P-Channel 40-V (D-S) MOSFET

PRODUCT SUMMARY		
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
-40	0.011 at V_{GS} = -10 V	-48
	0.016 at V_{GS} = -4.5 V	-40

FEATURES

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

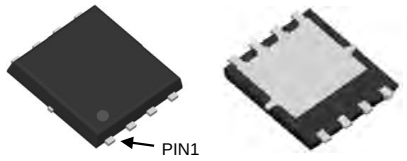
APPLICATIONS

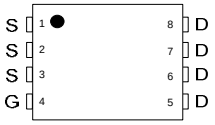
- Notebook
  - Load Switch

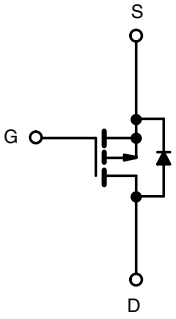
Pb-free

RoHS COMPLIANT

DFN5X6







P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise noted)				
PARAMETER		SYMBOL	Limit	UNIT
Drain-Source Voltage		V_{DS}	- 40	V
Gate-Source Voltage		V_{GS}	± 20	
Continuous Drain Current (T_J = 150 °C) [a]	T_A = 25 °C	I_D	- 48	A
	T_A = 70 °C		- 35	
Pulsed Drain Current		I_{DM}	- 190	
Continuous Source Current (Diode Conduction) [a]		I_S	- 48	
Avalanche Current	L = 0.1 mH	I_{AS}	- 35	
Single Pulse Avalanche Energy		E_{AS}	113	mJ
Maximum Power Dissipation [a]	T_A = 25 °C	P_D	39	W
	T_A = 70 °C		25	
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]	t ≤ 10 s	R_{thJA}	20	25	°C/W
	Steady State		25	35	
Maximum Junction-to-Case (Drain)	Steady State	R_{thJC}	2.1	3.3	

Notes

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

b. TheDFN5x6isa leadlesspackage.The endof thelead terminalisexposedcopper (not plated) as a result of thesingulation process in manufacturing. A solderfillet at the exposed copper tip cannot be guaranteed andis not required to ensure adequatebottom side solder interconnection.

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

SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
PARAMETER	**SYMBOL**	**TEST CONDITIONS**	**MIN.**	**TYP.**	**MAX.**	**UNIT**
Static						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250 µA	-1	-	-3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ± 20 V	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = -32 V, V_{GS} = 0 V	-	-	-1	µA
		V_{DS} = -32 V, V_{GS} = 0 V, T_J = 70 °C	-	-	-10	
On-State Drain Current [a]	$I_{D(on)}$	V_{DS} ≤ -5 V, V_{GS} = -10 V	-60	-	-	A
Drain-Source On-State Resistance [a]	$R_{DS(on)}$	V_{GS} = -10 V, I_D = -5 A	-	0.011	0.014	Ω
		V_{GS} = -4.5 V, I_D = -3 A	-	0.016	0.022	
Forward Transconductance [a]	g_{fs}	V_{DS} = -15 V, I_D = -5 A	-	35	-	S
Diode Forward Voltage [a]	V_{SD}	I_S = -4.5 A, V_{GS} = 0 V	-	-0.7	-1.2	V
Dynamic [b]						
Input Capacitance	C_{iss}	V_{GS} = 0 V, V_{DS} = 100 V, f = 1 MHz	-	2120	-	pF
Output Capacitance	C_{oss}		-	230	-	
Reverse Transfer Capacitance	C_{rss}		-	180	-	
Total Gate Charge	Q_g	V_{DS} = -20 V, V_{GS} = -10 V, I_D = -5 A	-	121	-	nC
Gate-Source Charge	Q_{gs}		-	20	-	
Gate-Drain Charge	Q_{gd}		-	32	-	
Gate Resistance	R_g		-	1.5	-	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = -20 V, R_L = 30 Ω, I_D ≅ -5 A, V_{GEN} = -10 V, R_g = 6 Ω	-	21	-	ns
Rise Time	t_r		-	20	-	
Turn-Off Delay Time	$t_{d(off)}$		-	55	-	
Fall Time	t_f		-	12	-	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = -4.5 A, dI/dt = 100 A/µs	-	29	50	

