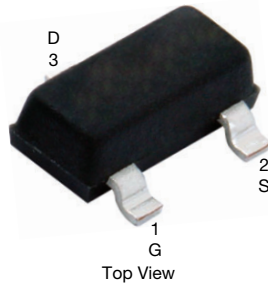


P-Channel 40 V (D-S) MOSFET

SOT-23 (TO-236)



Marking code: G4

PRODUCT SUMMARY	
V_{DS} (V)	-40
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 10$ V	0.075
$R_{DS(on)}$ max. (Ω) at $V_{GS} = 4.5$ V	0.100
Q_g typ. (nC)	6
I_D (A)	-3.6 ^a
Configuration	Single

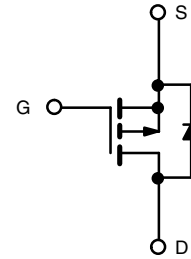
FEATURES

- TrenchFET® Gen III p-channel power MOSFET
- 100 % R_g and UIS tested
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
 COMPLIANT
 HALOGEN
FREE

APPLICATIONS

- Battery switch
- Motor drive control
- Load switch



P-Channel MOSFET

ORDERING INFORMATION	
Package	SOT-23
Lead (Pb)-free and halogen-free	Si2319DDS-T1-GE3

ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C, unless otherwise noted)				
PARAMETER	SYMBOL	LIMIT	UNIT	
Drain-source voltage	V_{DS}	-40	V	
Gate-source voltage	V_{GS}	± 20		
Continuous drain current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	-3.6	A
		$T_C = 70$ °C	-2.9	
		$T_A = 25$ °C	-2.7 ^{b, c}	
		$T_A = 70$ °C	-2.2 ^{b, c}	
Pulsed drain current ($t = 100$ μ s)	I_{DM}	-15	A	
Continuous source-drain diode current	I_S	$T_C = 25$ °C		
		$T_A = 25$ °C	-0.8 ^{b, c}	
Single pulse avalanche current	I_{AS}	-5	mJ	
Single pulse avalanche energy	E_{AS}	1.25		
Maximum power dissipation	I_P	$T_C = 25$ °C	1.7	W
		$T_C = 70$ °C	1.1	
		$T_A = 25$ °C	1 ^{b, c}	
		$T_A = 70$ °C	0.6 ^{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	R_{thJA}	100	130	°C/W	
Maximum junction-to-case (drain)	R_{thJF}	60	75		

Notes

- Based on $T_C = 25$ °C
- Surface mounted on 1" x 1" FR4 board
- $t = 5$ s
- Maximum under steady state conditions is 175 °C/W



SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Drain-source breakdown voltage	V _{DS}	V _{GS} = 0 V, I _D = -250 μA	-40	-	-	V
V _{DS} temperature coefficient	ΔV _{DS} /T _J	I _D = -250 μA	-	-27.5	-	mV/°C
V _{GS(th)} temperature coefficient	ΔV _{GS(th)} /T _J	I _D = -250 μA	-	3.2	-	
Gate-source threshold voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	-1	-	-2.5	V
Gate-source leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V	-	-	100	nA
Zero gate voltage drain current	I _{DSS}	V _{DS} = -40 V, V _{GS} = 0 V	-	-	-1	μA
		V _{DS} = -40 V, V _{GS} = 0 V, T _J = 70 °C	-	-	-15	
On-state drain current ^a	I _{D(on)}	V _{DS} ≥ -10 V, V _{GS} = -10 V	-10	-	-	A
Drain-source on-state resistance ^a	R _{DS(on)}	V _{GS} = -10 V, I _D = -2.7 A	-	0.062	0.075	Ω
		V _{GS} = -4.5 V, I _D = -2.4 A	-	0.081	0.100	
Forward transconductance ^a	g _{fs}	V _{DS} = -15 V, I _D = -2.7 A	-	10	-	S
Dynamic ^b						
Input capacitance	C _{ISS}	V _{DS} = -20 V, V _{GS} = 0 V, f = 1 MHz	-	650	-	pF
Output capacitance	C _{OSS}		-	54	-	
Reverse transfer capacitance	C _{RSS}		-	43	-	
Total gate charge	Q _g	V _{DS} = -20 V, V _{GS} = -10 V, I _D = -2.7 A	-	12.5	19	nC
		V _{DS} = -20 V, V _{GS} = -4.5 V, I _D = -2.7 A	-	6	12	
Gate-source charge	Q _{gs}		-	1.8	-	
Gate-drain charge	Q _{gd}		-	2	-	
Gate resistance	R _g	f = 1 MHz	2	10	20	Ω
Turn-on delay time	t _{d(on)}	V _{DD} = -20 V, R _L = 9.1 Ω, I _D ≅ -2.2 A, V _{GEN} = -10 V, R _g = 1 Ω	-	10	20	ns
Rise time	t _r		-	20	30	
Turn-off delay time	t _{d(off)}		-	20	30	
Fall time	t _f		-	12	24	
Turn-on delay time	t _{d(on)}	V _{DD} = -20 V, R _L = 9.1 Ω, I _D ≅ -2.2 A, V _{GEN} = -4.5 V, R _g = 1 Ω	-	30	45	
Rise time	t _r		-	32	48	
Turn-off delay time	t _{d(off)}		-	20	30	
Fall time	t _f		-	15	30	
Drain-Source Body Diode Characteristics						
Continuous source-drain diode current	I _S	T _C = 25 °C	-	-	-1.4	A
Pulse diode forward current	I _{SM}		-	-	-15	
Body diode voltage	V _{SD}	I _S = -2.2 A, V _{GS} = 0 V	-	-0.8	-1.2	V
Body diode reverse recovery time	t _{rr}	I _F = -2.2 A, di/dt = 100 A/μs, T _J = 25 °C	-	15	30	ns
Body diode reverse recovery charge	Q _{rr}		-	9	18	nC
Reverse recovery fall time	t _a		-	10.5	-	ns
Reverse recovery rise time	t _b		-	4.5	-	

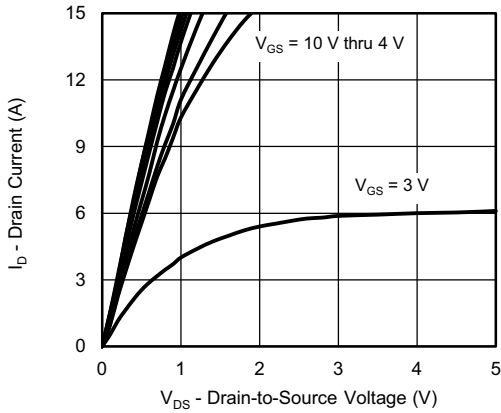
Notes

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

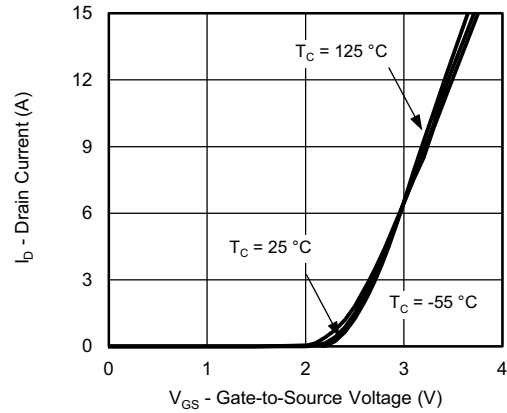
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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



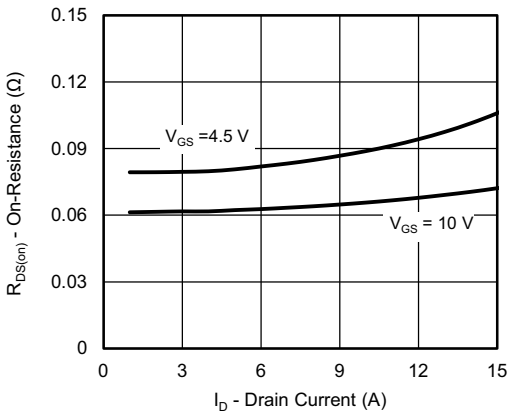
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



