

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

PRODUCT SUMMARY

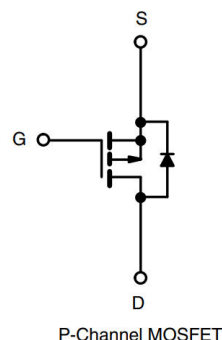
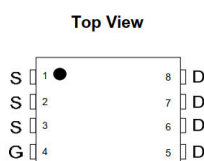
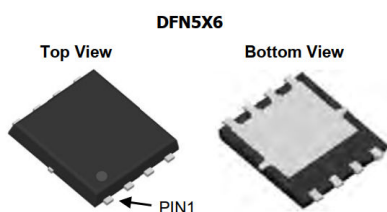
V_{DS} (V)	$R_{DS(on)}$ (m Ω)(TYP.)	I_D (A) ^{a, e}	Q_g (Typ.)
-60	12 at $V_{GS} = -10V$	-60	121 nC
	20 at $V_{GS} = -4.5 V$		

FEATURES

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

APPLICATIONS

- Notebook
- Load Switch


RoHS
 COMPLIANT


ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$, unless otherwise noted)

PARAMETER	SYMBOL	Limit	UNIT
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150^\circ\text{C}$) ^a	I_D	-60	A
		-50	
Pulsed Drain Current	I_{DM}	-240	
Continuous Source Current (Diode Conduction) ^a	I_S	-60	
Avalanche Current	I_{AS}	-62	mJ
Single Pulse Avalanche Energy	E_{AS}	225	
Maximum Power Dissipation ^a	P_D	43	W
		38	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
Soldering Recommendations (Peak Temperature) ^{b, c}		260	

THERMAL RESISTANCE RATINGS

PARAMETER	SYMBOL	TYPICAL	MAXIMUM	UNIT
Maximum Junction-to-Ambient ^a	R_{thJA}	15	23	$^\circ\text{C/W}$
		22	35	
Maximum Junction-to-Case (Drain)	R_{thJC}	1	1.3	

Notes

- Surface mounted on 1" x 1" FR4 board.
- The DFN5x6 is a lead less 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 a dequate bottom side solder interconnection.
- Rework conditions: manual soldering with a soldering iron is not recommended for leadless components.

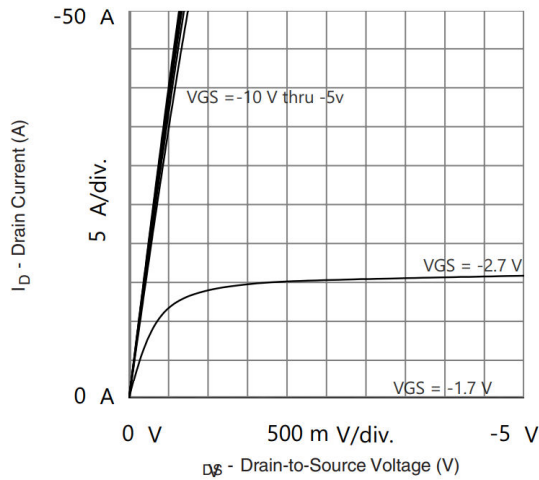
SPECIFICATIONS ($T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted)						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -250\text{ }\mu\text{A}$	-1	-	-3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}$, $V_{GS} = \pm 20\text{ V}$	-	-	± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = -48\text{ V}$, $V_{GS} = 0\text{ V}$	-	-	-1	μA
		$V_{DS} = -48\text{ V}$, $V_{GS} = 0\text{ V}$, $T_J = 70\text{ }^{\circ}\text{C}$	-	-	-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	$R_{DS(on)}$	$V_{GS} = -10\text{ V}$, $I_D = -15\text{ A}$	-	12	14.5	m Ω
		$V_{GS} = -4.5\text{ V}$, $I_D = -10\text{ A}$	-	20	25	
Forward Transconductance ^a	g_{fs}	$V_{DS} = -15\text{ V}$, $I_D = -15\text{ A}$	-	31	-	S
Diode Forward Voltage ^a	V_{SD}	$I_S = -1\text{ A}$, $V_{GS} = 0\text{ V}$	-	-	-1	V
Dynamic ^b						
Input Capacitance	C_{iss}	$V_{DS} = -30\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$	-	9360	-	pF
Output Capacitance	C_{oss}		-	368	-	
Reverse Transfer Capacitance	C_{rss}		-	300	-	
Total Gate Charge	Q_g	$V_{DS} = -30\text{ V}$, $V_{GS} = -10\text{ V}$, $I_D = -15\text{ A}$	-	121	190	nC
Gate-Source Charge	Q_{gs}		-	20	-	
Gate-Drain Charge	Q_{gd}		-	32	-	
Gate Resistance	R_g		-	3.5	-	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = -30\text{ V}$, $R_L = 30\text{ }\Omega$ $I_D \cong -15\text{ A}$, $V_{GEN} = -10\text{ V}$, $R_g = 6\text{ }\Omega$	-	20	-	ns
Rise Time	t_r		-	20	-	
Turn-Off Delay Time	$t_{d(off)}$		-	205	-	
Fall Time	t_f		-	90	-	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = -4.5\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$	-	45	-	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I_S	$T_C = 25\text{ }^{\circ}\text{C}$			- 60	A
Pulse Diode Forward Current	I_{SM}				- 240	
Body Diode Voltage	V_{SD}	$I_S = -1\text{ A}$, $V_{GS} = 0\text{ V}$		- 0.6	- 1	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 15\text{ A}$, $dI/dt = 100\text{ A}/\mu\text{s}$, $T_J = 25\text{ }^{\circ}\text{C}$		39		nS
Body Diode Reverse Recovery Charge	Q_{rr}			40		nC
Reverse Recovery Fall Time	t_a			19		nS
Reverse Recovery Rise Time	t_b			25		

