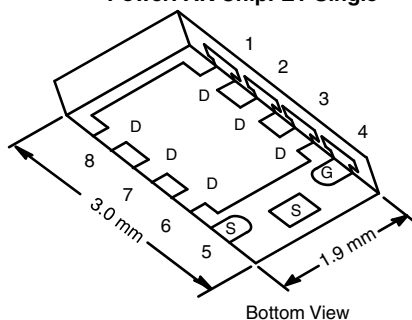


N-Channel 20 V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A) ^a	Q_g (Typ.)
20	0.0100 at $V_{GS} = 4.5$ V	25	16.6 nC
	0.0115 at $V_{GS} = 2.5$ V	25	
	0.0135 at $V_{GS} = 1.8$ V	25	

PowerPAK ChipFET Single



Ordering Information:
Si5442DU-T1-GE3 (Lead (Pb)-free and Halogen-free)

FEATURES

- TrenchFET[®] Power MOSFET
- Thermally Enhanced PowerPAK[®] ChipFET[®] Package
 - Small Footprint Area
 - Low On-Resistance
 - Thin 0.8 mm Profile
- 100% R_g Tested
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

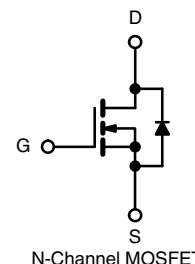
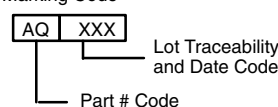


RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Load Switch, PA Switch, and for Portable Applications
- Point-of-Load
- DC/DC Converters
- Power Management

Marking Code



N-Channel MOSFET

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	20	V
Gate-Source Voltage	V_{GS}	± 8	
Continuous Drain Current ($T_J = 150$ °C)	I_D	$T_C = 25$ °C	A
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Pulsed Drain Current ($t = 300$ μ s)	I_{DM}	60	A
Continuous Source-Drain Diode Current	I_S	$T_C = 25$ °C	
		$T_A = 25$ °C	
Maximum Power Dissipation	P_D	$T_C = 25$ °C	W
		$T_C = 70$ °C	
		$T_A = 25$ °C	
		$T_A = 70$ °C	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, f}	R_{thJA}	34	40	°C/W
Maximum Junction-to-Case (Drain)	R_{thJC}	3	4	

Notes:

a. Package limited.

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

c. $t = 5$ s.

d. See solder profile (www.vishay.com/doc?273257). The PowerPAK ChipFET is a leadless package. The end of the lead terminal is exposed copper (not plated) as a result of the singulation process in manufacturing. A solder fillet at the exposed copper tip cannot be guaranteed and is not required to ensure adequate bottom side solder interconnection.

e. Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.

