HM25P03D-VB Datasheet
P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)[e,f]	Q_g (Typ.)
- 30	0.0083 at V_{GS} = - 10 V	- 35	24.6 nC
	0.0155 at V_{GS} = - 4.5V	- 35	

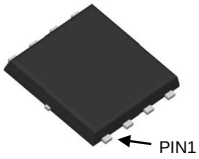
FEATURES

- **Halogen-free According to IEC 61249-2-21 Definition**
- Trench Power MOSFET
- Low Thermal Resistance Power Package with Small Size and Low 1.07 mm Profile
- 100 % R_g Tested
- 100 % UIS Tested
- Compliant to RoHS Directive 2002/95/EC

RoHS COMPLIANT
HALOGEN FREE

DFN5X6

Top View

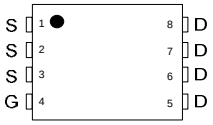


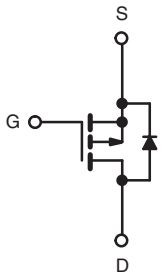
Bottom View

APPLICATIONS

- Load Switch
- Adaptor Switch
- Notebook PC

Top View





P-Channel MOSFET

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	
Continuous Drain Current (T_J = 150 °C)	T_C = 25 °C	I_D	- 35[e]	A
	T_C = 70 °C		- 35[e]	
	T_A = 25 °C		- 16.1[a, b]	
	T_A = 70 °C		- 12.9[a, b]	
Pulsed Drain Current		I_{DM}	- 60	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 30	
	T_A = 25 °C		- 3.5[a, b]	
Avalanche Current	L = 0.1 mH	I_{AS}	- 25	
Single-Pulse Avalanche Energy		E_{AS}	31.25	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	35.7	W
	T_C = 70 °C		22.8	
	T_A = 25 °C		4.2[a, b]	
	T_A = 70 °C		2.7[a, b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 50 to 150	°C
Soldering Recommendations (Peak Temperature)[c, d]			260	

Notes:
a. Package limited.
b. Duty cycle ≤ 1 %.
c. See SOA curve fo voltage derating.
d. When mounted on 1" square PCB (FR-4 material).

THERMAL RESISTANCE RATINGS					
Parameter		**Symbol**	**Typical**	**Maximum**	**Unit**
Maximum Junction-to-Ambient[a, b]	t ≤ 10 s	R_{thJA}	25	30	°C/W
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	2.9	3.5	

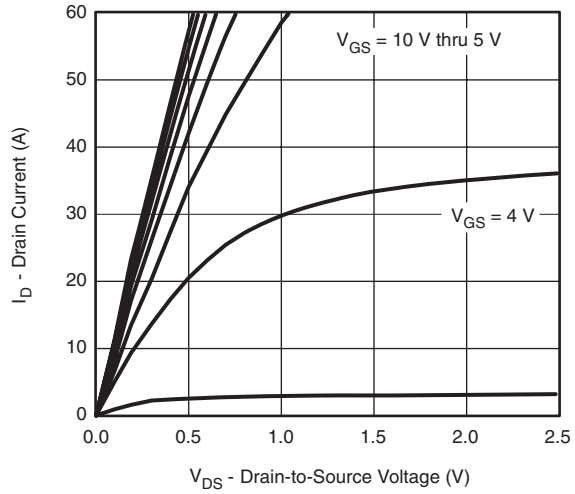
Notes:
a. Surface mounted on 1" x 1" FR4 board.
b. Maximum under steady state conditions is 70 °C/W.

