

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

PRODUCT SUMMARY

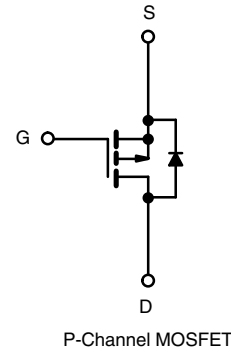
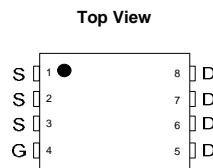
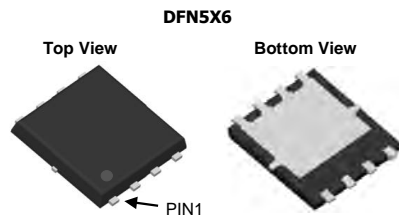
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
-40	0.011 at $V_{GS} = -10$ V	-48
	0.016 at $V_{GS} = -4.5$ V	-40

FEATURES

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

APPLICATIONS

- Notebook
- Load Switch


RoHS
 COMPLIANT


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	I_D	- 48	A
		- 35	
Pulsed Drain Current	I_{DM}	- 190	
Continuous Source Current (Diode Conduction) ^a	I_S	- 48	
Avalanche Current	I_{AS}	- 35	mJ
Single Pulse Avalanche Energy		113	
Maximum Power Dissipation ^a	P_D	39	W
		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	R_{thJA}	20	25	°C/W
		25	35	
Maximum Junction-to-Case (Drain)	R_{thJC}	2.1	3.3	

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.

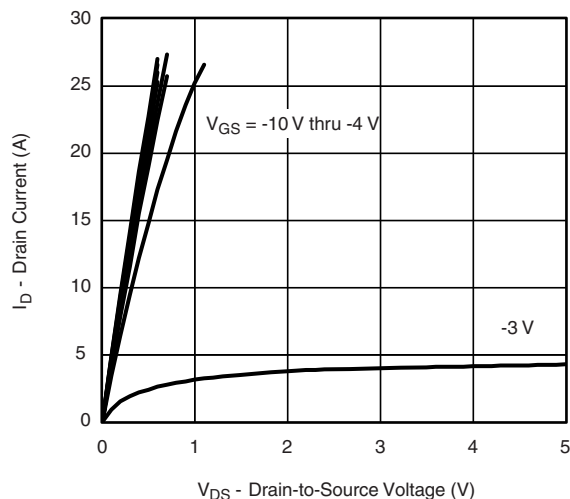
SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\text{ }\mu\text{A}$	-1	-	-3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}$	-	-	-1	μA
		$V_{DS} = -32\text{ V}, V_{GS} = 0\text{ V}, T_J = 70\text{ }^{\circ}\text{C}$	-	-	-10	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \leq -5\text{ V}, V_{GS} = -10\text{ V}$	-60	-	-	A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = -10\text{ V}, I_D = -5\text{ A}$	-	0.011	0.014	Ω
		$V_{GS} = -4.5\text{ V}, I_D = -3\text{ A}$	-	0.016	0.022	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}, I_D = -5\text{ A}$	-	35	-	S
Diode Forward Voltage ^a	V_{SD}	$I_S = -4.5\text{ A}, V_{GS} = 0\text{ V}$	-	-0.7	-1.2	V
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{GS} = 0\text{ V},$ $V_{DS} = 100\text{ V},$ $f = 1\text{ MHz}$	-	2120	-	pF
Output Capacitance	C_{oss}		-	230	-	
Reverse Transfer Capacitance	C_{rss}		-	180	-	
Total Gate Charge	Q_g	$V_{DS} = -20\text{ V}, V_{GS} = -10\text{ V}, I_D = -5\text{ A}$	-	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	$t_{d(on)}$	$V_{DD} = -20\text{ V}, R_L = 30\text{ }\Omega$ $I_D \cong -5\text{ A}, V_{GEN} = -10\text{ V}, R_g = 6\text{ }\Omega$	-	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}	$I_F = -4.5\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$	-	29	50	

