

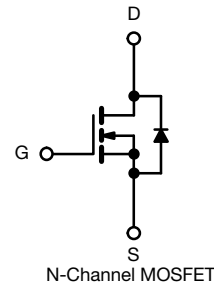
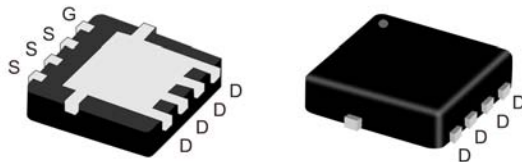
N-Channel 30V (D-S) MOSFET

Product Summary

V _{DS} (V)	R _{DS(on)} (mΩ) (Max.)	I _D (A)
30	3.5 at V _{GS} = 10 V	40
	5.1 at V _{GS} = 4.5 V	40

Pin Configuration

Power5x6



Features

- Very Low RDS(on) at 4.5V Vgs
- Low Gate Charge
- High Current Capability
- 100% Rg and UIS Tested
- RoHS and Halogen-Free Compliant

Applications

- DC/DC Converter
 - Low Side Switch
- Notebook PC
- Graphic Cards
- Server

Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	V _{DS}	30	V
Gate-Source Voltage	V _{GS}	±20	V
Continuous Drain Current ^G	I _D	T _C =25°C	40
		T _C =70°C	40
Pulsed Drain Current ^C	I _{DM}	70	A
Continuous Drain Current	I _{DSM}	T _A =25°C	28
		T _A =70°C	22.5
Avalanche Current ^C	I _{AS} , I _{AR}	30	A
Avalanche energy L=0.1mH ^C	E _{AS} , E _{AR}	45	mJ
Power Dissipation ^B	P _D	T _C =25°C	54
		T _C =70°C	34.7
Power Dissipation ^A	P _{DSM}	T _A =25°C	5
		T _A =70°C	3.2
Junction and Storage Temperature Range	T _J , T _{STG}	-55 to 150	°C

Thermal Data

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ^A	R _{θJA}	20	25	°C/W
Maximum Junction-to-Case	R _{θJC}	1.8	3.3	°C/W

Electrical Characteristics (T_J = 25°C Unless Otherwise Specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
B _{V(DSS)}	Drain-Source Breakdown Voltage	I _D =250μA, V _{GS} =0V	30			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =30V, V _{GS} =0V T _J =55°C			1 10	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} = ±20V			± 100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.2		2.4	V
I _{D(ON)}	On state drain current	V _{GS} =10V, V _{DS} =5V	30			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V, I _D =15A		2.9	3.5	mΩ
		V _{GS} =4.5V, I _D =10A		4.2	5.1	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =15A		65		S
V _{SD}	Diode Forward Voltage	I _S =3A, V _{GS} =0V		0.74	1.1	V
I _S	Maximum Body-Diode Continuous Current ^G				40	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =15V, f=1MHz		2730		pF
C _{oss}	Output Capacitance			540		pF
C _{rss}	Reverse Transfer Capacitance			205		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	0.2	0.8	1.6	Ω
SWITCHING PARAMETERS						
Q _g (10V)	Total Gate Charge	V _{GS} =10V, V _{DS} =15V, I _D =10A		42.5	65	nC
Q _g (4.5V)	Total Gate Charge	V _{GS} =10V, V _{DS} =4.5V, I _D =10A		21.5	33	
Q _{gs}	Gate Source Charge			6.9		nC
Q _{gd}	Gate Drain Charge			7.1		nC
t _{D(on)}	Turn-On DelayTime		V _{DD} =15V, R _L =1.5 Ω, I _D ≅ 10A, V _{GEN} =4.5V, R _g =1Ω		30	50
t _r	Turn-On Rise Time			19	35	ns
t _{D(off)}	Turn-Off DelayTime			35	60	ns
t _f	Turn-Off Fall Time			15	30	ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =10A, dI/dt=100A/μs			28	55
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =10A, dI/dt=100A/μs		21	42	nC

A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_A = 25° C. The Power dissipation P_{DSM} is based on R_{θJA} and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design, and the maximum temperature of 150° C may be used if the PCB allows it.