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	- 30			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 20		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			5		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1.2		- 2.8	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} = - 30 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 30 V, V_{GS} = 0 V, T_J = 55 °C			- 10	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} ≤ - 5 V, V_{GS} = - 10 V	- 20			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 16.1 A		0.0083		Ω
		V_{GS} = - 4.5 V, I_D = 11.8 A		0.0155		
Forward Transconductance[a]	g_{fs}	V_{DS} = - 15 V, I_D = - 16.1 A		37		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 15 V, V_{GS} = 0 V, f = 1 MHz		2230		pF
Output Capacitance	C_{oss}			385		
Reverse Transfer Capacitance	C_{rss}			322		
Total Gate Charge	Q_g	V_{DS} = - 15 V, V_{GS} = - 10 V, I_D = - 14.4 A		47.5	71	nC
		V_{DS} = - 15 V, V_{GS} = - 4.5 V, I_D = - 14.4 A		24.6	37	
Gate-Source Charge	Q_{gs}			7.7		
Gate-Drain Charge	Q_{gd}			12		
Gate Resistance	R_g	f = 1 MHz	0.3	1.5	3.0	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 1.5 Ω, I_D ≅ - 10 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		50	75	ns
Rise Time	t_r			43	65	
Turn-Off DelayTime	$t_{d(off)}$			30	45	
Fall Time	t_f			14	21	
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 15 V, R_L = 1.5 Ω, I_D ≅ - 10 A, V_{GEN} = - 10 V, R_g = 1 Ω		14	21	
Rise Time	t_r			9	18	
Turn-Off DelayTime	$t_{d(off)}$			36	54	
Fall Time	t_f			10	20	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	T_C = 25 °C			- 30	A
Pulse Diode Forward Current[a]	I_{SM}				- 60	
Body Diode Voltage	V_{SD}	I_F = - 10 A		- 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		31	47	ns
Body Diode Reverse Recovery Charge	Q_{rr}			30	45	nC
Reverse Recovery Fall Time	t_a			15		ns
Reverse Recovery Rise Time	t_b			16		

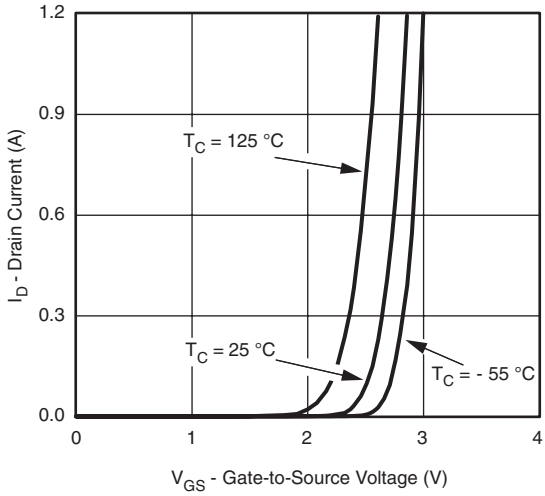
Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.

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.

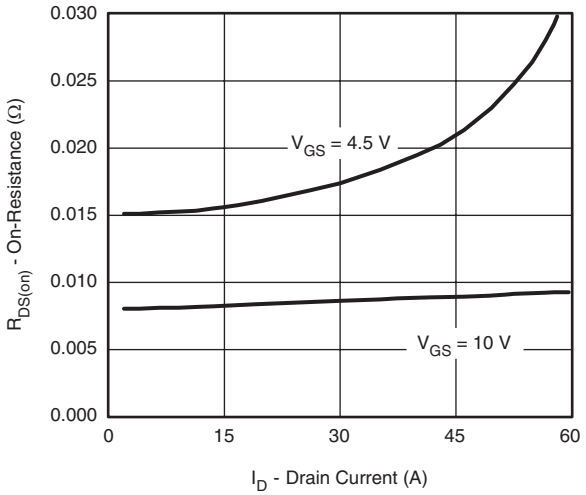
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



