

P-Channel 60-V (D-S) MOSFET



RoHS
COMPLIANT

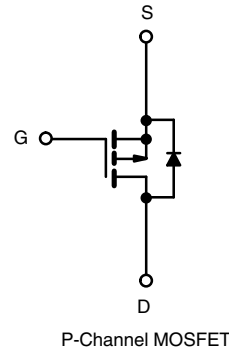
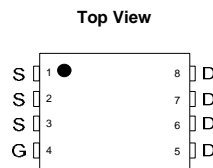
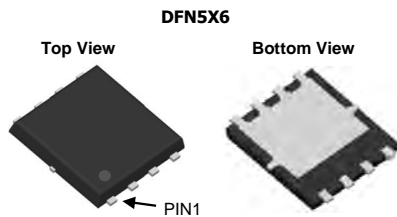
PRODUCT SUMMARY			
V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A) ^{a, e}	Q _g (Typ.)
-60	0.0075 at V _{GS} = -10 V	-90	62nC
	0.0095 at V _{GS} = -4.5 V	-75	

FEATURES

- DT-Trench Power MOSFET
- 100 % R_g and UIS Tested

APPLICATIONS

- Notebook
- Load Switch



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)			
PARAMETER	SYMBOL	Limit	UNIT
Drain-Source Voltage	V _{DS}	- 60	V
Gate-Source Voltage	V _{GS}	± 20	
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	- 90
		T _A = 70 °C	- 57.6
Pulsed Drain Current	I _{DM}	- 360	A
Continuous Source Current (Diode Conduction) ^a	I _S	- 90	
Avalanche Current	I _{AS}	- 87	
Single Pulse Avalanche Energy	E _{AS}	225	mJ
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	110
		T _A = 70 °C	70.5
Operating Junction and Storage Temperature Range	T _J , T _{stg}	-55 to +150	°C
Soldering Recommendations (Peak Temperature) ^{b, c}		260	

THERMAL RESISTANCE RATINGS				
PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum Junction-to-Ambient ^a	R _{thJA}	t ≤ 10 s	11	°C/W
		Steady State	19	
Maximum Junction-to-Case (Drain)	R _{thJC}	1	1.3	

Notes

- Surface mounted on 1" x 1" FR4 board.
- The DFN5x6 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.

SPECIFICATIONS ($T_J = 25\text{ }^\circ\text{C}$, unless otherwise noted)