Notes

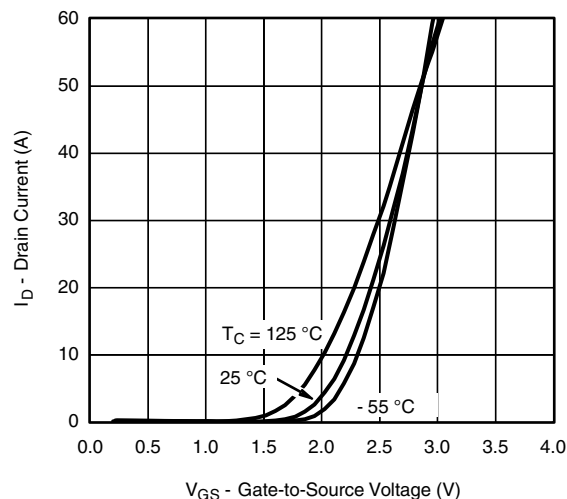
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

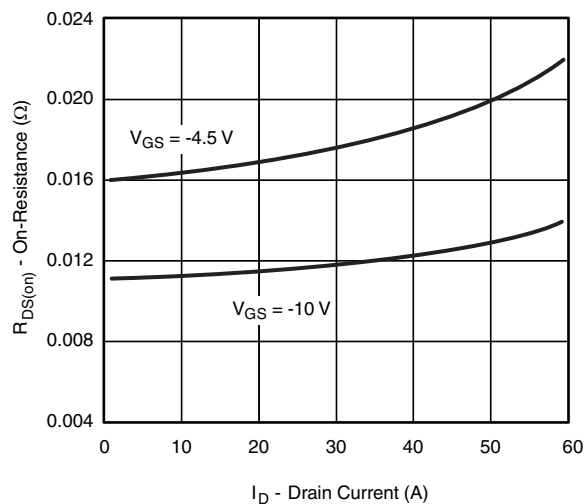
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