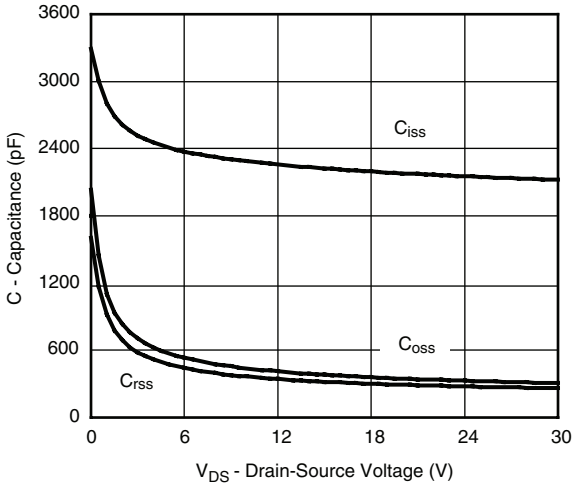
Output Characteristics



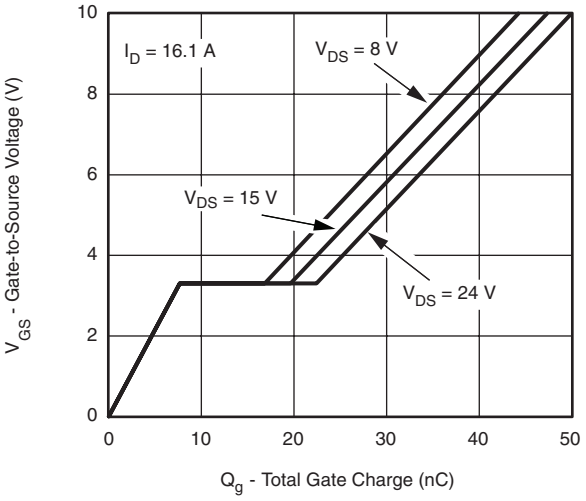
Transfer Characteristics



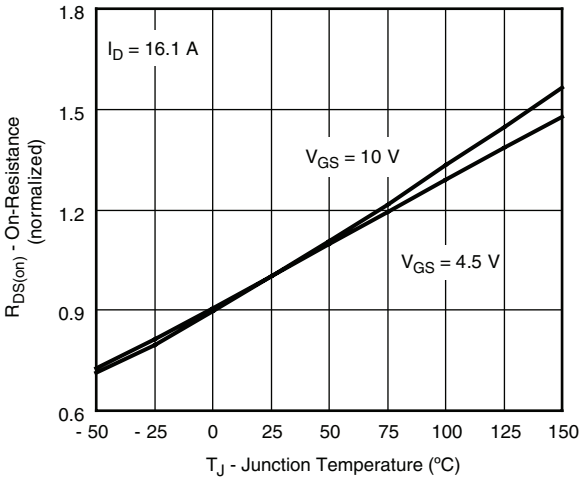
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