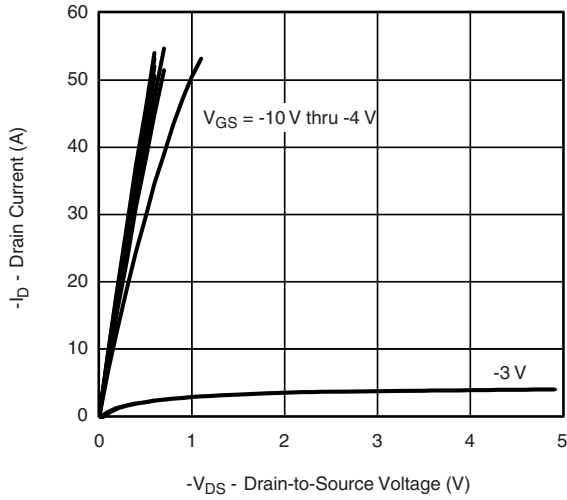
Parameter	Symbol	Test Conditions	Min .	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = -250\text{ }\mu\text{A}$	-60			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	$I_D = -250\text{ }\mu\text{A}$		-35		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			-5.8		
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	1.0		2.5	V
Gate-Source Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -60\text{ V}, V_{GS} = 0\text{ V}$			-1	μA
		$V_{DS} = -48\text{ V}, V_{GS} = 0\text{ V}, T_J = 55\text{ }^\circ\text{C}$			-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq -5\text{ V}, V_{GS} = -10\text{ V}$	-90			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -15\text{ A}$		0.0075	0.092	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$		0.095	0.014	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -15\text{ A}$		-62		S
Dynamic^b						
Input Capacitance	C_{iss}	$V_{DS} = -30\text{ V}, V_{GS} = 0\text{ V}, f = 1\text{ MHz}$		4965		pF
Output Capacitance	C_{oss}			602		
Reverse Transfer Capacitance	C_{rss}			81		
Total Gate Charge	Q_g	$V_{DS} = -30\text{ V}, V_{GS} = -10\text{ V}, I_D = -15\text{ A}$		85		nC
		$V_{DS} = -30\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$		58		
Gate-Source Charge	Q_{gs}	$V_{DS} = -30\text{ V}, V_{GS} = -4.5\text{ V}, I_D = -15\text{ A}$		15		
Gate-Drain Charge	Q_{gd}			8.3		
Gate Resistance	R_g	$f = 1\text{ MHz}$		2.5	5.0	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 1.2\text{ }\Omega$ $I_D \equiv -15\text{ A}, V_{GEN} = -10\text{ V}, R_g = 3\text{ }\Omega$		32		ns
Rise Time	t_r			17		
Turn-Off Delay Time	$t_{d(off)}$			92		
Fall Time	t_f			13		
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}, R_L = 1.5\text{ }\Omega$ $I_D \equiv -15\text{ A}, V_{GEN} = -4.5\text{ V}, R_g = 3\text{ }\Omega$		55		
Rise Time	t_r			21		
Turn-Off Delay Time	$t_{d(off)}$			107		
Fall Time	t_f			19		
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^\circ\text{C}$			-90	A
Pulse Diode Forward Current ^a	I_{SM}				-360	
Body Diode Voltage	V_{SD}	$I_S = -10\text{ A}$		-0.8	-1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = -10\text{ A}, di/dt = 100\text{ A}/\mu\text{s}, T_J = 25\text{ }^\circ\text{C}$		60		ns
Body Diode Reverse Recovery Charge	Q_{rr}			71		nC
Reverse Recovery Fall Time	t_a			27		ns
Reverse Recovery Rise Time	t_b			21		

Notes:

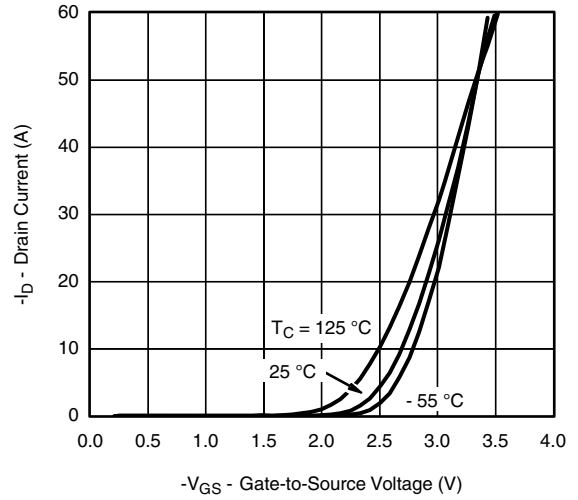
- Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
- Guaranteed by design, not subject to production testing.

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.

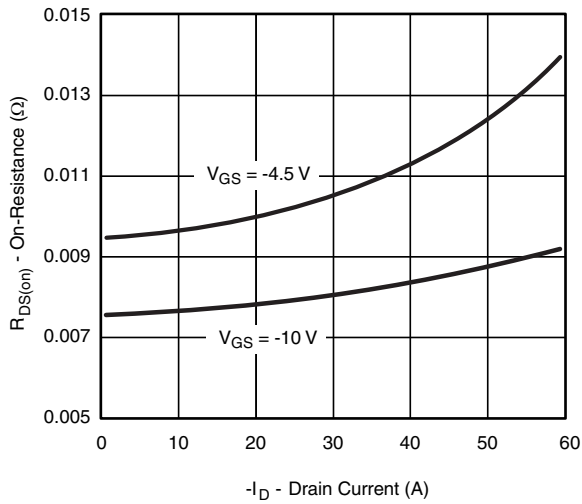
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



