

FDMC7570S-VB Datasheet

N-Channel 30 V (D-S) MOSFET

PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)	Q _g (Typ.)
30	0.0018 at V _{GS} = 10 V	70	22.5 nC
	0.0025 at V _{GS} = 4.5 V	60	

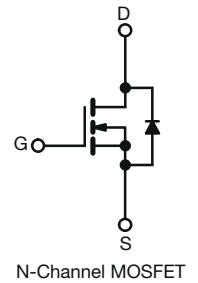
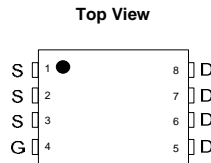
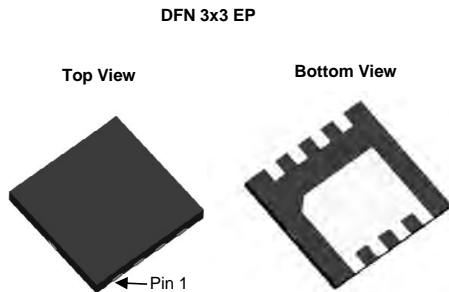
FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- TrenchFET® Gen IV Power MOSFET
- 100 % R_g and UIS Tested
- Compliant to RoHS Directive 2002/95/EC



APPLICATIONS

- Switch Mode Power Supplies
- Personal Computers and Servers
- Telecom Bricks
- VRM's and POL



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, - 16		
Continuous Drain Current (T _J = 150 °C)	I _D	T _C = 25 °C	70	A
		T _C = 70 °C	50	
		T _A = 25 °C	30.9 ^{a, b}	
		T _A = 70 °C	28.3 ^{a, b}	
Pulsed Drain Current (t = 300 μs)	I _{DM}	80	A	
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C		
		T _A = 25 °C	3.3 ^{a, b}	
Single Pulse Avalanche Current	I _{AS}	20	mJ	
Single Pulse Avalanche Energy	E _{AS}	20		
Maximum Power Dissipation	P _D	T _C = 25 °C	52	W
		T _C = 70 °C	43	
		T _A = 25 °C	3.7 ^{a, b}	
		T _A = 70 °C	3.1 ^{a, b}	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150	°C	
Soldering Recommendations (Peak Temperature) ^{c, d}		260		

THERMAL RESISTANCE RATINGS					
Parameter	Symbol	Typical	Maximum	Unit	
Maximum Junction-to-Ambient ^{a, e}	R _{thJA}	24	33	°C/W	
Maximum Junction-to-Case (Drain)	R _{thJC}	1.9	2.4		

Notes:

- Surface mounted on 1" x 1" FR4 board.
- t = 10 s.
- The DFN 3 x 3 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.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.
- Maximum under steady state conditions is 81 °C/W.
- Based on T_C = 25 °C.
- Package limited.

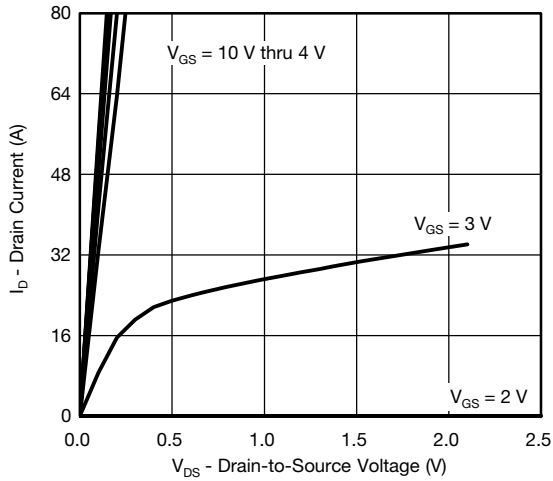
SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = 250\text{ }\mu\text{A}$		14		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			- 5.5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1.1		2.2	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = + 20\text{ V}, - 16\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 30\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	40			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 15\text{ A}$		0.0018		Ω
		$V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		0.0025		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 15\text{ A}$		105		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		3050		pF
Output Capacitance	C_{oss}			1040		
Reverse Transfer Capacitance	C_{rss}			79		
C_{rss}/C_{iss} Ratio				0.022	0.044	
Total Gate Charge	Q_g	$V_{DS} = 15\text{ V}, V_{GS} = 10\text{ V}, I_D = 10\text{ A}$		51	77	nC
		$V_{DS} = 15\text{ V}, V_{GS} = 4.5\text{ V}, I_D = 10\text{ A}$		22.5	34	
Gate-Source Charge	Q_{gs}		8.6			
Gate-Drain Charge	Q_{gd}		4			
Output Charge	Q_{oss}	$V_{DS} = 15\text{ V}, V_{GS} = 0\text{ V}$		30.5		
Gate Resistance	R_g	$f = 1\text{ MHz}$	0.3	1.25	2.5	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 4.5\text{ V}, R_g = 1\text{ }\Omega$		24	48	ns
Rise Time	t_r			17	34	
Turn-Off Delay Time	$t_{d(off)}$			25	50	
Fall Time	t_f			10	20	
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \cong 10\text{ A}, V_{GEN} = 10\text{ V}, R_g = 1\text{ }\Omega$		12	24	
Rise Time	t_r			10	20	
Turn-Off Delay Time	$t_{d(off)}$			30	60	
Fall Time	t_f			8	16	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			40	A
Pulse Diode Forward Current	I_{SM}				80	
Body Diode Voltage	V_{SD}	$I_S = 5\text{ A}, V_{GS} = 0\text{ V}$		0.73	1.1	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 10\text{ A}, dI/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		36	70	ns
Body Diode Reverse Recovery Charge	Q_{rr}			24	48	nC
Reverse Recovery Fall Time	t_a			16		ns
Reverse Recovery Rise Time	t_b			20		