Notes

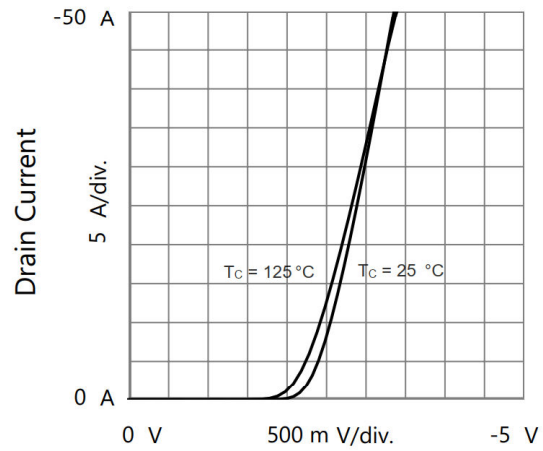
- a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
 b. Guaranteed by design, not subject to production testing.

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.

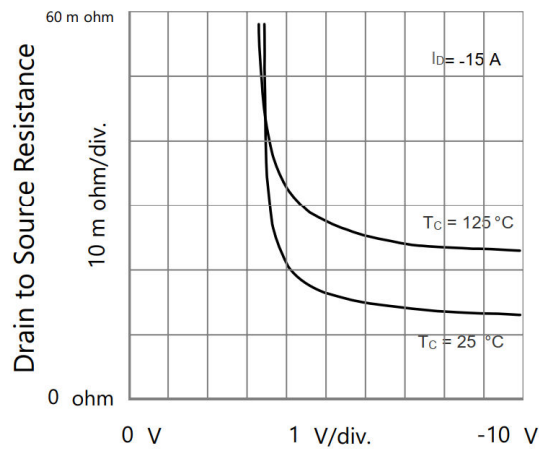
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



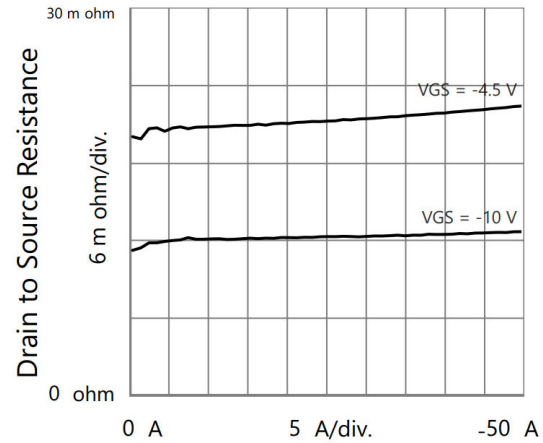
Output Characteristics



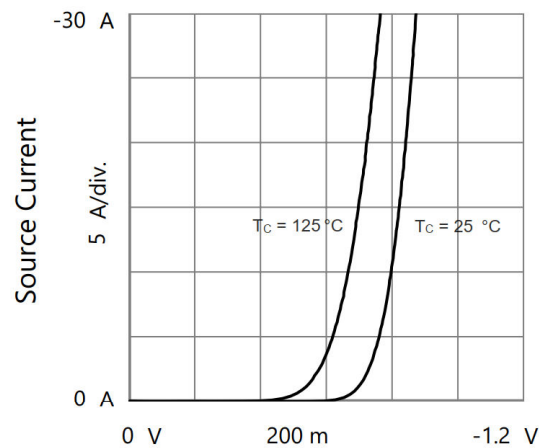
Transfer Characteristics



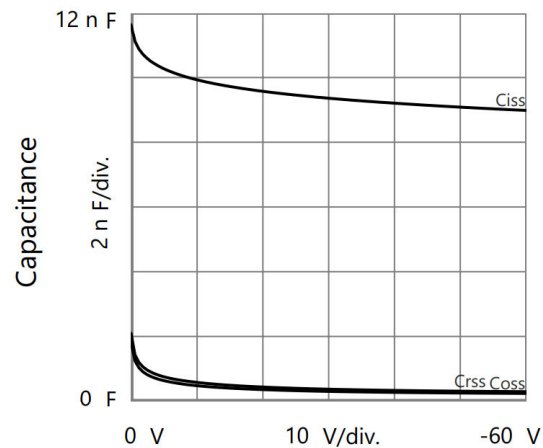
Drain to Source Resistance vs. Gate to Source Voltage