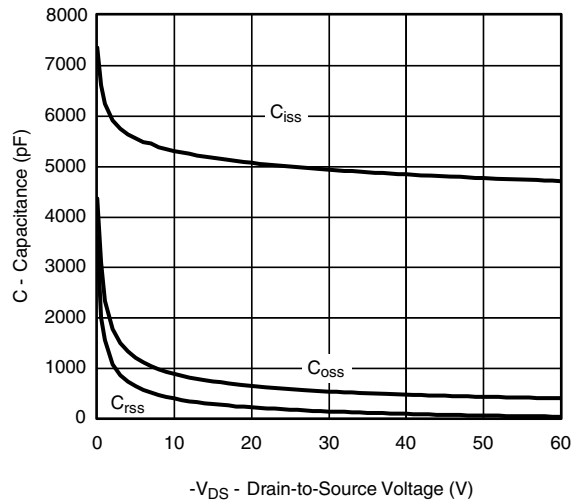
Output Characteristics



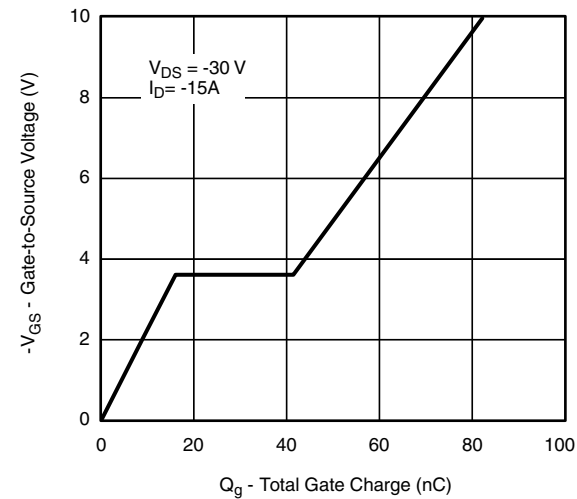
Transfer Characteristics



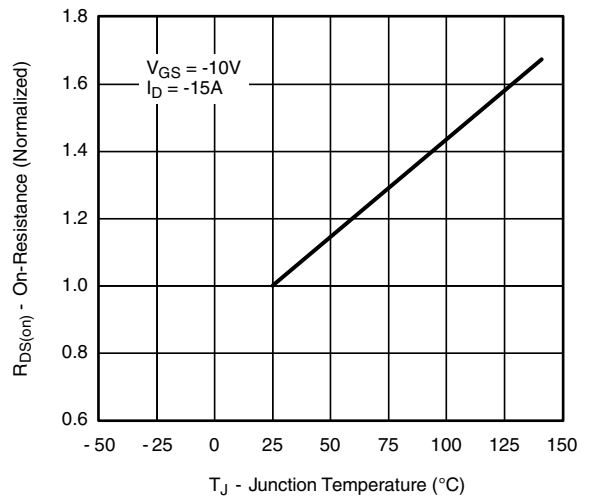
On-Resistance vs. Drain Current



Capacitance

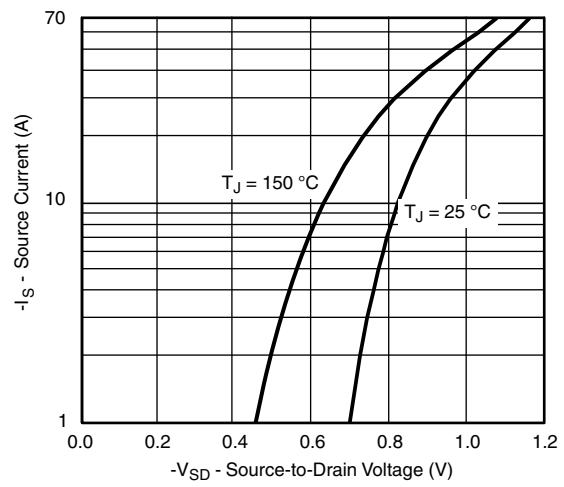


Gate Charge

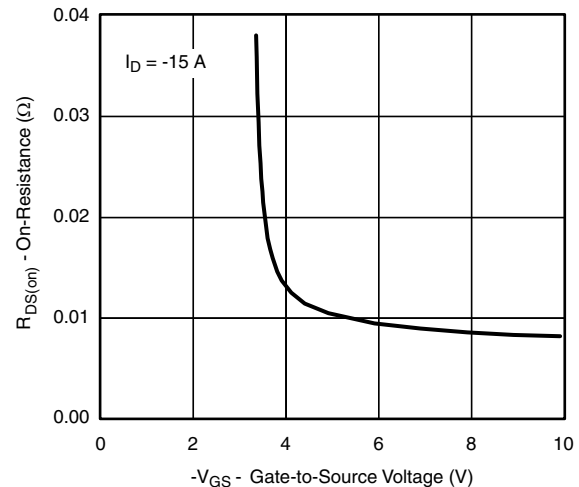