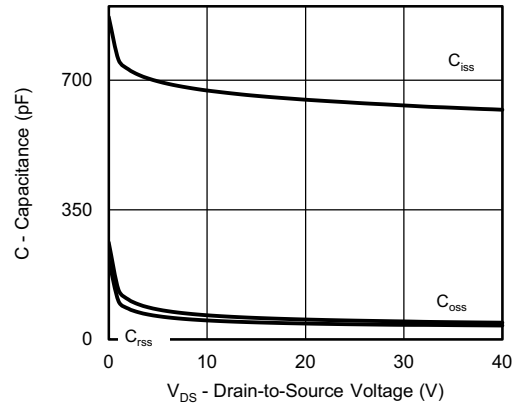
Output Characteristics



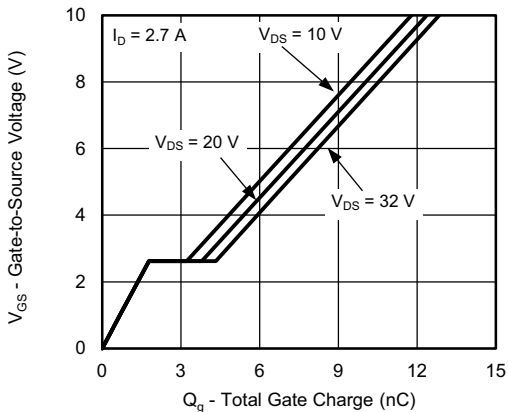
Transfer Characteristics



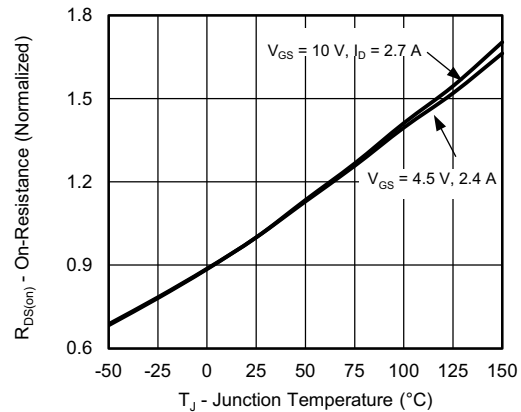
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

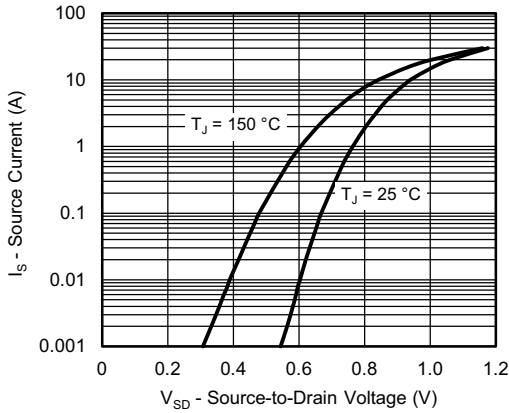


Gate Charge

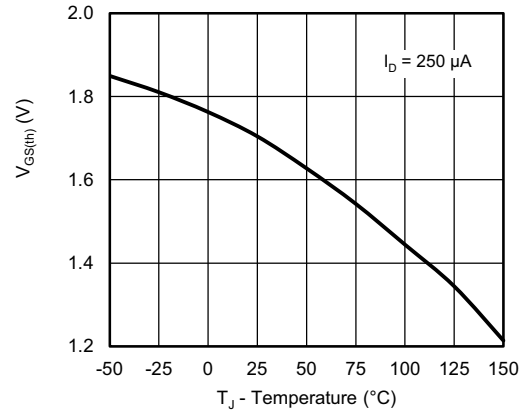


On-Resistance vs. Junction Temperature

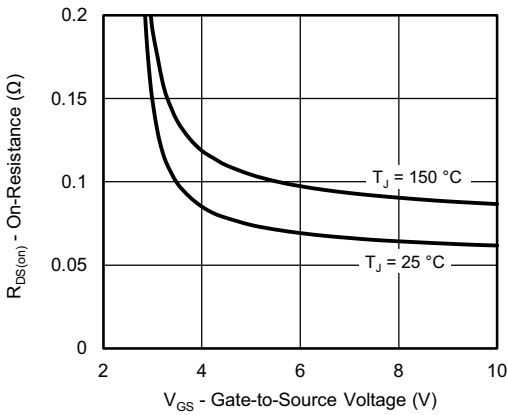
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