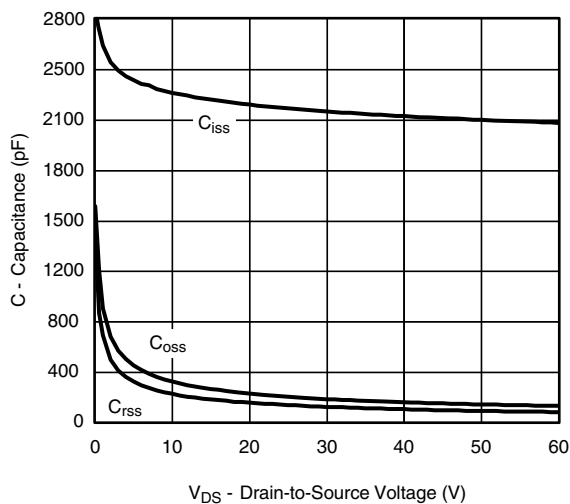
Output Characteristics



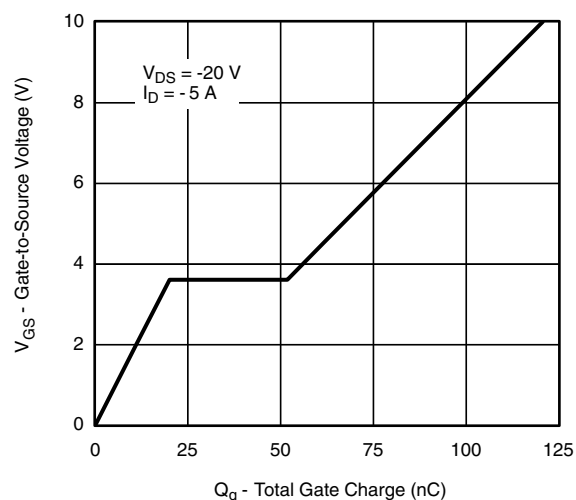
Transfer Characteristics



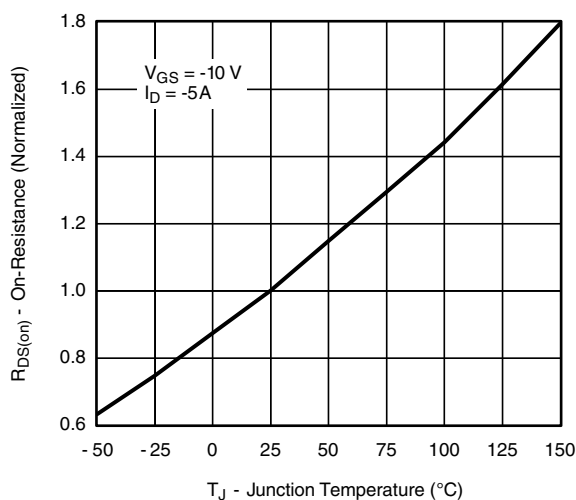
On-Resistance vs. Drain Current



Capacitance

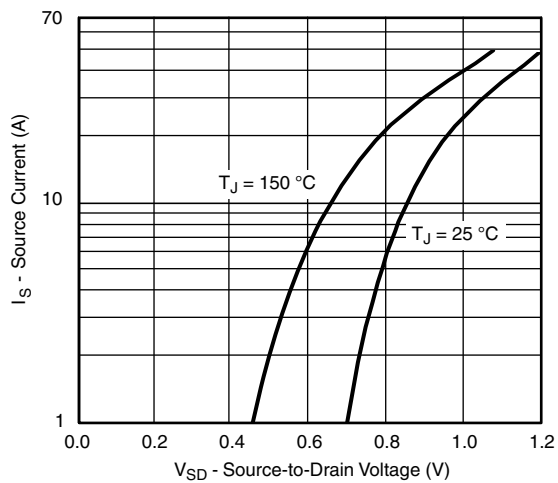


Gate Charge

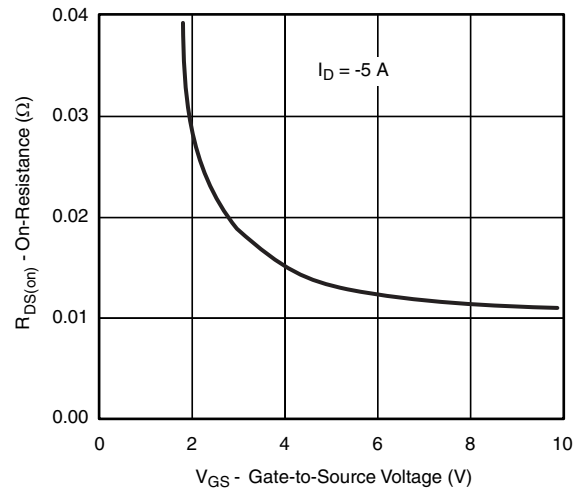


On-Resistance vs. Junction Temperature

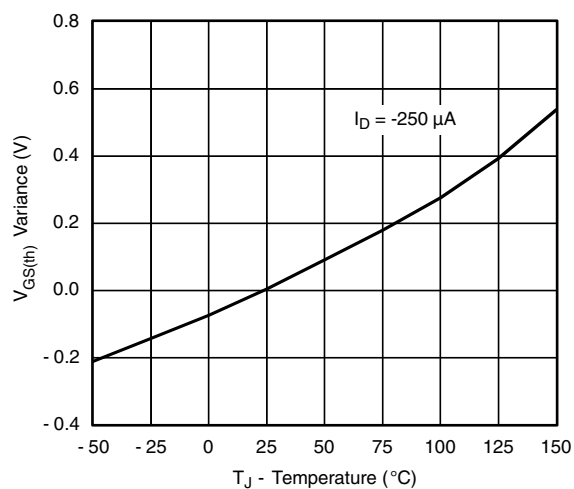
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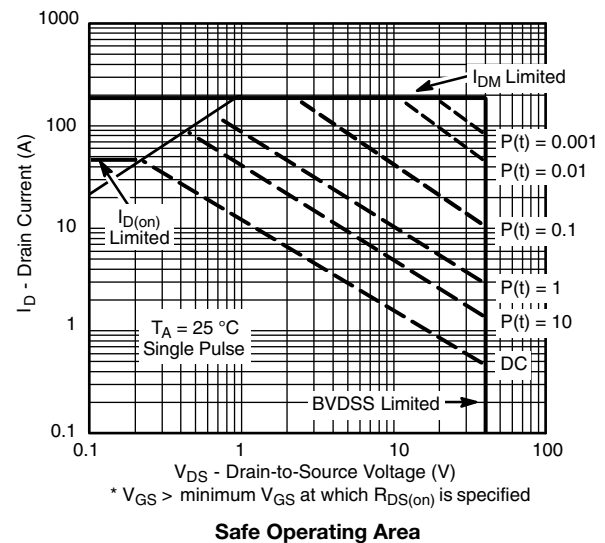
Source-Drain Diode Forward Voltage