B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150° C. Ratings are based on low frequency and duty cycles to keep initial T_J=25° C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

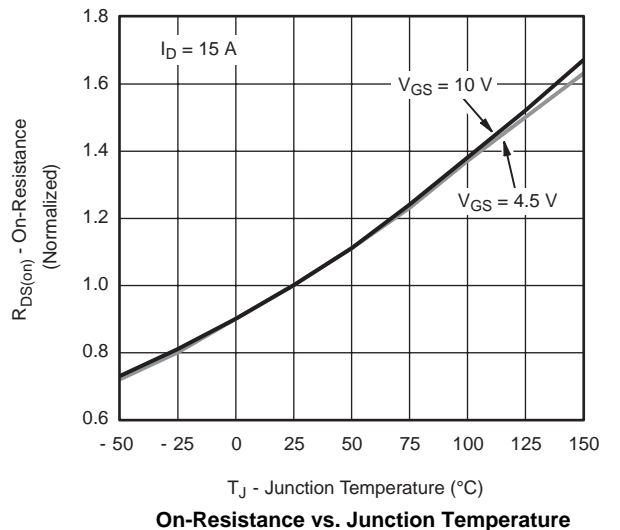
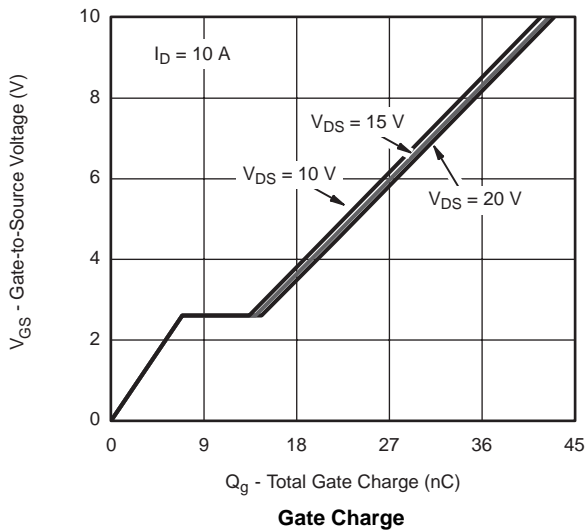
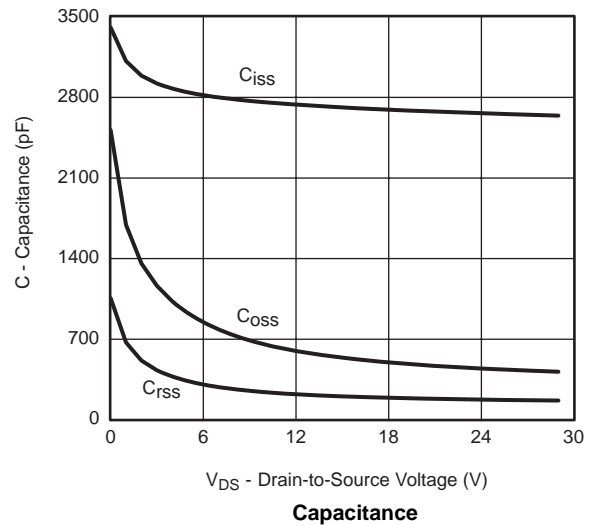
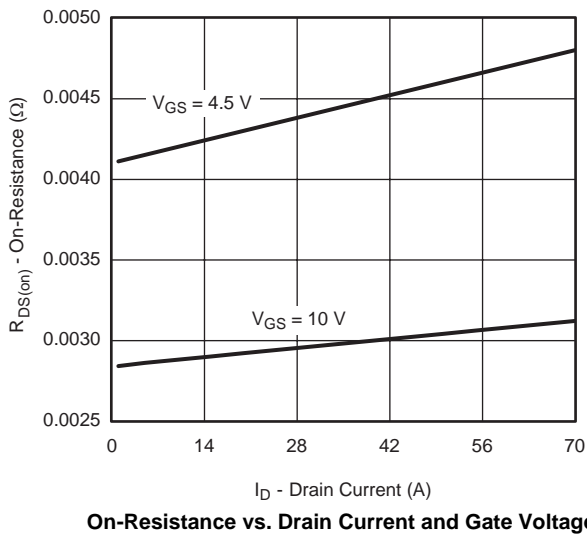
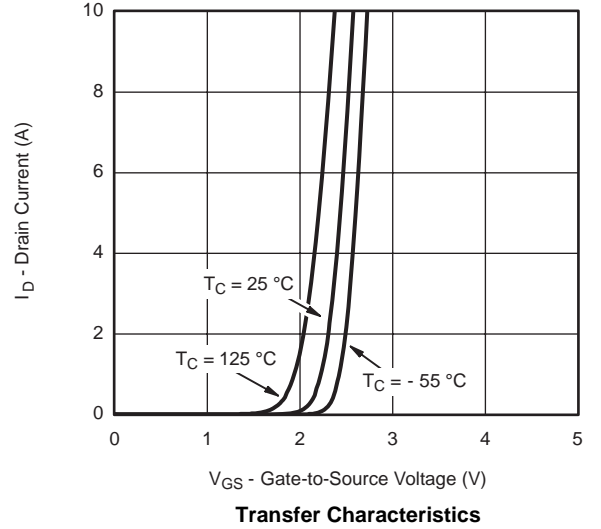
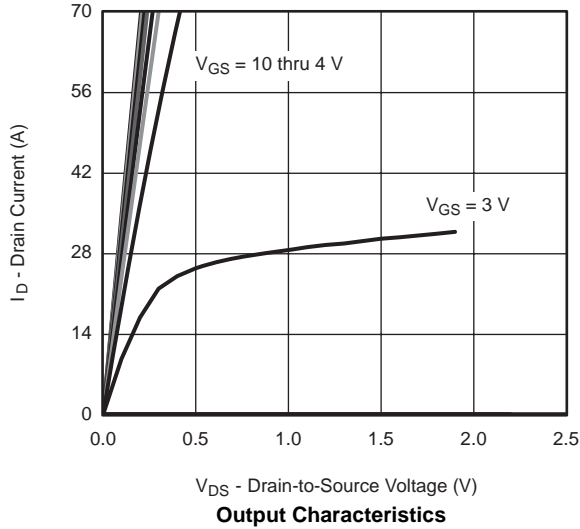
E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