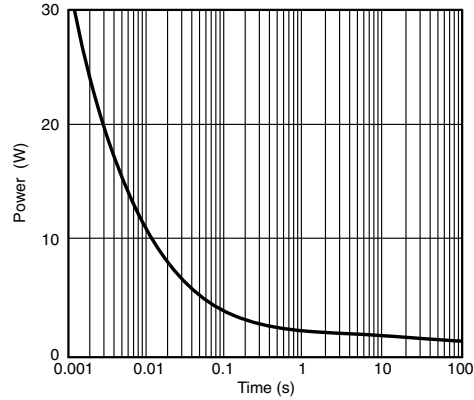
Source-Drain Diode Forward Voltage



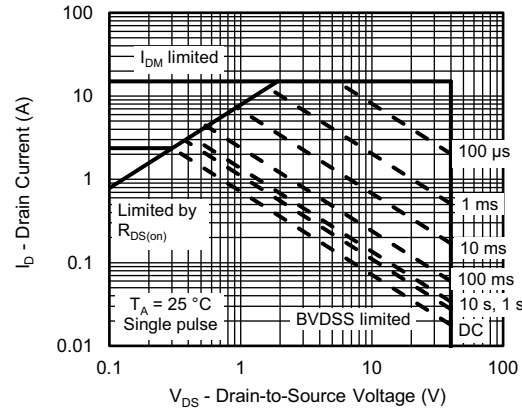
Threshold Voltage



On-Resistance vs. Gate-to-Source Voltage



Single Pulse Power, Junction-to-Ambient

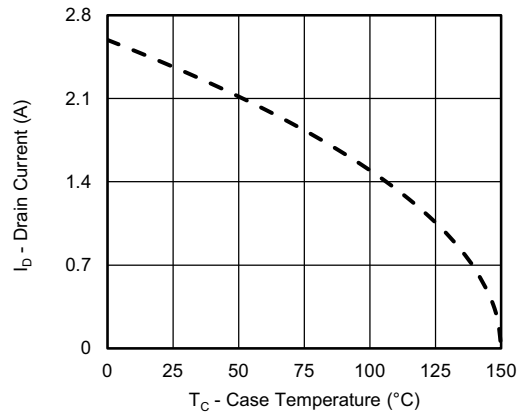


Safe Operating Area, Junction-to-Ambient

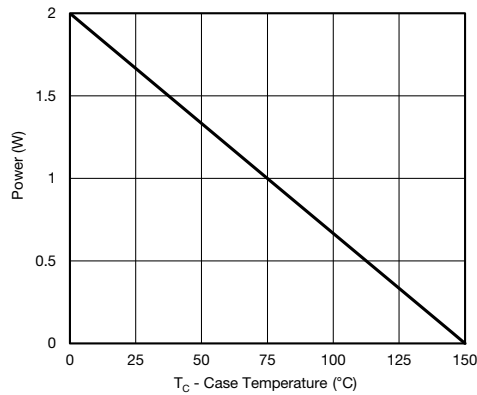
(1) $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified



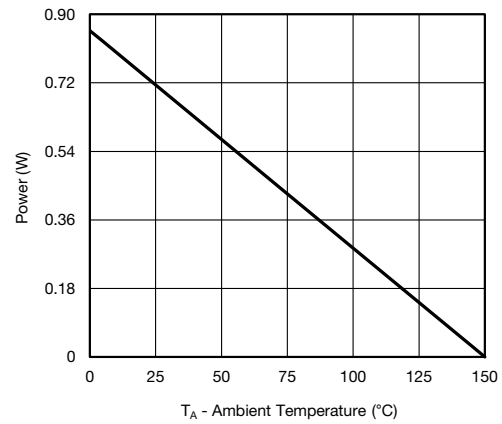
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating ^a