Notes:

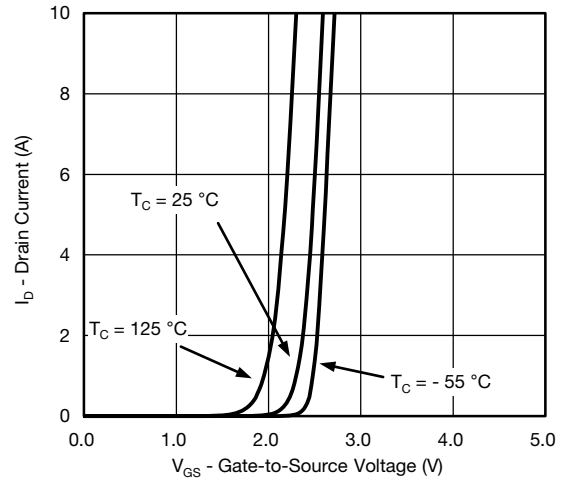
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$
- Guaranteed by design, not subject to production testing.

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.

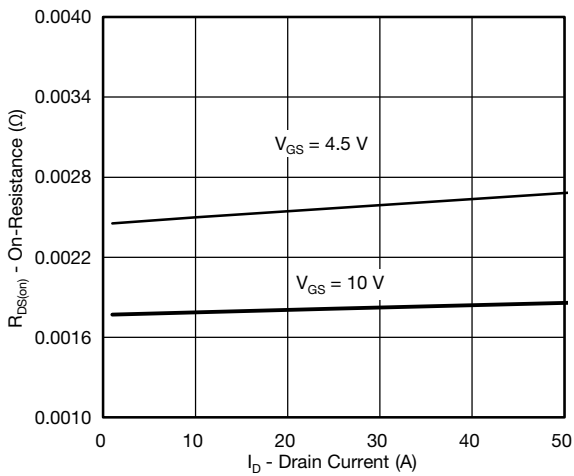
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