On-Resistance vs. Junction Temperature

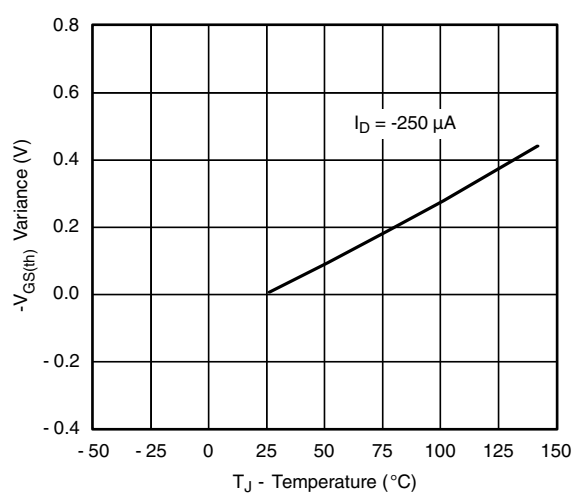
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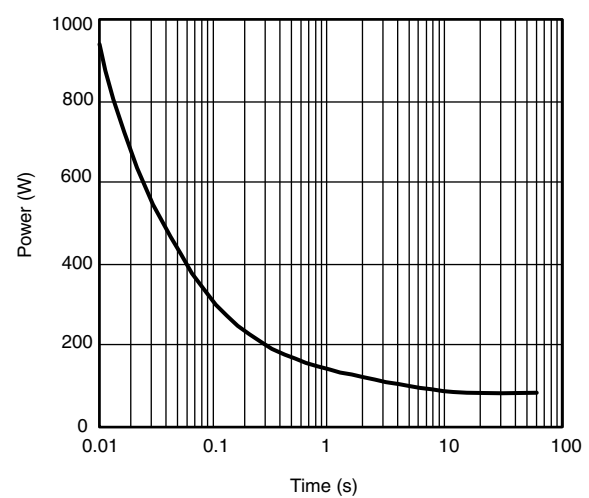
Source-Drain Diode Forward Voltage



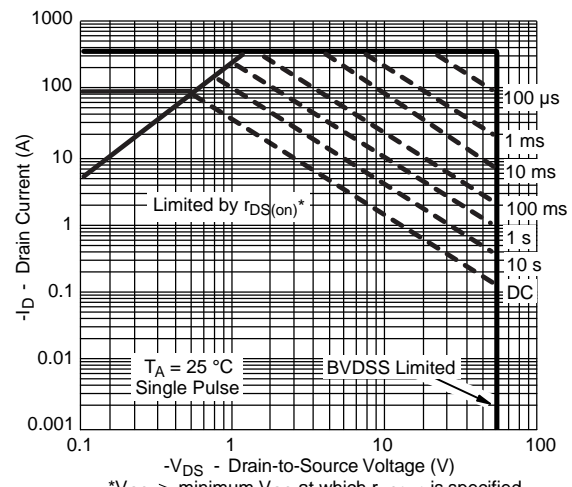
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