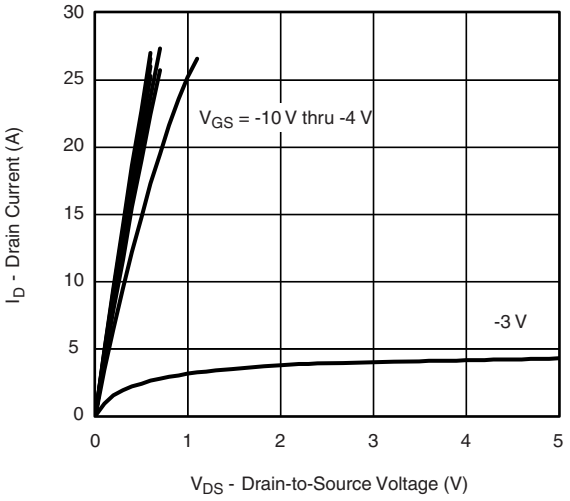
Notes

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

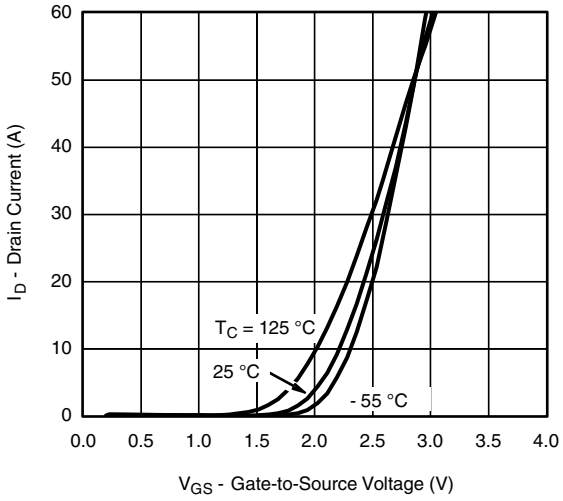
b. Guaranteed by design, not subject to production testing.

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.

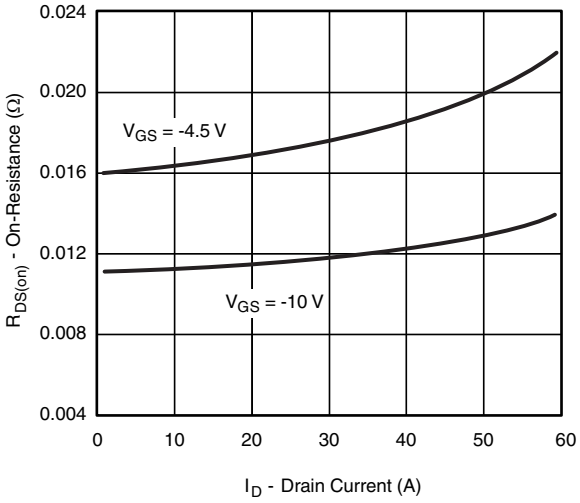
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