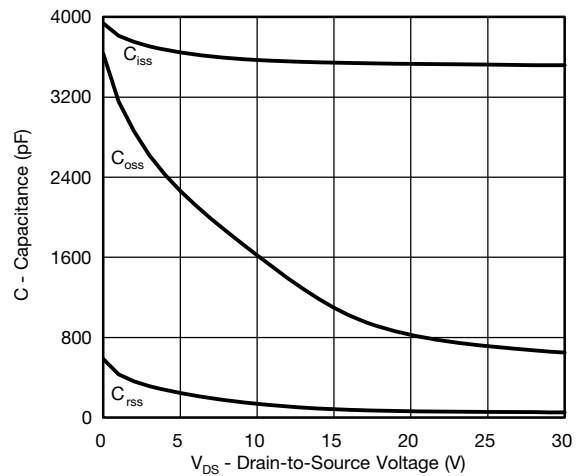
Output Characteristics



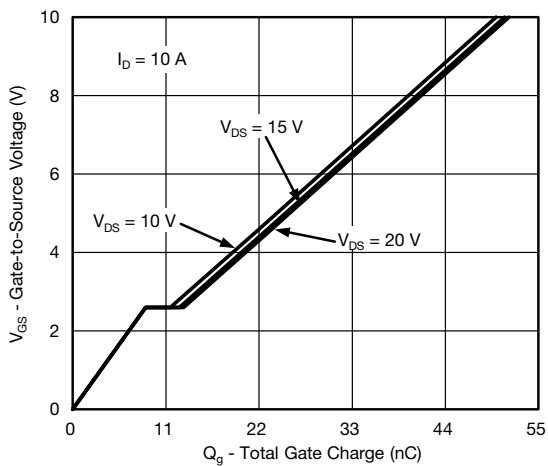
Transfer Characteristics



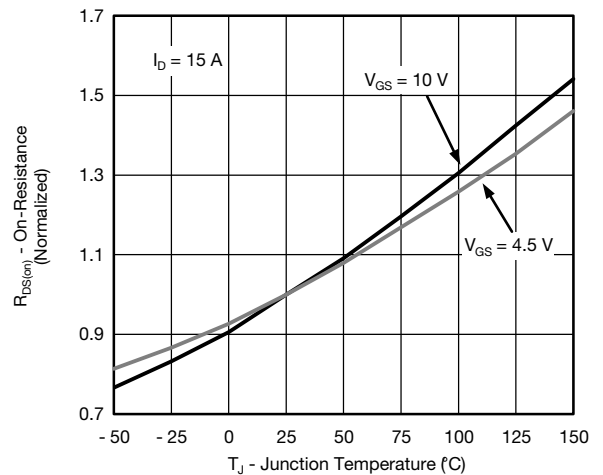
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

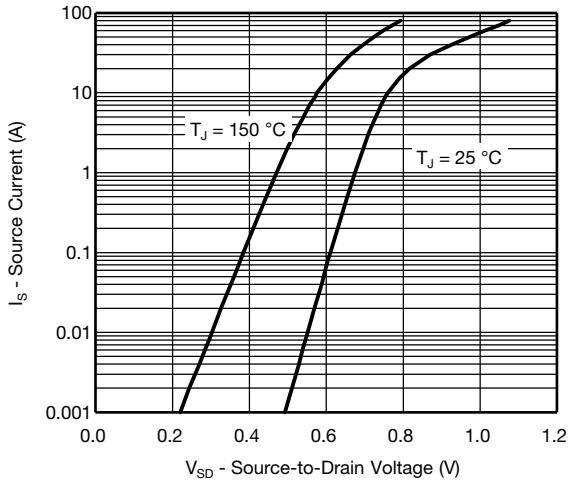


Gate Charge

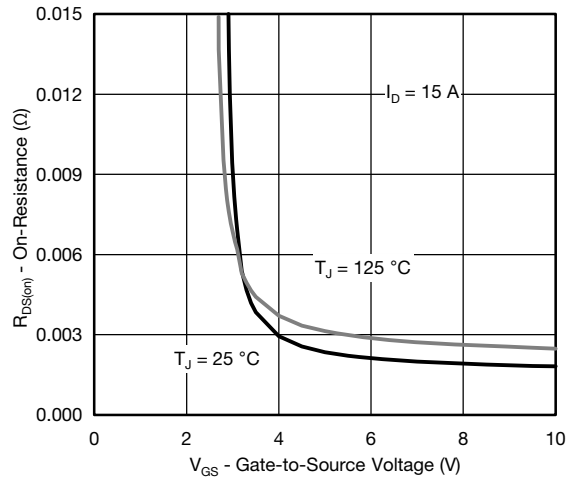


On-Resistance vs. Junction Temperature

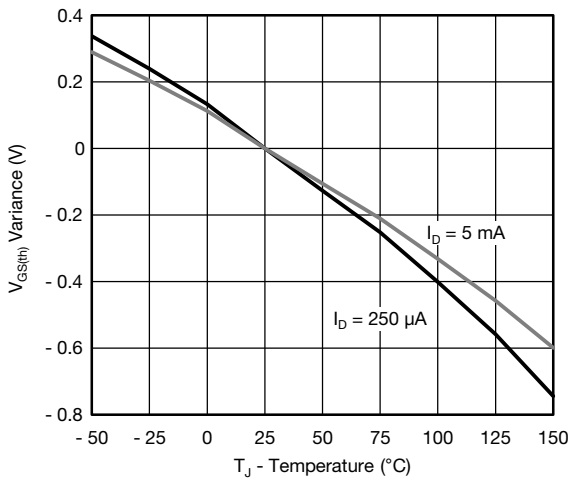
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