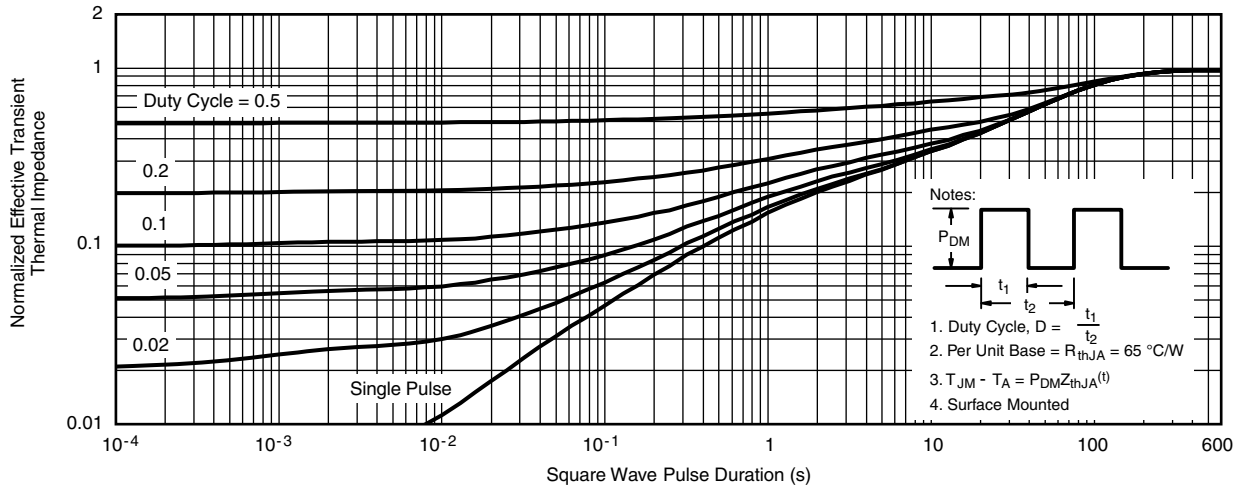


Single Pulse Power, Junction-to-Ambient

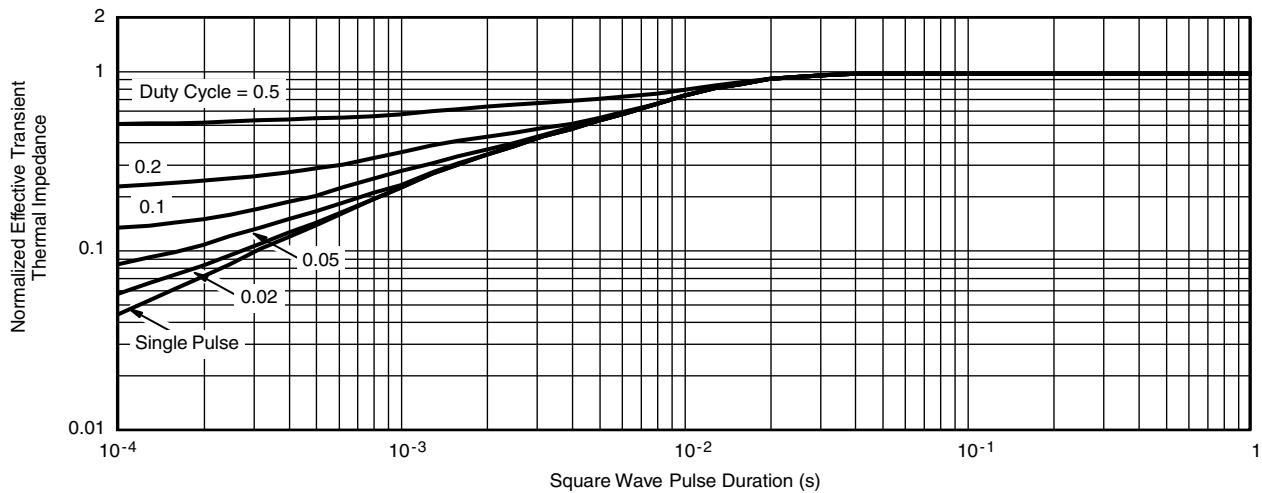


Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

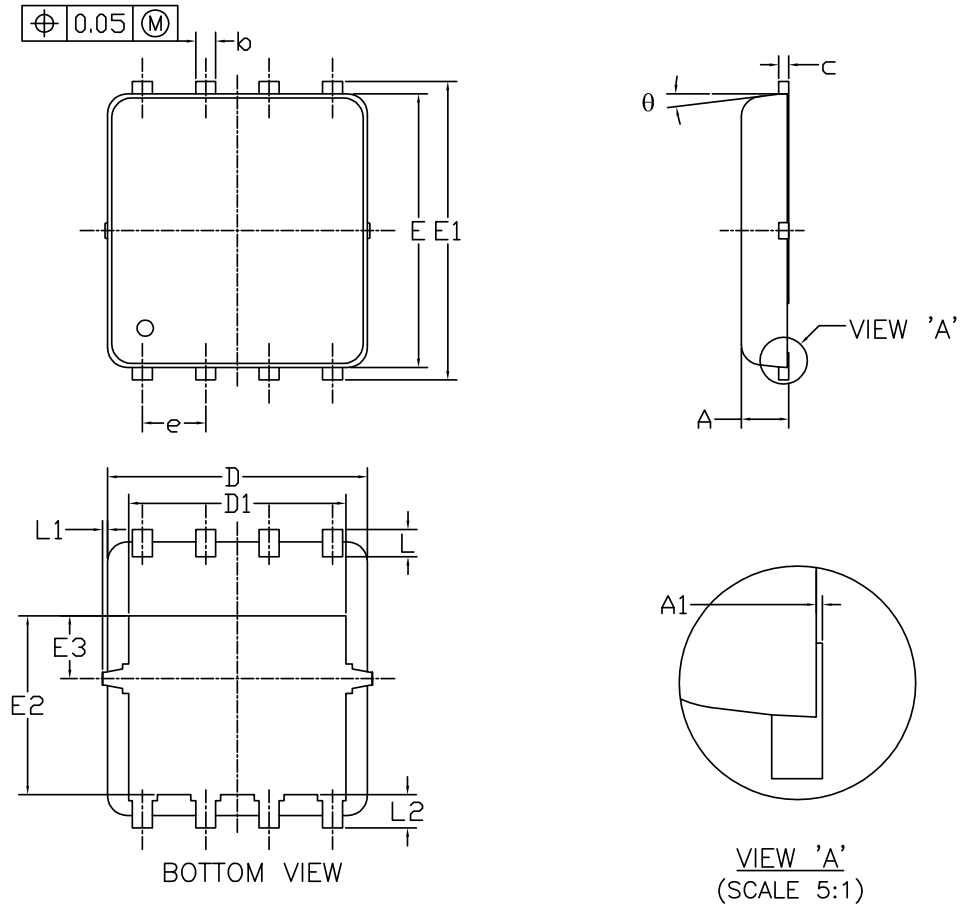


Normalized Thermal Transient Impedance, Junction-to-Ambient

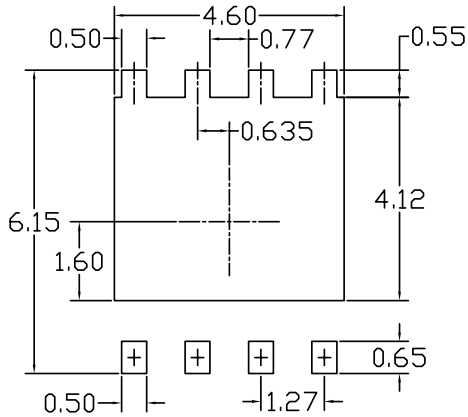


Normalized Thermal Transient Impedance, Junction-to-Case

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	4.80	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°

NOTE

UNIT: mm

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

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