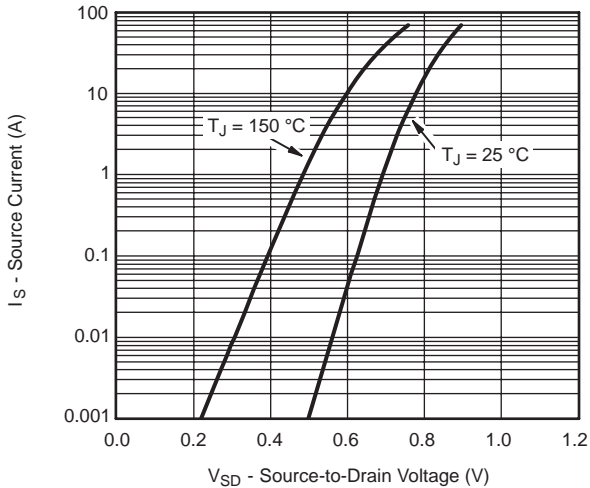
G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C.

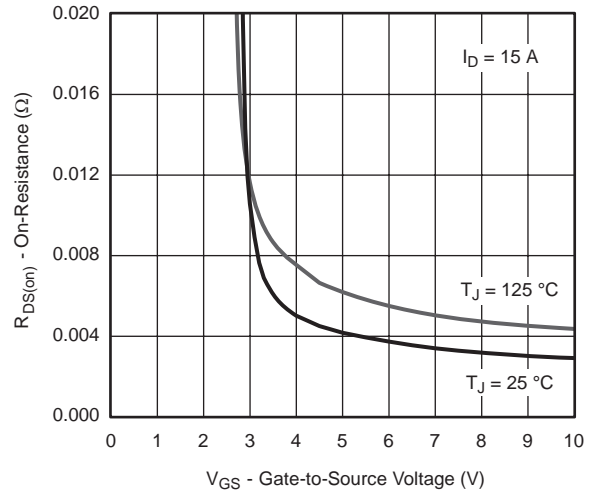
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