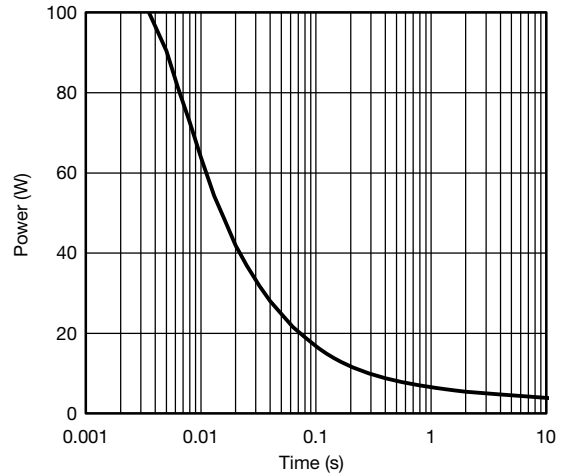
Source-Drain Diode Forward Voltage



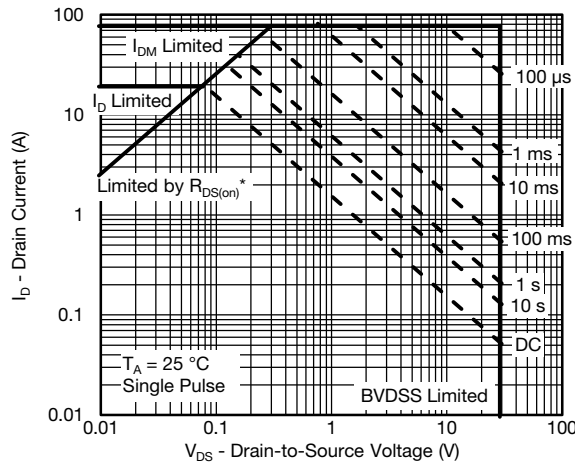
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



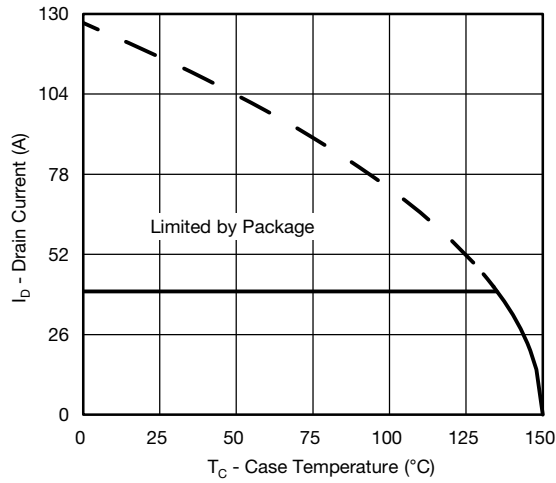
Single Pulse Power, Junction-to-Ambient



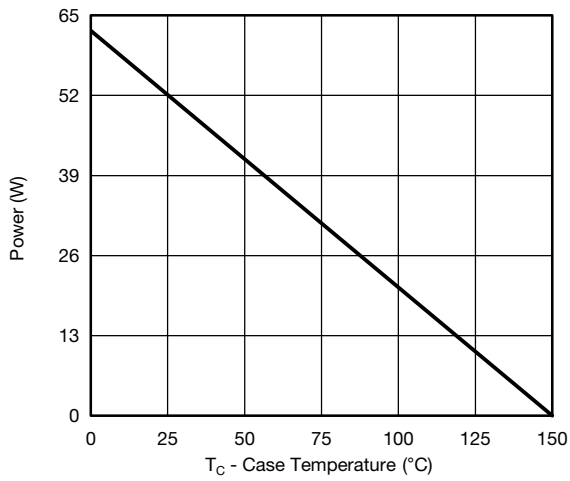
Safe Operating Area, Junction-to-Ambient