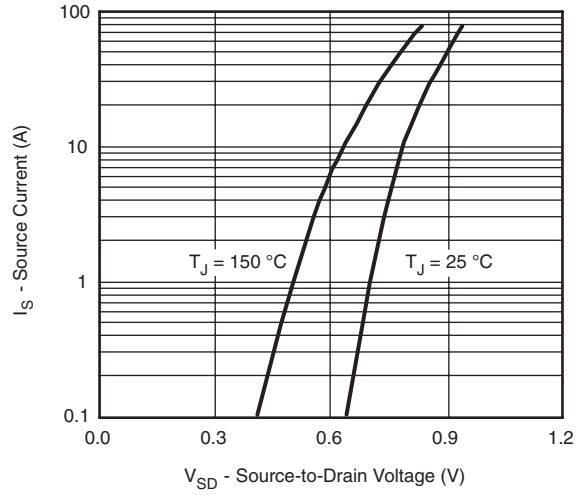


Gate Charge

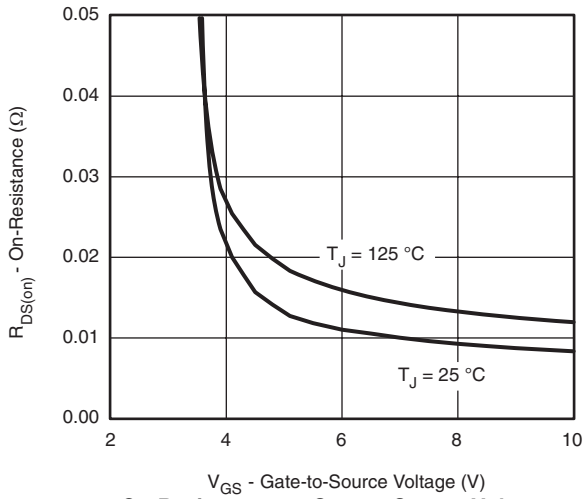


On-Resistance vs. Junction Temperature

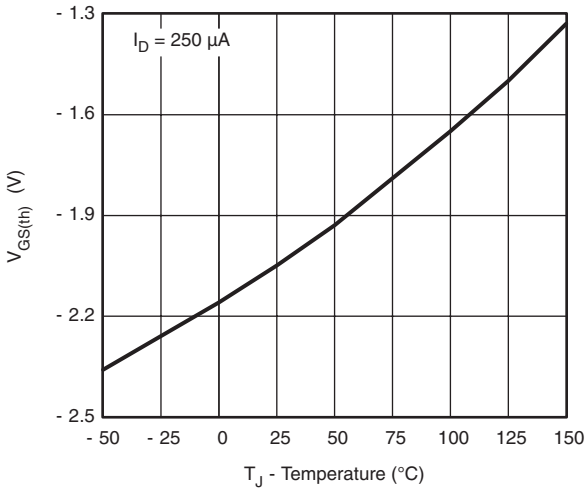
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



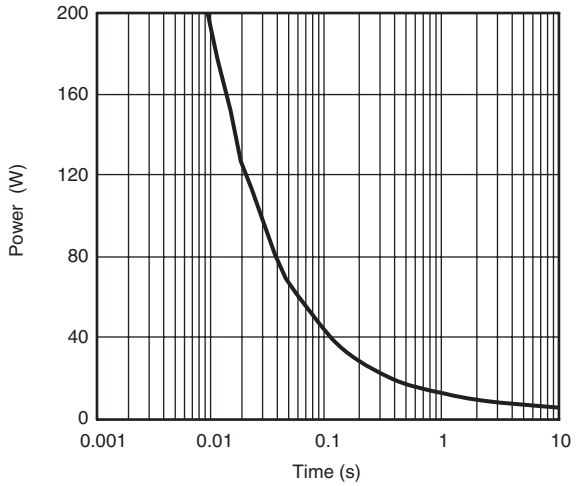
Source-Drain Diode Forward Voltage



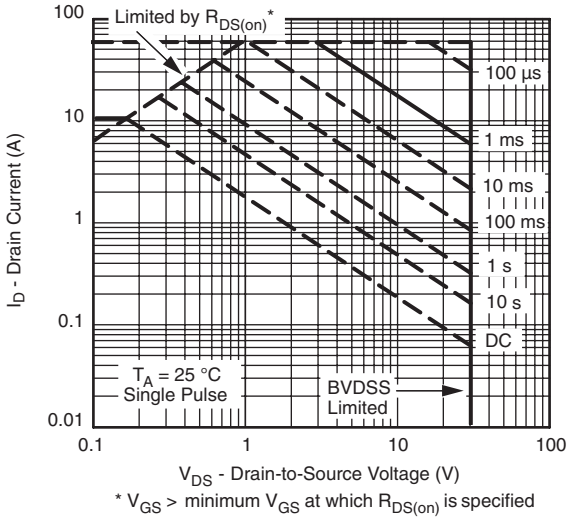
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