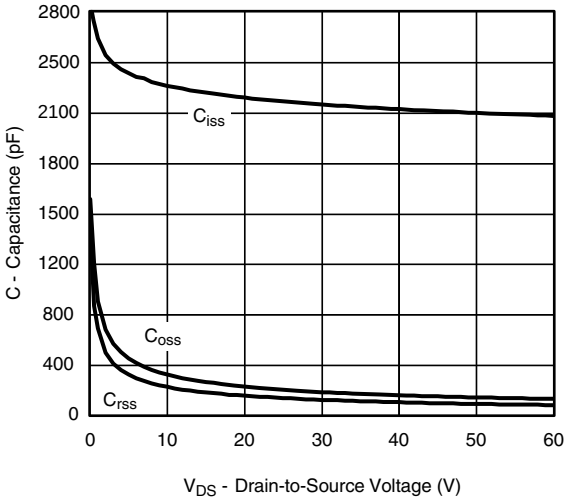
Output Characteristics



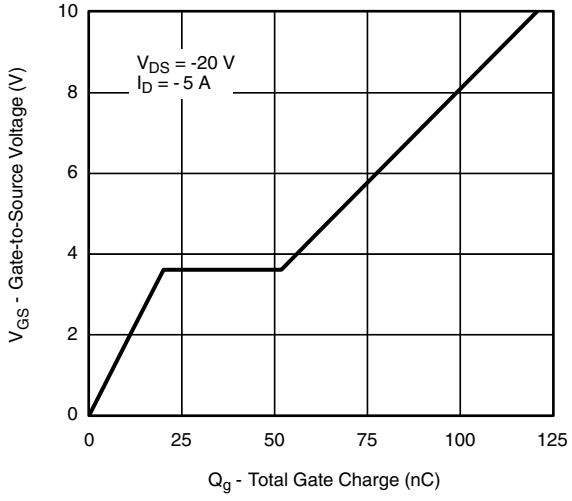
Transfer Characteristics



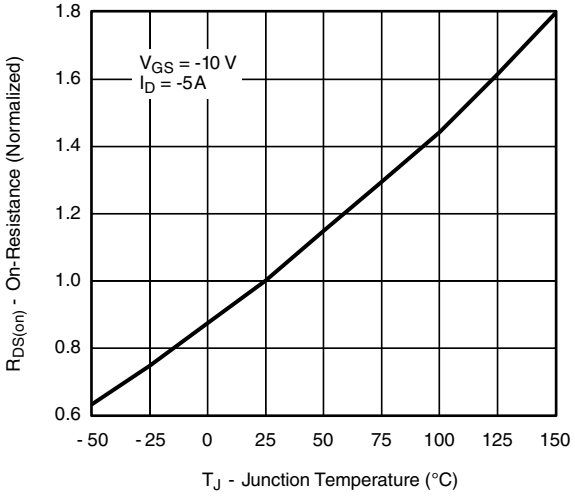
On-Resistance vs. Drain Current



Capacitance

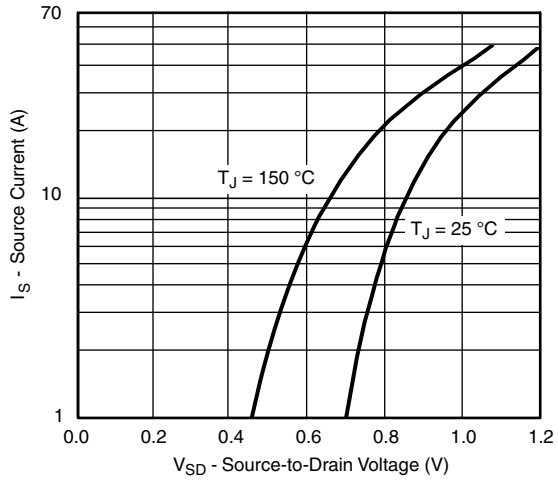


Gate Charge

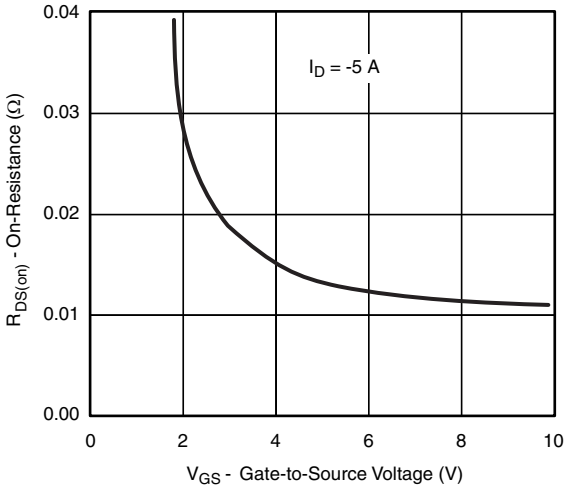


On-Resistance vs. Junction Temperature

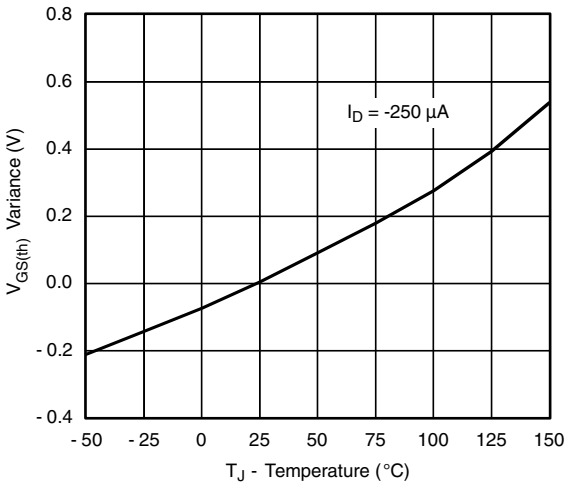
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