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

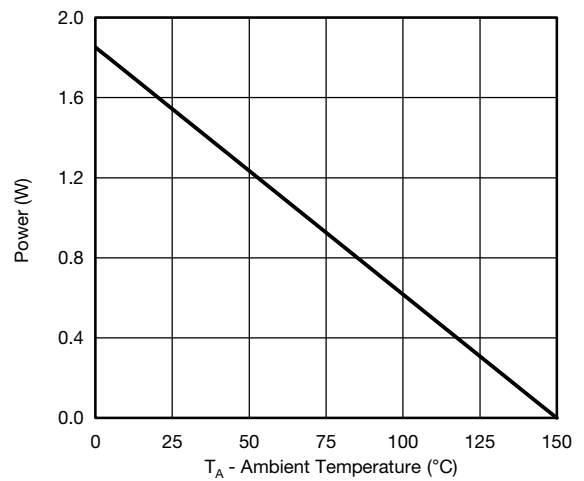
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



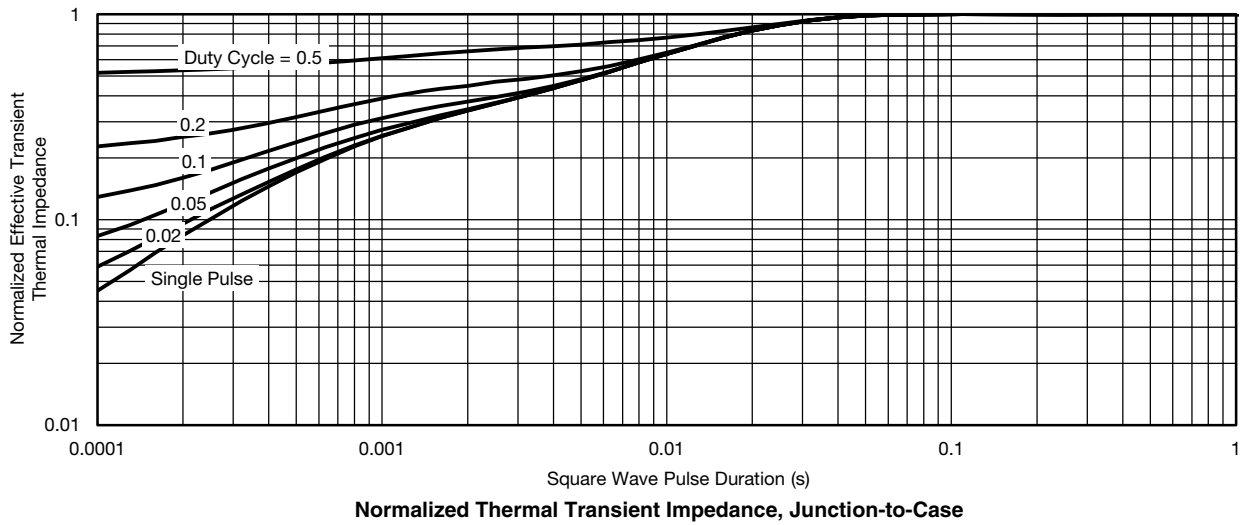
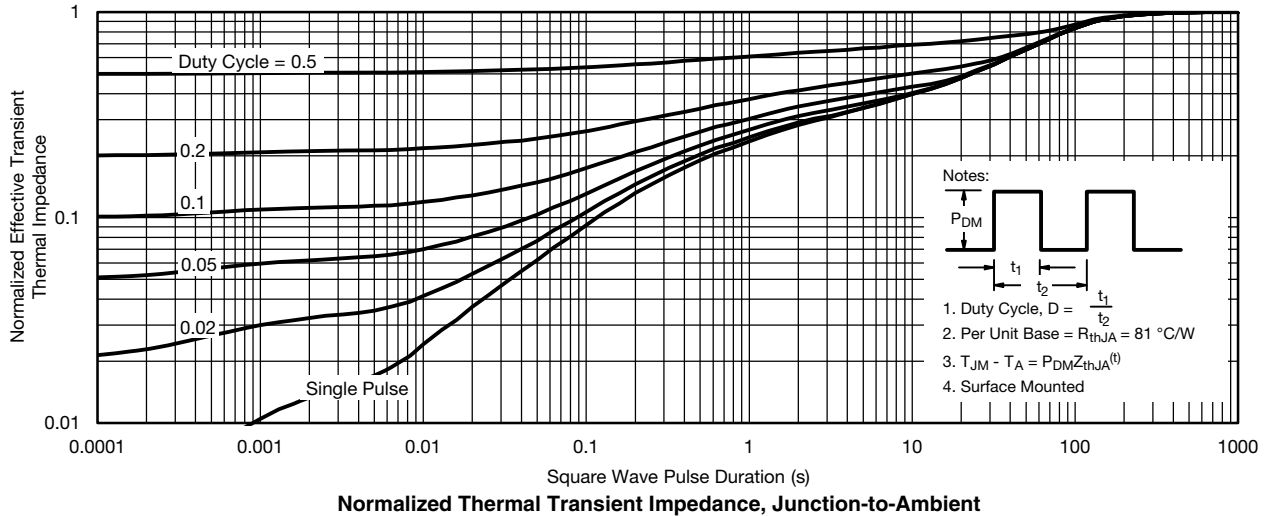
Power, Junction-to-Case

