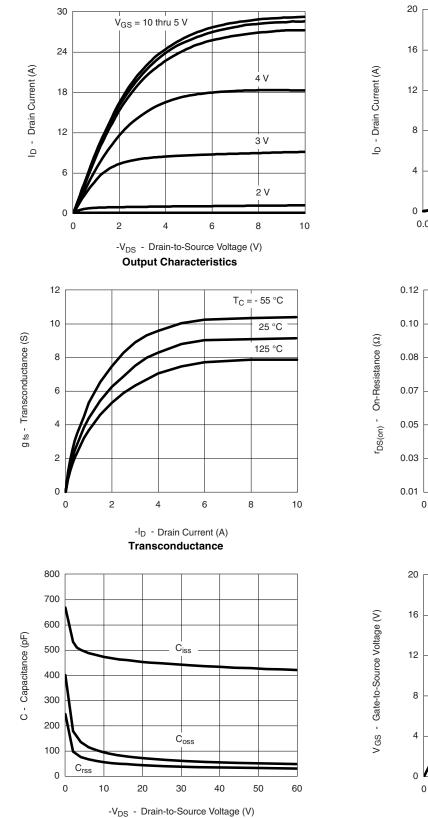
VBsemi VBsemi.com



125 °C

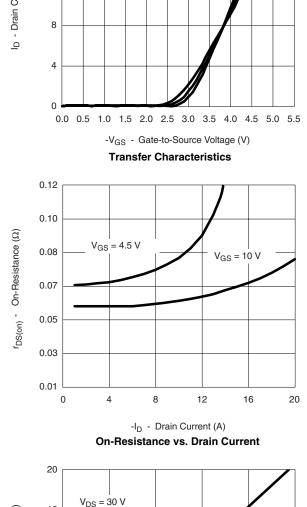
T_C = - 55 °C

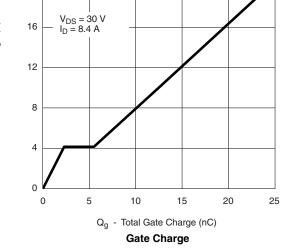
1 25 °C



Capacitance

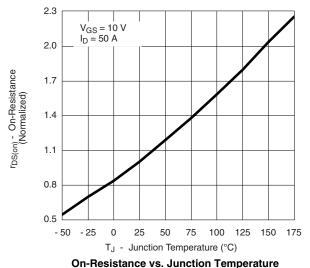
TYPICAL CHARACTERISTICS 25 °C unless noted

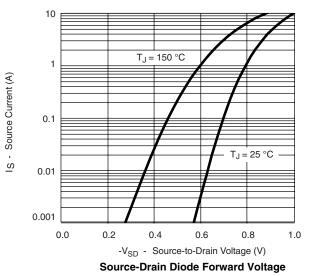




服务热线:400-655-8788

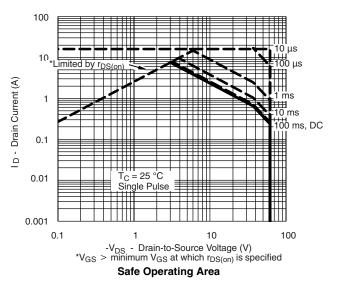
TYPICAL CHARACTERISTICS 25 °C unless noted