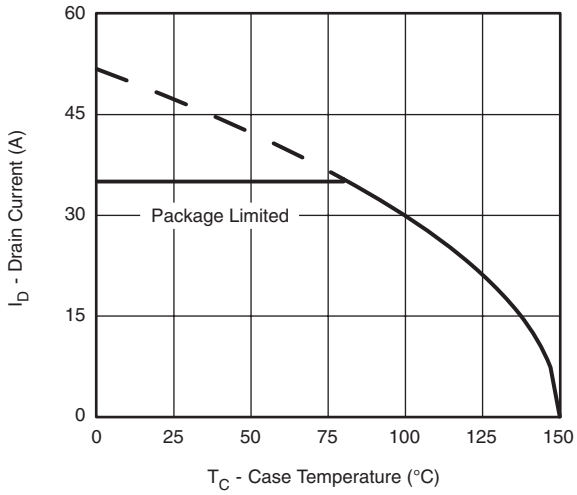


Single Pulse Power, Junction-to-Ambient

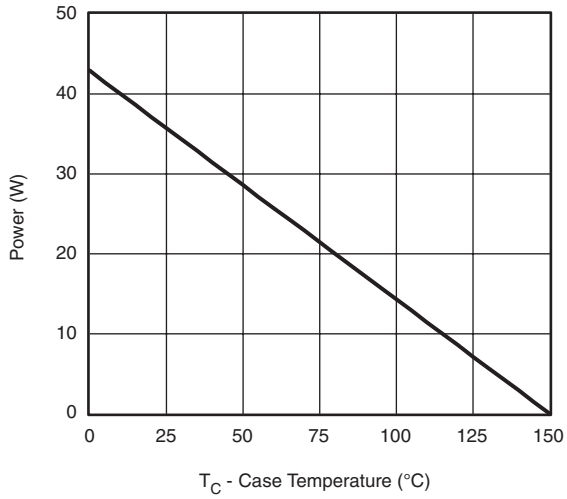


Safe Operating Area, Junction-to-Ambient

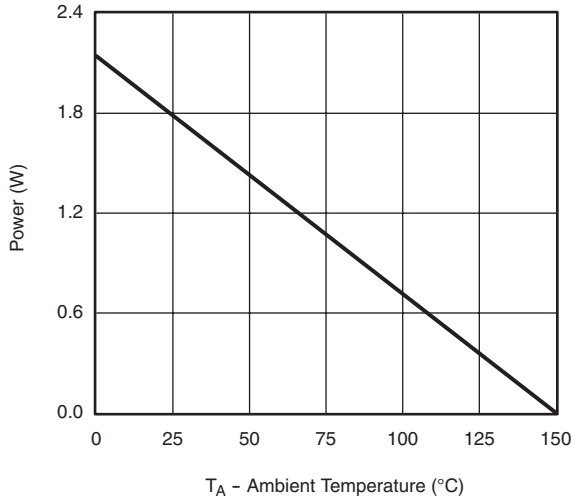
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Current Derating*