f. Maximum under steady state conditions is 90 °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	20			V	
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		21		mV/°C	
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 3			
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.4		0.9	V	
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 8 V			± 100	nA	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 20 V, V _{GS} = 0 V			1	μA	
		V _{DS} = 20 V, V _{GS} = 0 V, T _J = 55 °C			10		
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 4.5 V	20			A	
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 8 A		0.0080	0.0100	Ω	
		V _{GS} = 2.5 V, I _D = 7 A		0.0090	0.0115		
		V _{GS} = 1.8 V, I _D = 4 A		0.0100	0.0135		
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 8 A		65		S	
Dynamic ^b							
Input Capacitance	C _{iss}	V _{DS} = 10 V, V _{GS} = 0 V, f = 1 MHz		1700		pF	
Output Capacitance	C _{oss}			280			
Reverse Transfer Capacitance	C _{rss}			115			
Total Gate Charge	Q _g	V _{DS} = 10 V, V _{GS} = 8 V, I _D = 15 A		29	45	nC	
		V _{DS} = 10 V, V _{GS} = 4.5 V, I _D = 15 A		16.6	25		
					1.9		
					2		
Gate-Source Charge	Q _{gs}						
Gate-Drain Charge	Q _{gd}						
Gate Resistance	R _g	f = 1 MHz	0.28	1.4	2.8	Ω	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 4.5 V, R _g = 1 Ω		10	20	ns	
Rise Time	t _r			15	30		
Turn-Off Delay Time	t _{d(off)}			35	70		
Fall Time	t _f			10	20		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10 V, R _L = 1 Ω I _D ≅ 10 A, V _{GEN} = 8 V, R _g = 1 Ω		10	20		
Rise Time	t _r			10	20		
Turn-Off Delay Time	t _{d(off)}			30	60		
Fall Time	t _f			10	20		
Drain-Source Body Diode Characteristics							
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			25	A	
Pulse Diode Forward Current	I _{SM}				60		
Body Diode Voltage	V _{SD}	I _S = 10 A, V _{GS} = 0 V		0.8	1.2	V	
Body Diode Reverse Recovery Time	t _{rr}	I _F = 10 A, di/dt = 100 A/μs, T _J = 25 °C		20	40	ns	
Body Diode Reverse Recovery Charge	Q _{rr}			10	20	nC	
Reverse Recovery Fall Time	t _a			11		ns	
Reverse Recovery Rise Time	t _b			9			

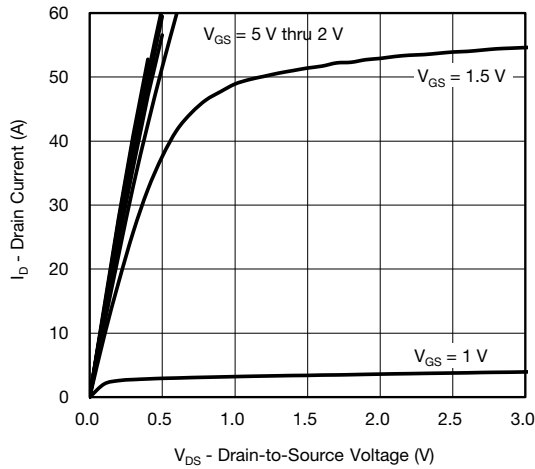
Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

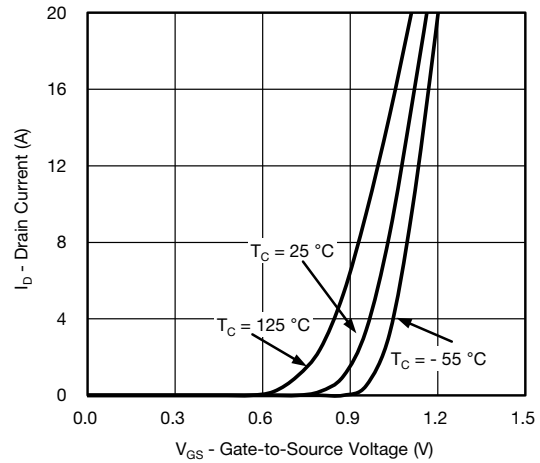
b. Guaranteed by design, not subject to production testing.

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.

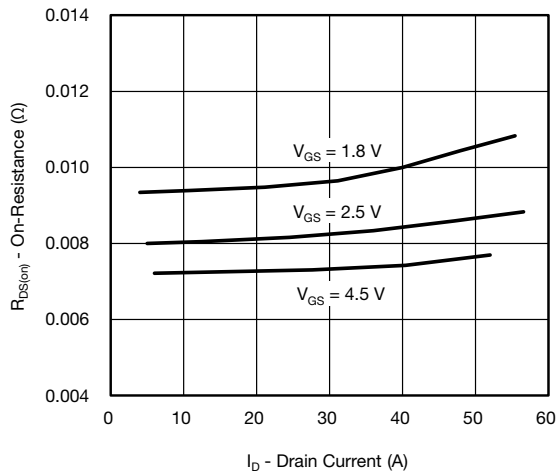
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