Power, Junction-to-Case



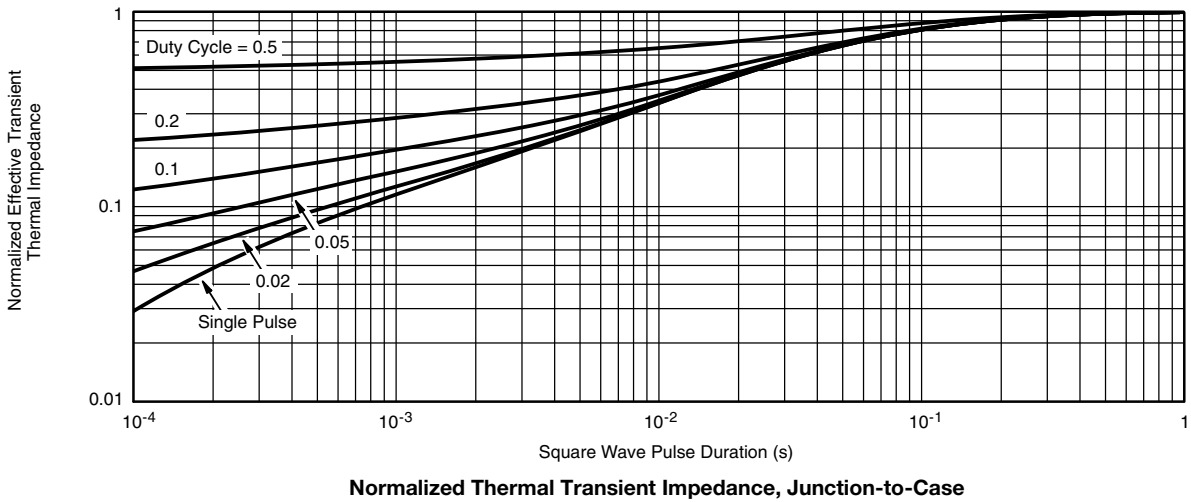
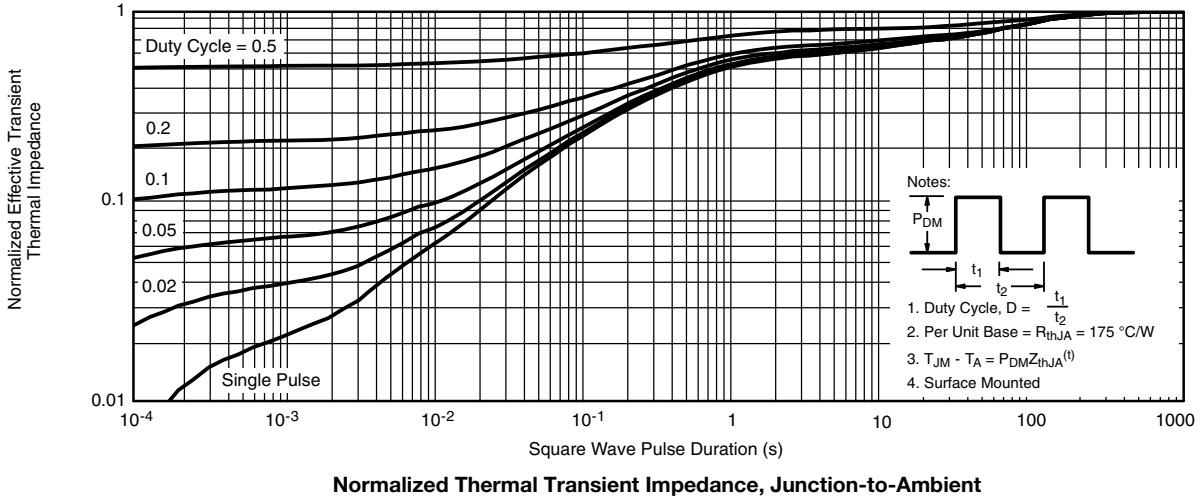
Power, Junction-to-Ambient

Note

- a. The power dissipation P_D is based on T_J max. = 150 °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



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Vishay Siliconix maintains worldwide manufacturing capability. Products may be manufactured at one of several qualified locations. Reliability data for Silicon Technology and Package Reliability represent a composite of all qualified locations. For related documents such as package / tape drawings, part marking, and reliability data, see www.vishay.com/ppg?79400.