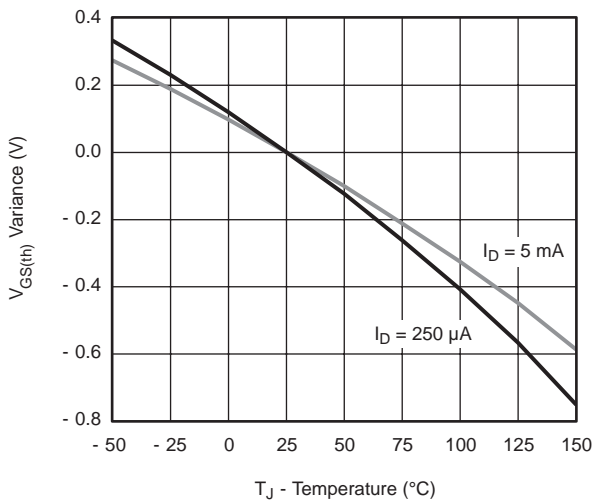
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



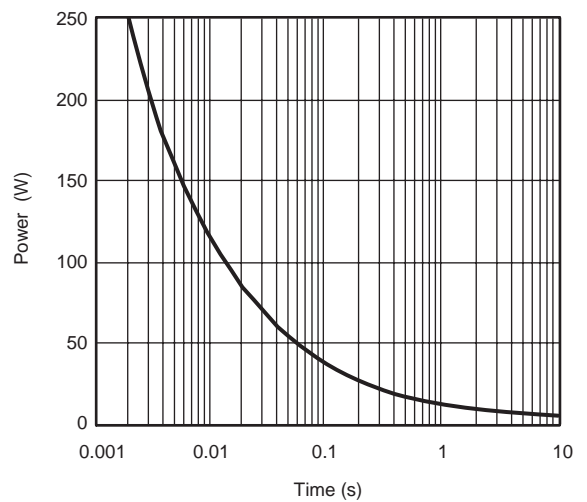
Source-Drain Diode Forward Voltage



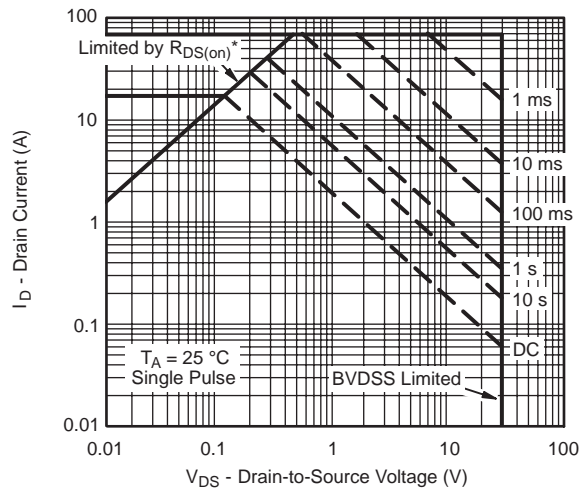
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



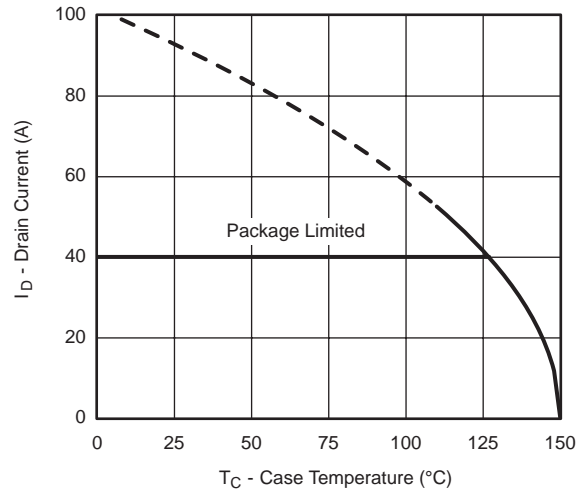
Single Pulse Power, Junction-to-Ambient



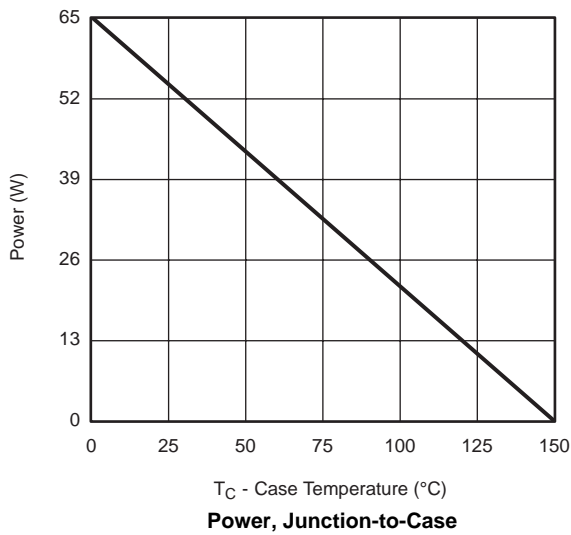
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