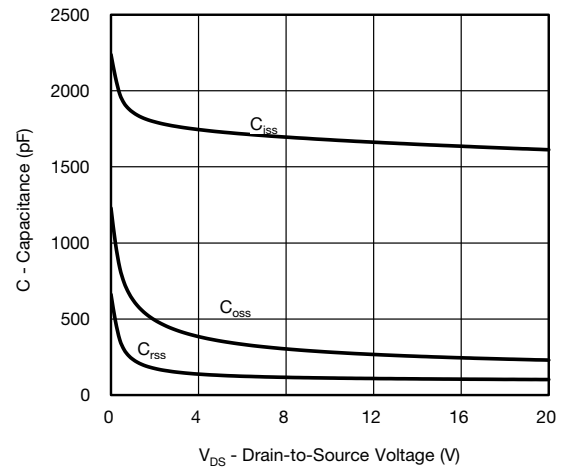
Output Characteristics



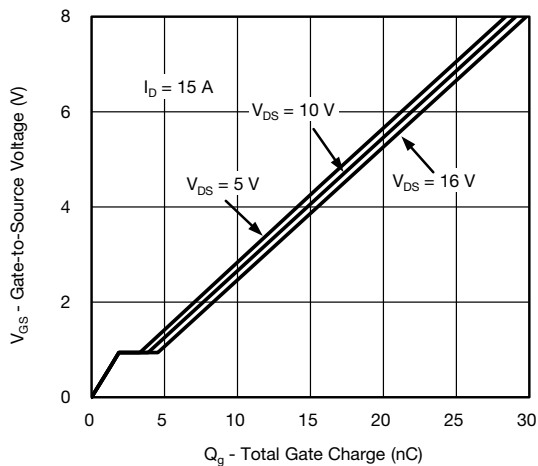
Transfer Characteristics



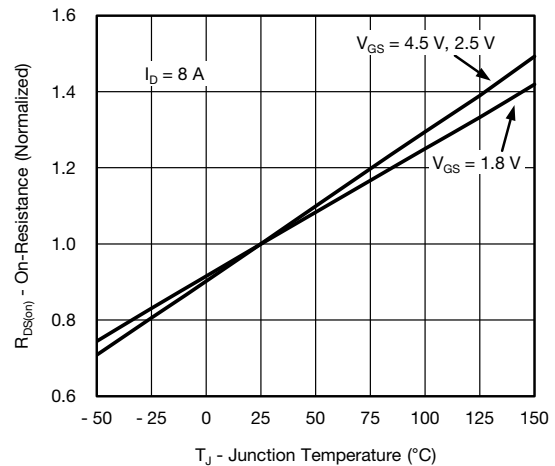
On-Resistance vs. Drain Current and Gate Voltage