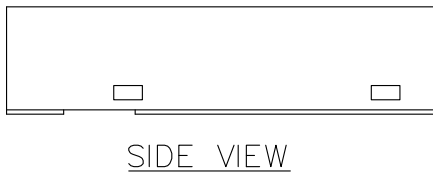
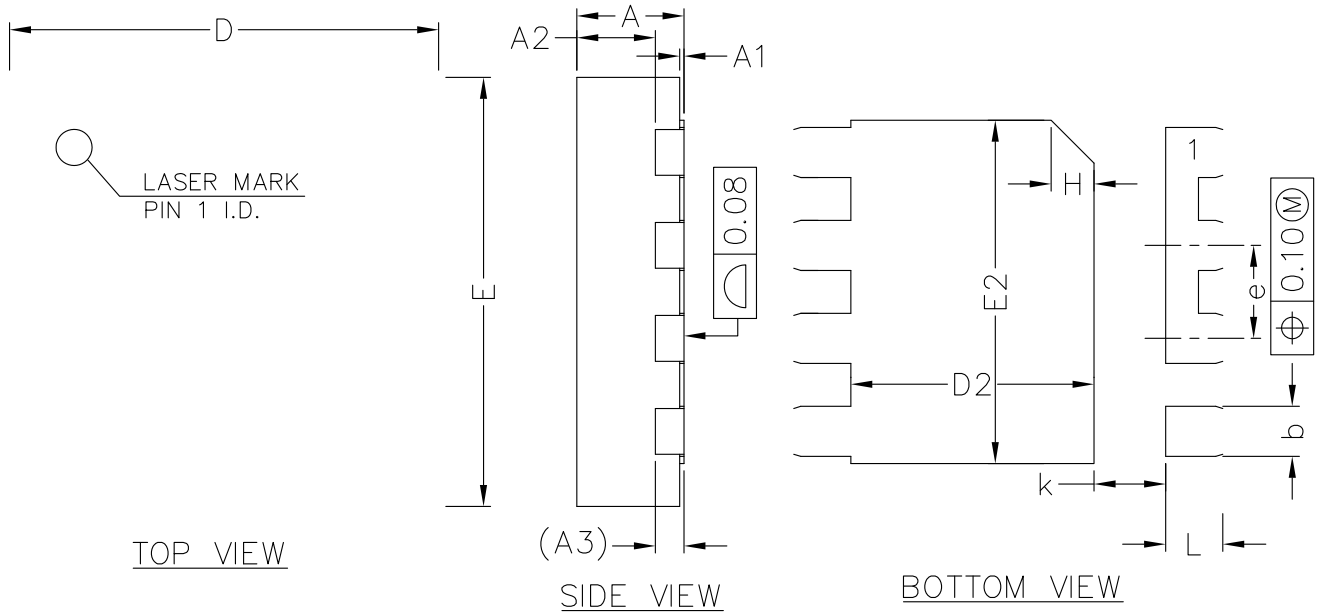


Power, Junction-to-Ambient

* 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 CHARACTERISTICS (25 °C, unless otherwise noted)





COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2	0.50	0.55	0.60
A3	0.20REF		
b	0.30	0.35	0.40
D	2.90	3.00	3.10
E	2.90	3.00	3.10
D2	1.60	1.70	1.80
E2	2.30	2.40	2.50
e	0.55	0.65	0.75
K	0.40	0.50	0.60
L	0.35	0.40	0.45

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