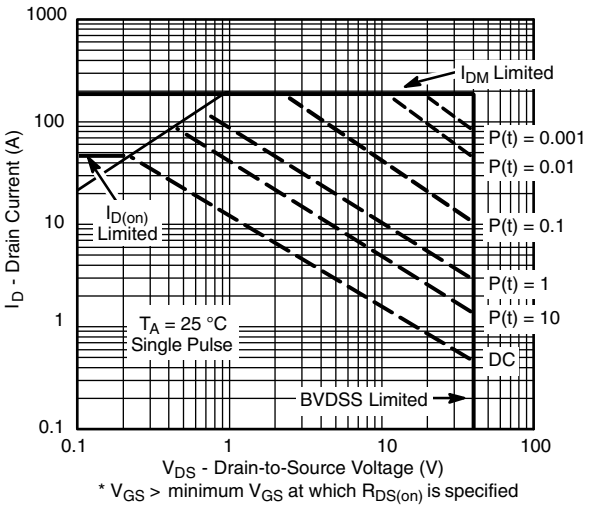
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage



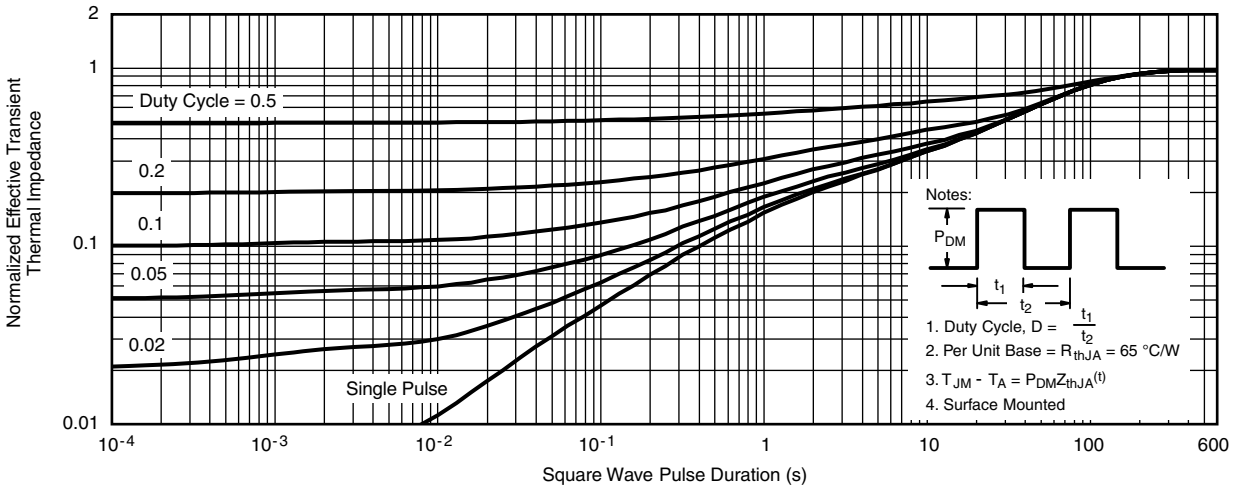
Threshold Voltage



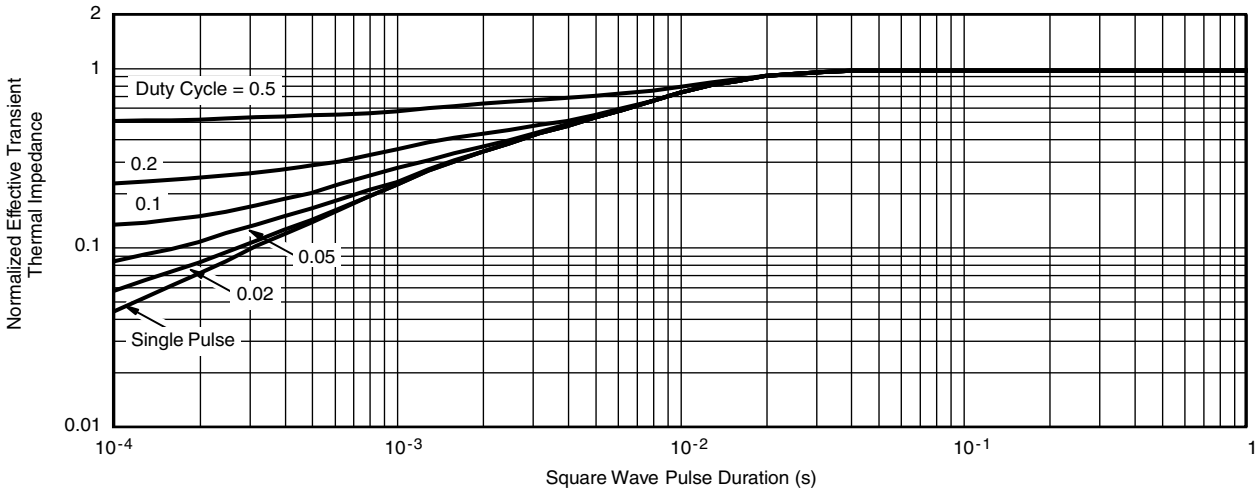
* V_{GS} > minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