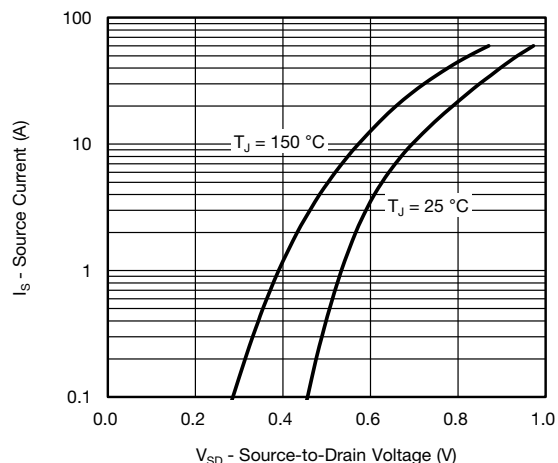
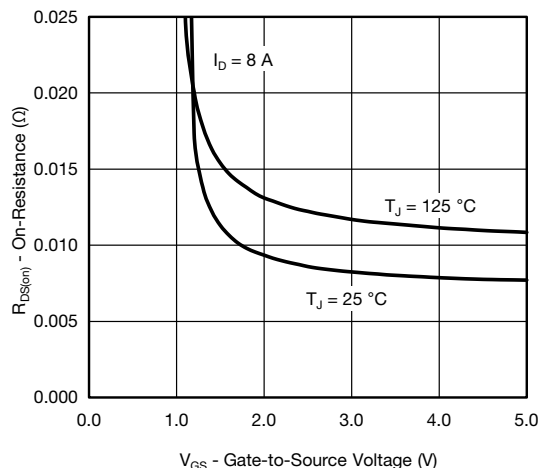
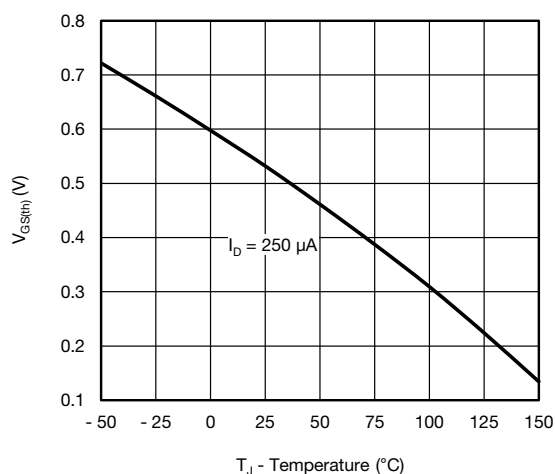
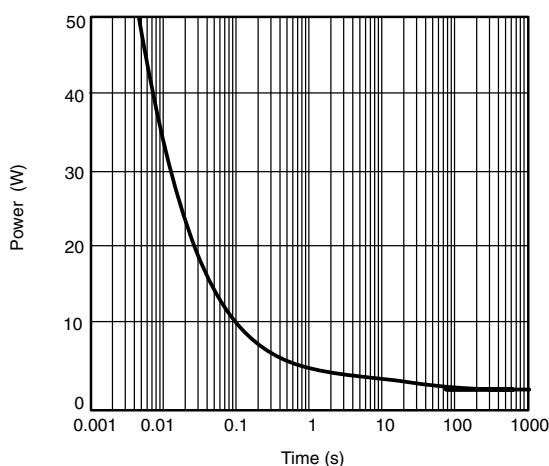
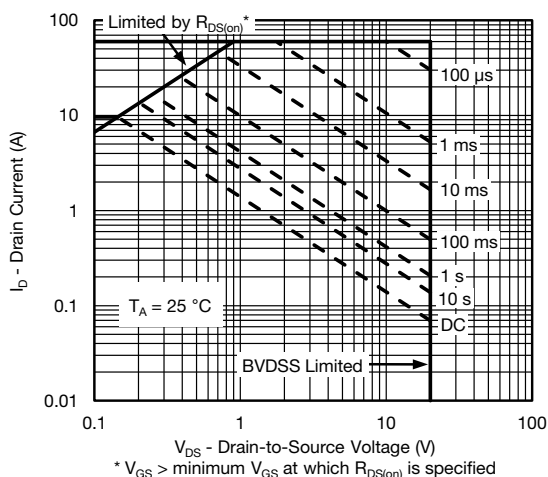
Capacitance