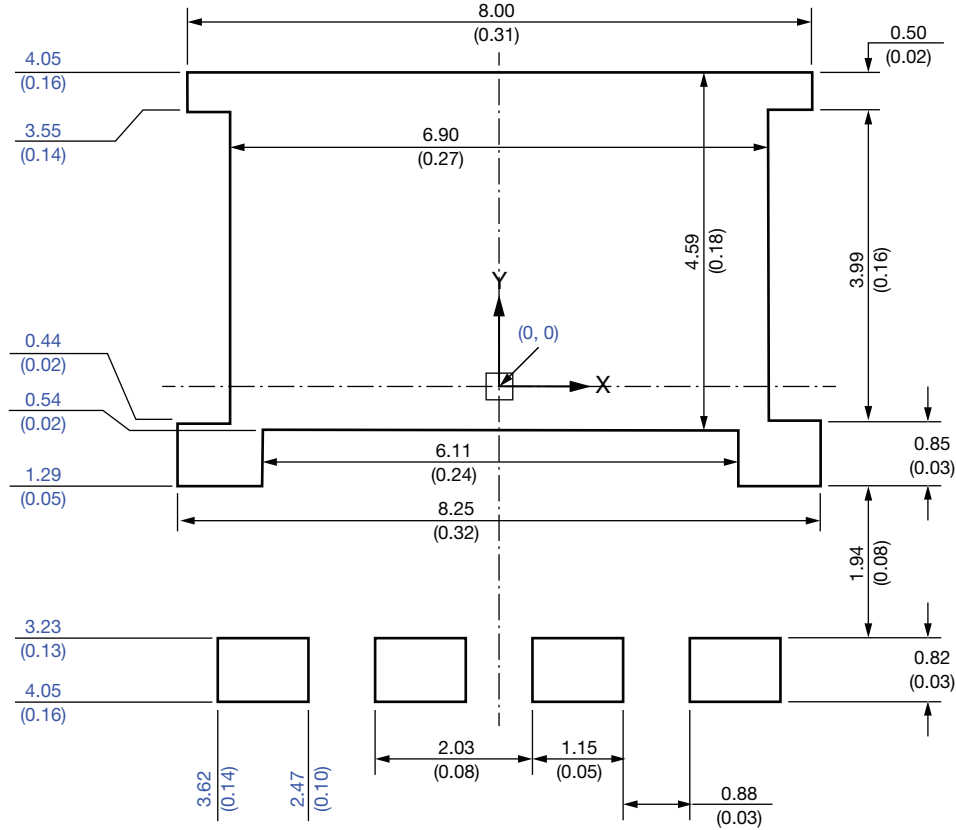
SOT-23 (TO-236): 3-LEAD



Dim	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	0.89	1.12	0.035	0.044
A ₁	0.01	0.10	0.0004	0.004
A ₂	0.88	1.02	0.0346	0.040
b	0.35	0.50	0.014	0.020
c	0.085	0.18	0.003	0.007
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E ₁	1.20	1.40	0.047	0.055
e	0.95 BSC		0.0374 Ref	
e ₁	1.90 BSC		0.0748 Ref	
L	0.40	0.60	0.016	0.024
L ₁	0.64 Ref		0.025 Ref	
S	0.50 Ref		0.020 Ref	
q	3°	8°	3°	8°

ECN: S-03946-Rev. K, 09-Jul-01
 DWG: 5479

Recommended Minimum PADS for PowerPAK[®] 8 x 8L Single



Dimensions in millimeters (inches)

Note

- Linear dimensions are in black, the same information is provided in ordinate dimensions which are in blue.



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