On-Resistance vs. Gate-to-Source Voltage

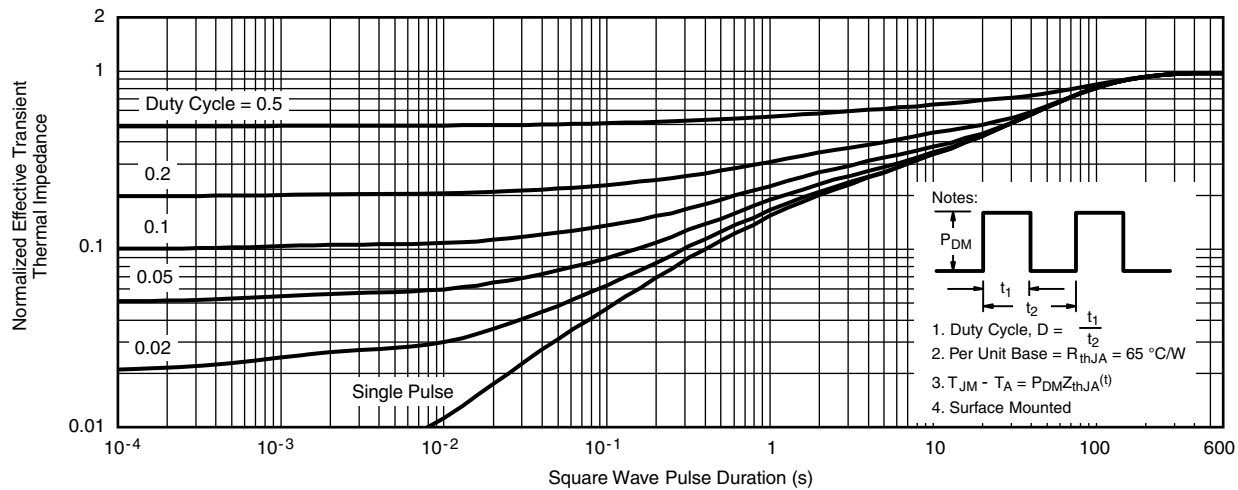


Threshold Voltage

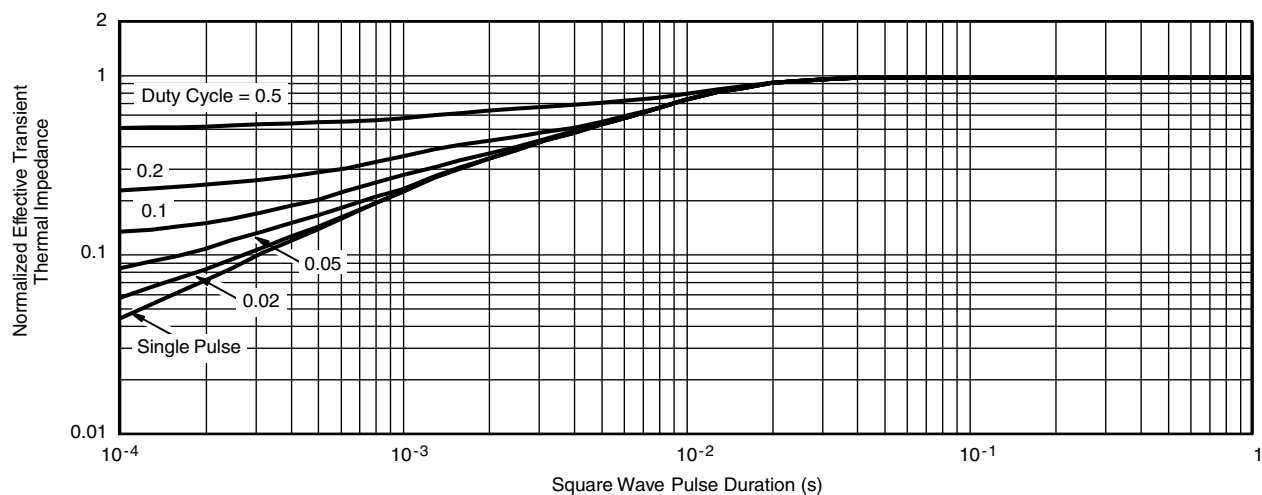


Safe Operating Area

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

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