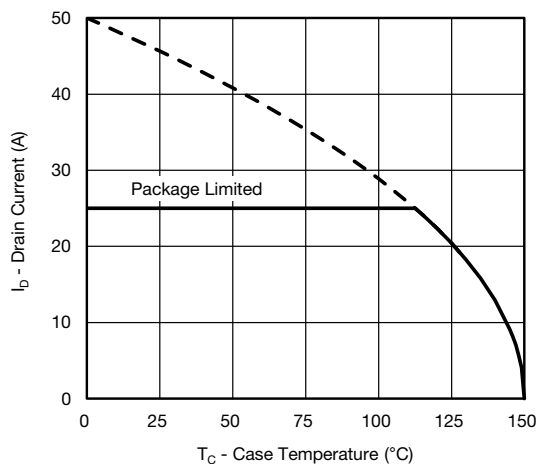
Gate Charge



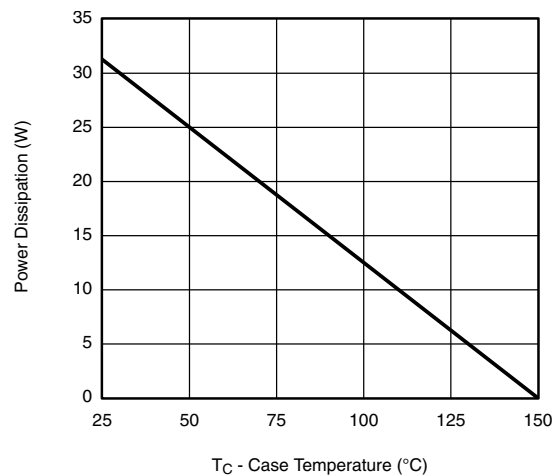
On-Resistance vs. Junction Temperature

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****Safe Operating Area, Junction-to-Ambient**

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

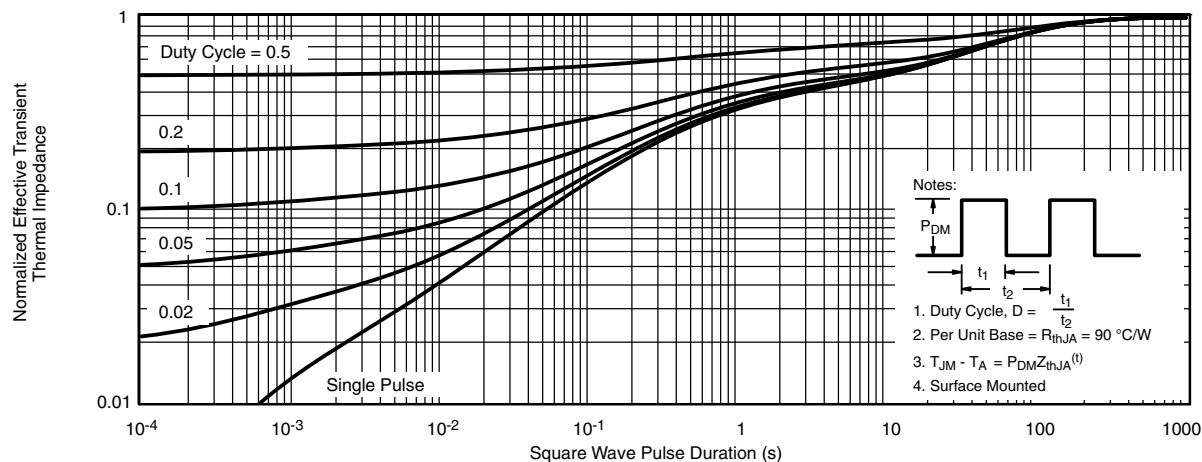
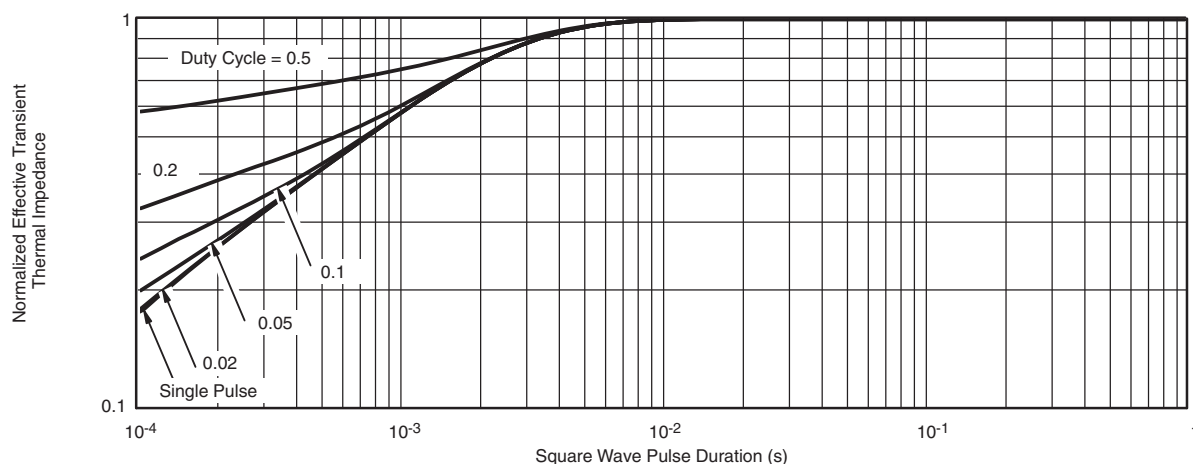