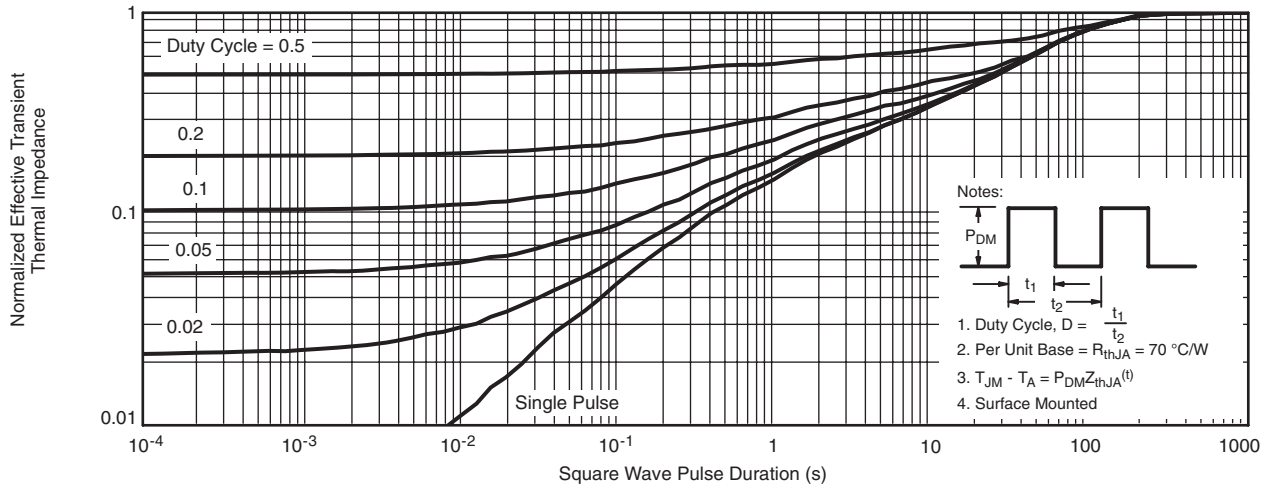
Power, Junction-to-Case



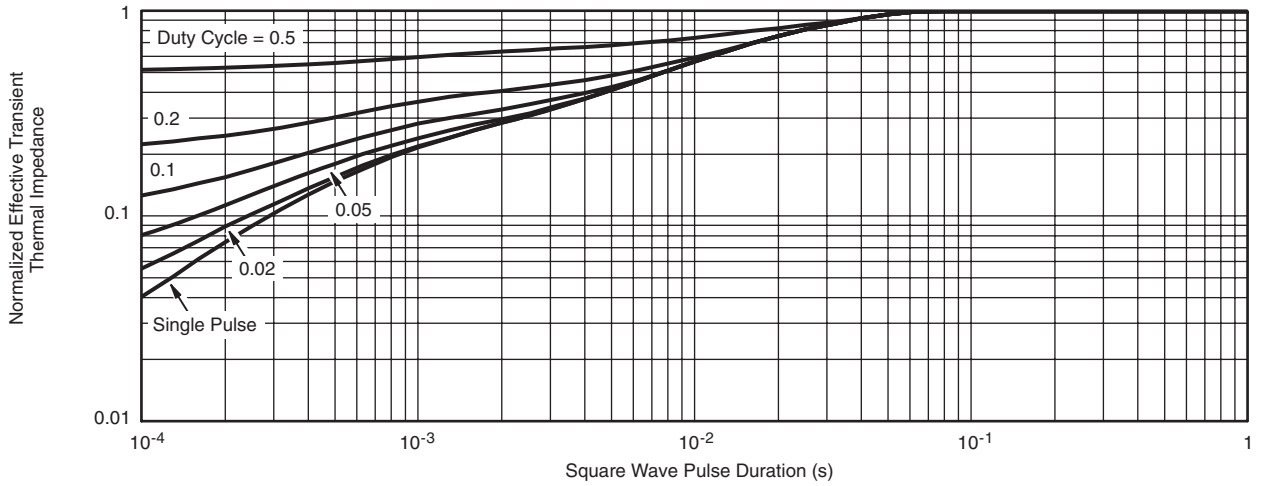
Power, Junction-to-Ambient

* 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

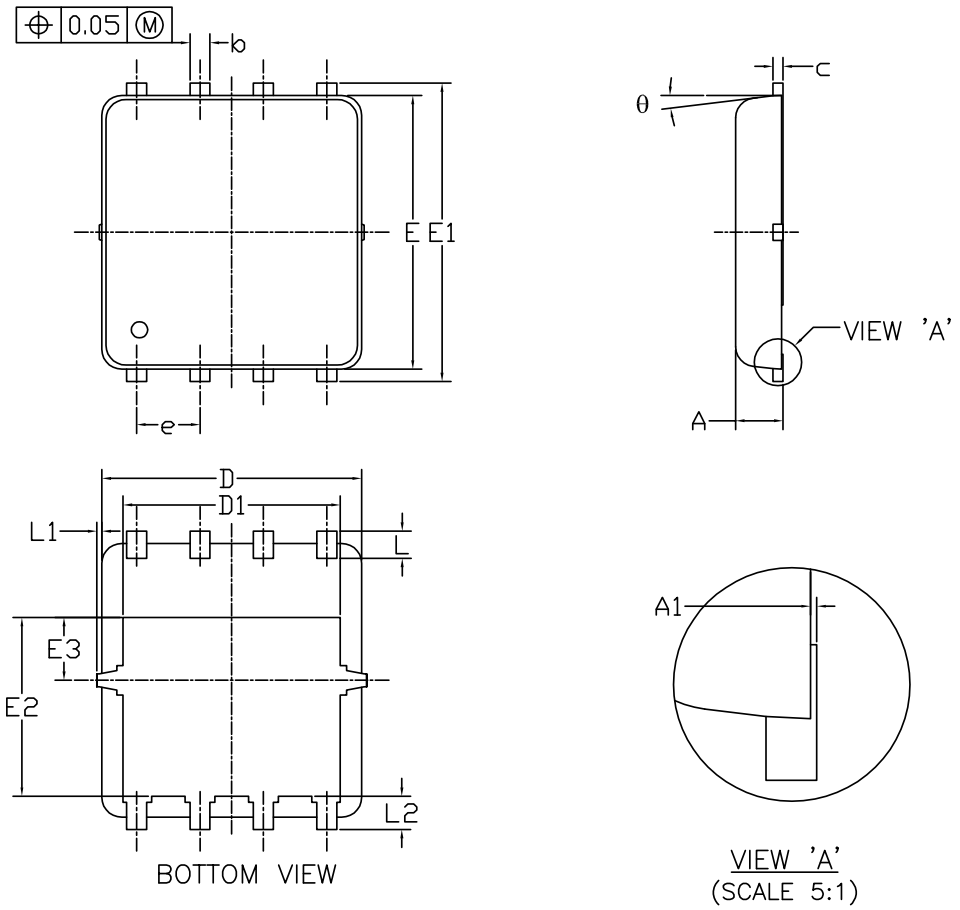


Normalized Thermal Transient Impedance, Junction-to-Ambient

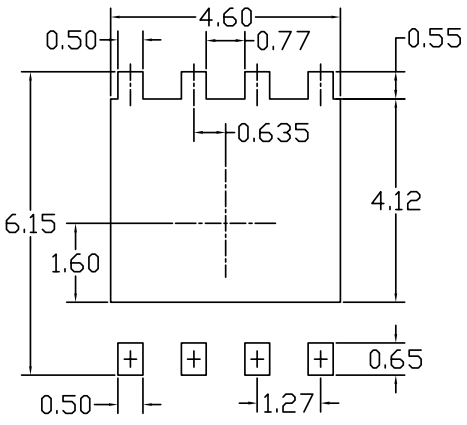


Normalized Thermal Transient Impedance, Junction-to-Case

DFN5x6_8L_EP1_P PACKAGE OUTLIN



RECOMMENDED LAND PATTERN



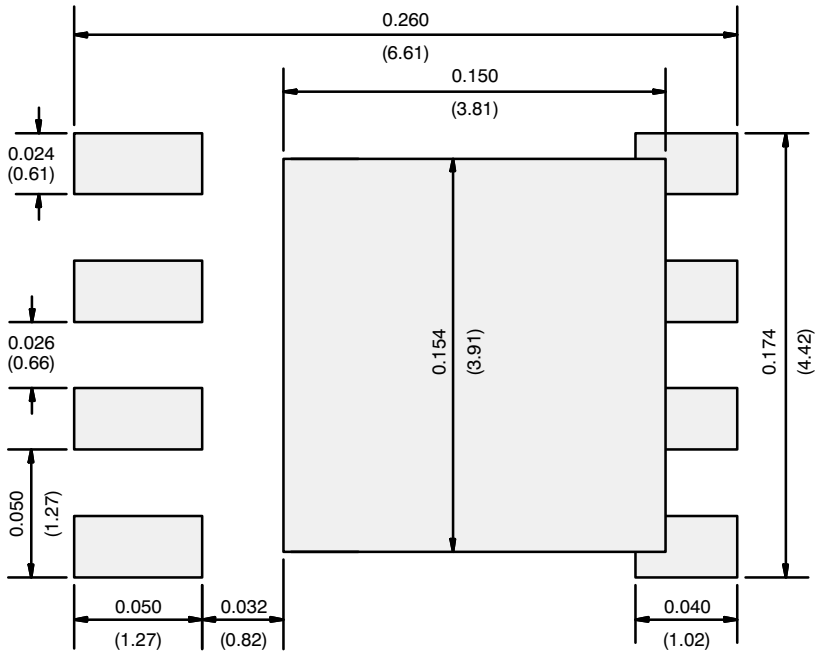
SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	---	0.05	0.000	---	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.10	5.20	5.30	0.201	0.205	0.209
D1	4.25	4.35	4.45	0.167	0.171	0.175
E	5.45	5.55	5.65	0.215	0.219	0.222
E1	5.95	6.05	6.15	0.234	0.238	0.242
E2	3.525	3.625	3.725	0.139	0.143	0.147
E3	1.175	1.275	1.375	0.046	0.050	0.054
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	---	0.15	0	---	0.006
L2	0.68 REF			0.027 REF		
θ	0°	---	10°	0°	---	10°

UNIT: mm

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
   MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.

RECOMMENDED MINIMUM PADS FOR DFN5 x 6



Recommended Minimum Pads
Dimensions in Inches/(mm)

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