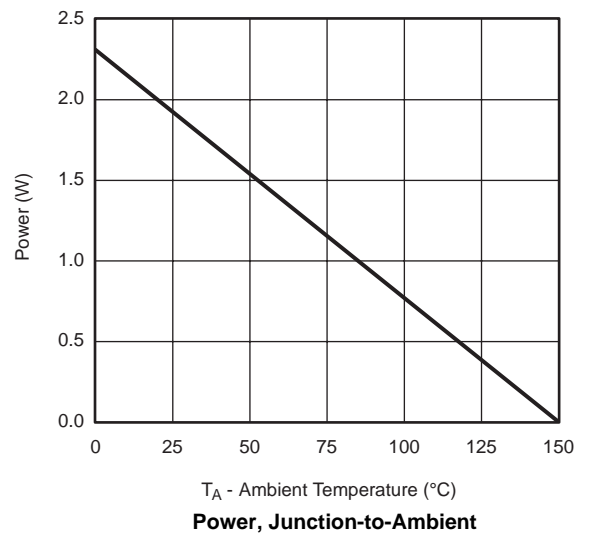
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



Current Derating*



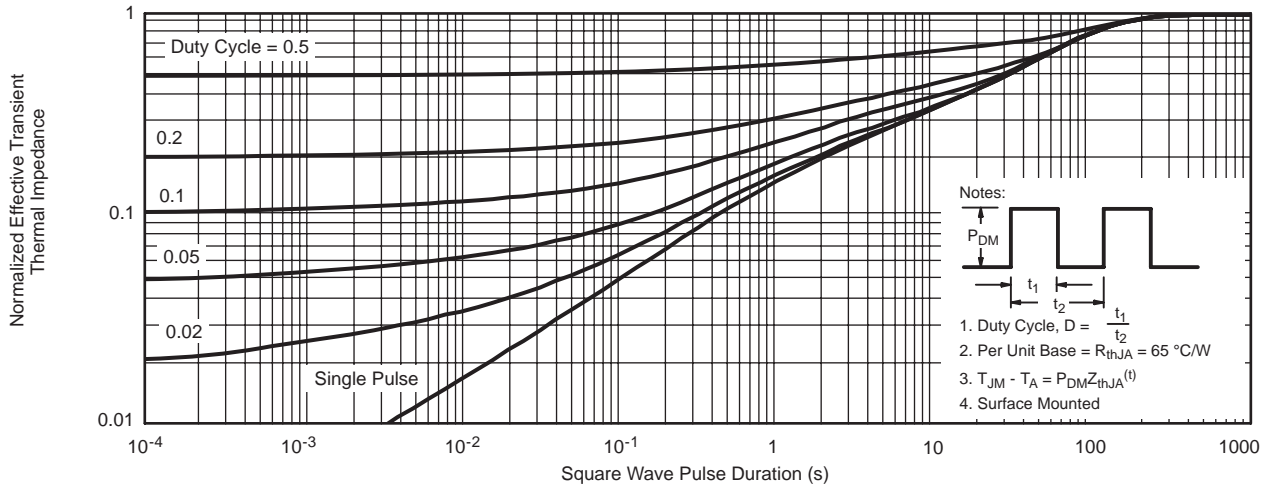
Power, Junction-to-Case



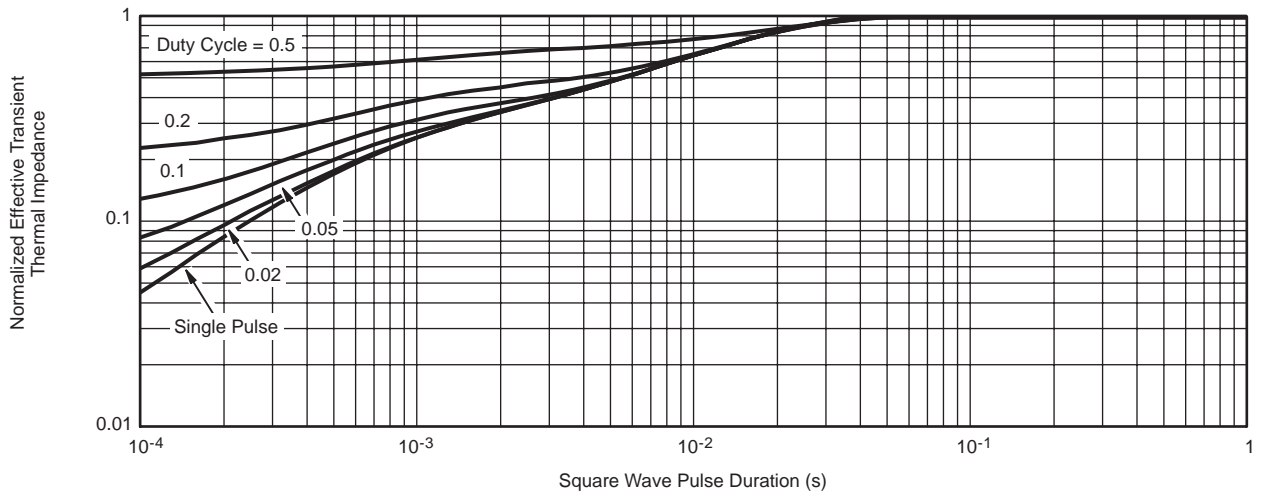
Power, Junction-to-Ambient

* 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 ELECTRICAL AND THERMAL CHARACTERISTICS

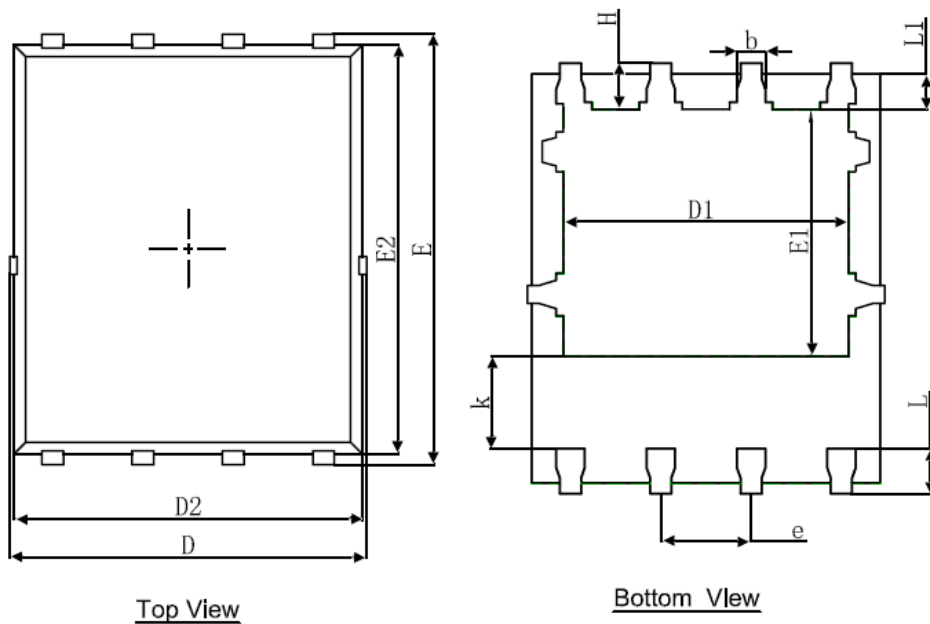


Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

Power5x6 Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.000	0.035	0.039
A3	0.254REF.		0.010REF.	
D	4.944	5.096	0.195	0.201
E	5.974	6.126	0.235	0.241
D1	3.910	4.110	0.154	0.162
E1	3.375	3.575	0.133	0.141
D2	4.824	4.976	0.190	0.196
E2	5.674	5.826	0.223	0.229
k	1.190	1.390	0.047	0.055
b	0.350	0.450	0.014	0.018
e	1.270TYP.		0.050TYP.	
L	0.559	0.711	0.022	0.028
L1	0.424	0.576	0.017	0.023
H	0.574	0.726	0.023	0.029
θ	8°	12°	8°	12°