Current Derating*



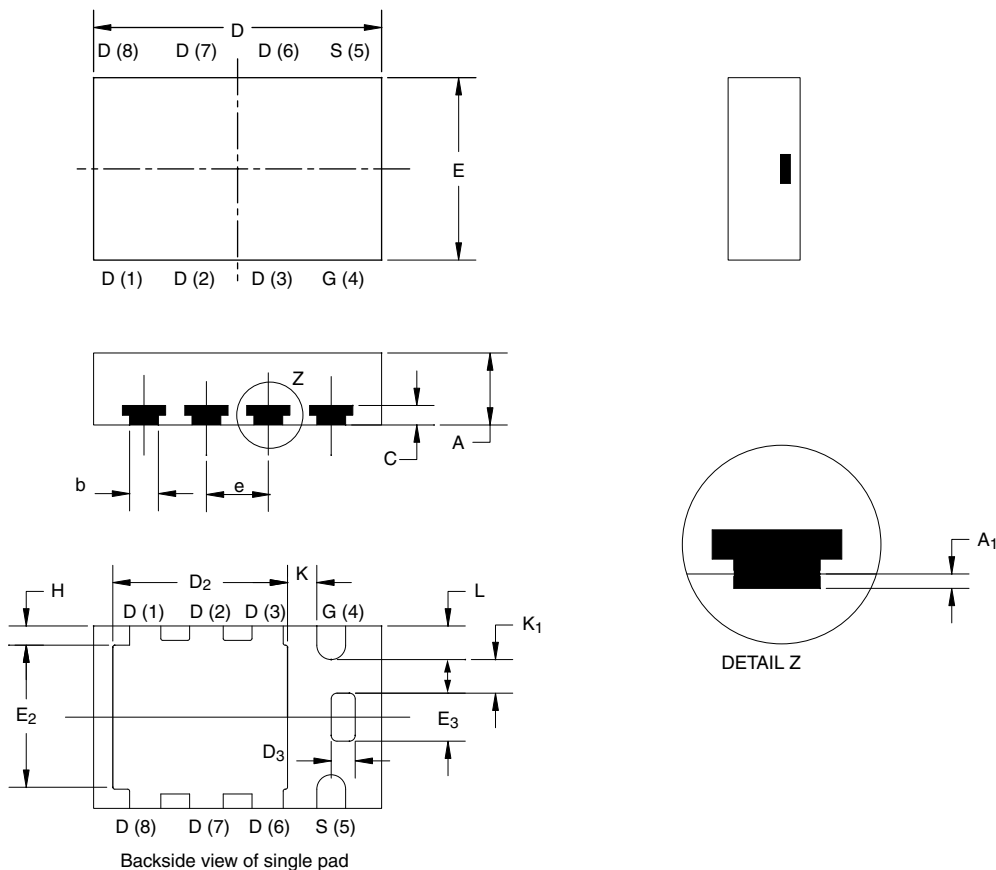
Power Derating

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

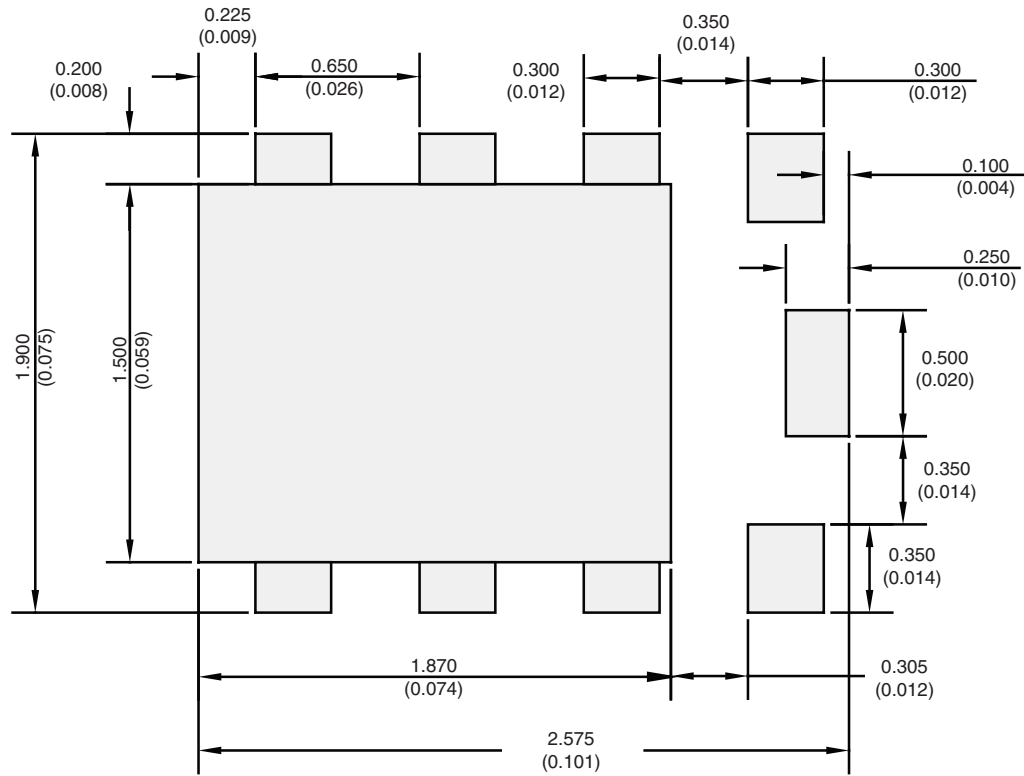
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PowerPAK® ChipFET® SINGLE PAD



DIM.	MILLIMETERS			INCHES		
	MIN.	NOM.	MAX.	MIN.	NOM.	MAX.
A	0.70	0.75	0.85	0.028	0.030	0.033
A ₁	0	-	0.05	0	-	0.002
b	0.25	0.30	0.35	0.010	0.012	0.014
C	0.15	0.20	0.25	0.006	0.008	0.010
D	2.92	3.00	3.08	0.115	0.118	0.121
D ₂	1.75	1.87	2.00	0.069	0.074	0.079
D ₃	0.20	0.25	0.30	0.008	0.010	0.012
E	1.82	1.90	1.98	0.072	0.075	0.078
E ₂	1.38	1.50	1.63	0.054	0.059	0.064
E ₃	0.45	0.50	0.55	0.018	0.020	0.022
e	0.65 BSC			0.026 BSC		
H	0.15	0.20	0.25	0.006	0.008	0.010
K	0.25	-	-	0.010	-	-
K ₁	0.30	-	-	0.012	-	-
L	0.30	0.35	0.40	0.012	0.014	0.016

RECOMMENDED MINIMUM PADS FOR PowerPAK® ChipFET® Single



Recommended Minimum Pads
Dimensions in mm/(Inches)

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