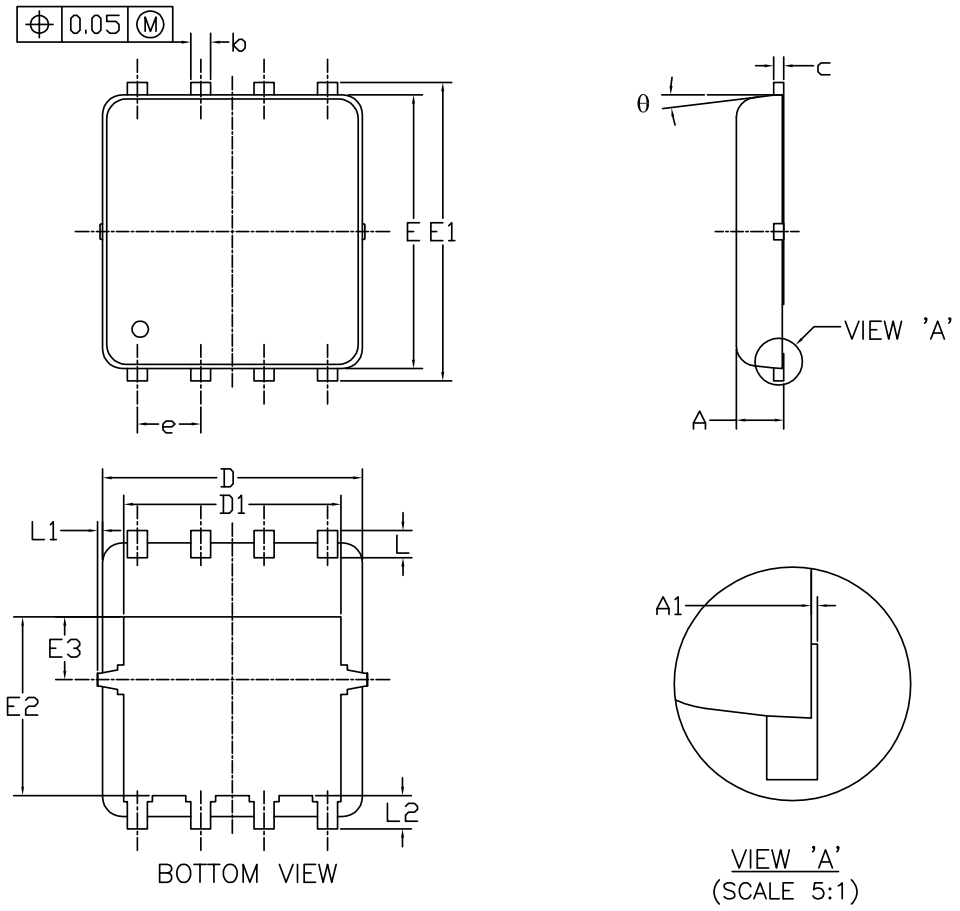


Normalized Thermal Transient Impedance, Junction-to-Ambient

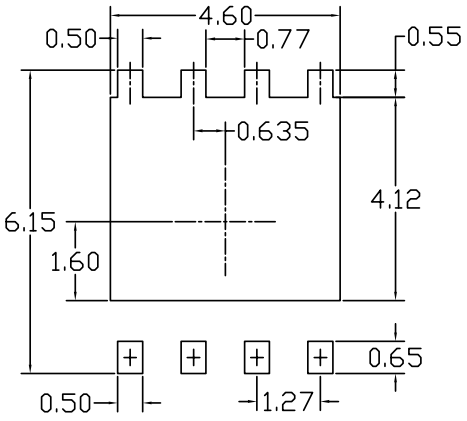


Normalized Thermal Transient Impedance, Junction-to-Case

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°

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.

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