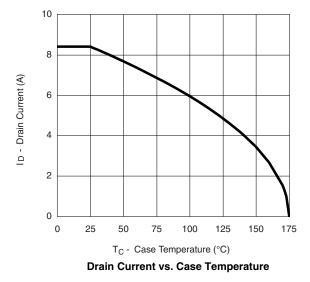


semi

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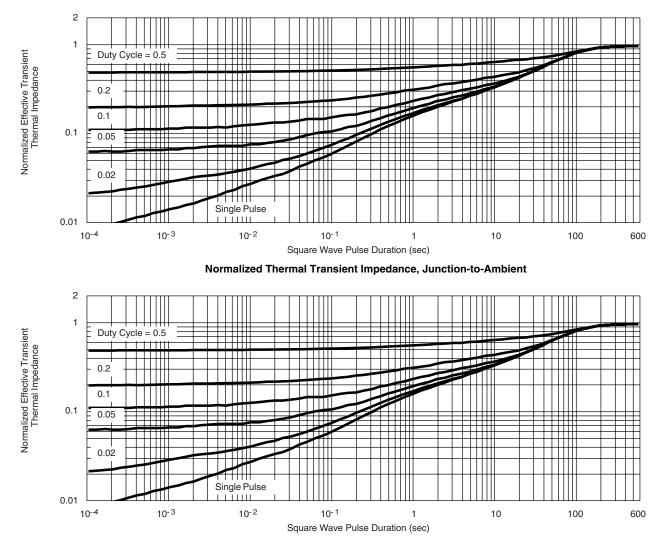


THERMAL RATINGS





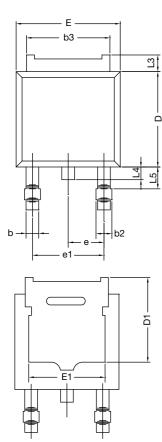
THERMAL RATINGS



Normalized Thermal Transient Impedance, Junction-to-Case



TO-252AA CASE OUTLINE





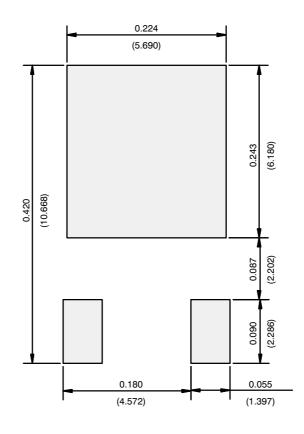
	MILLIN	IETERS	INCHES			
DIM.	MIN.	MAX.	MIN.	MAX.		
А	2.18	2.38	0.086	0.094		
A1	-	0.127	-	0.005		
b	0.64	0.88	0.025	0.035		
b2	0.76	1.14	0.030	0.045		
b3	4.95	5.46	0.195	0.215		
С	0.46	0.61	0.018	0.024		
C2	0.46	0.89	0.018	0.035		
D	5.97	6.22	0.235	0.245		
D1	5.21	-	0.205	-		
E	6.35	6.73	0.250	0.265		
E1	4.32	-	0.170	-		
Н	9.40	10.41	0.370	0.410		
е	2.28	BSC	0.090 BSC			
e1	4.56	BSC	0.180	0.180 BSC		
L	1.40	1.78	0.055	0.070		
L3	0.89	1.27	0.035	0.050		
L4	-	1.02	-	0.040		
L5	1.14	1.52	0.045	0.060		
ECN: X12-(DWG: 5347	0247-Rev. M,	24-Dec-12				

Note

• Dimension L3 is for reference only.



RECOMMENDED MINIMUM PADS FOR DPAK (TO-252)



Recommended Minimum Pads Dimensions in Inches/(mm)



Disclaimer

All products due to improve reliability, function or design or for other reasons, product specifications and data are subject to change without notice.

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Material Category Policy

Taiwan VBsemi Electronics Co., Ltd., hereby certify that all of the products are determined to be oHS compliant and meets the definition of restrictions under Directive of the European Parliament 2011/65 / EU, 2011 Nian. 6. 8 Ri Yue restrict the use of certain hazardous substances in electrical and electronic equipment (EEE) - modification, unless otherwise specified as inconsistent.(www.VBsemi.com)

Please note that some documents may still refer to Taiwan VBsemi RoHS Directive 2002/95 / EC. We confirm that all products identified as consistent with the Directive 2002/95 / EC European Directive 2011/65 /.

Taiwan VBsemi Electronics Co., Ltd. hereby certify that all of its products comply identified as halogen-free halogen-free standards required by the JEDEC JS709A. Please note that some Taiwanese VBsemi documents still refer to the definition of IEC 61249-2-21, and we are sure that all products conform to confirm compliance with IEC 61249-2-21 standard level JS709A.