Drain to Source Resistance vs. Drain Current

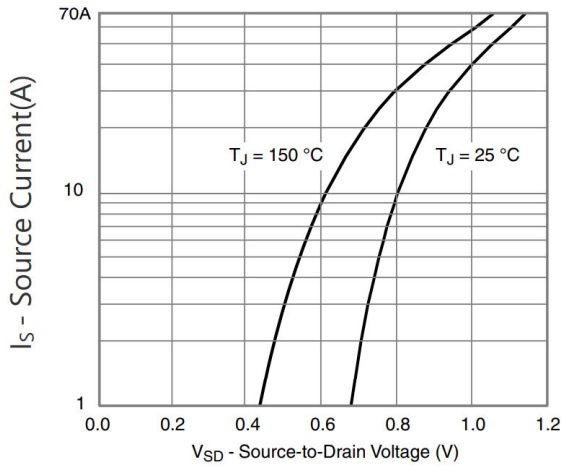


Body Diode Forward Characteristics

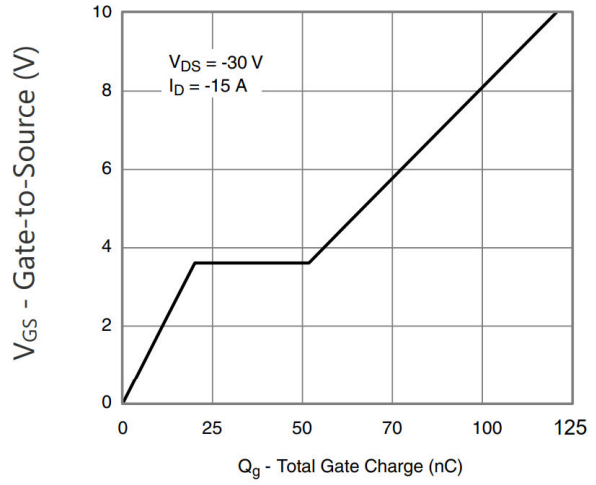


Drain to Source Capacitances

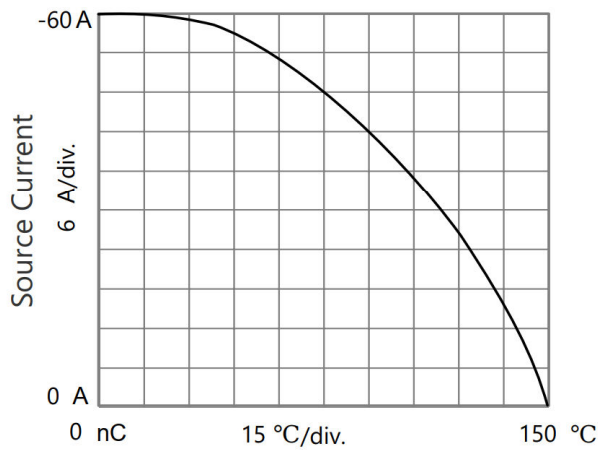
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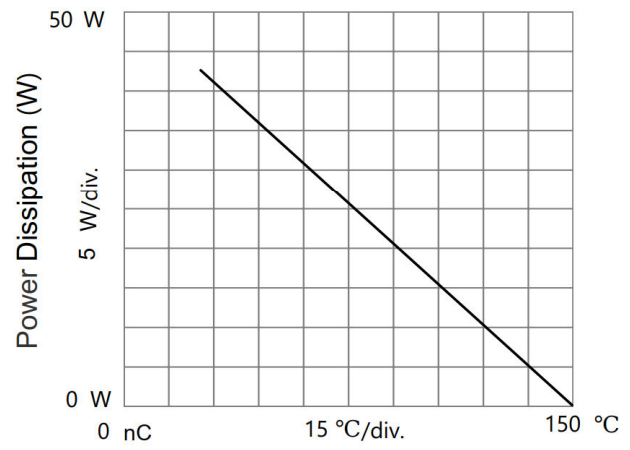
Source-Drain Diode Forward Voltage



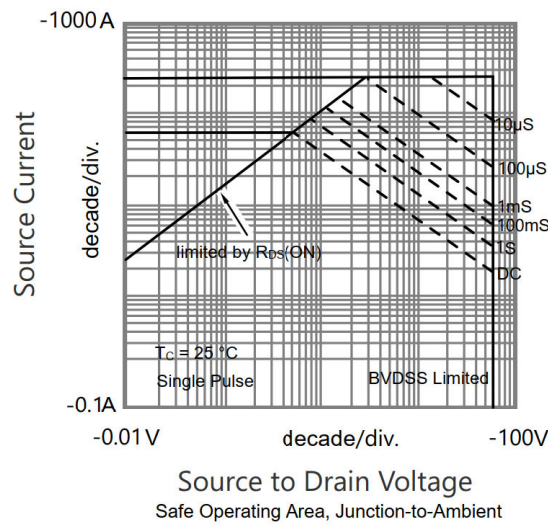
Gate Charge



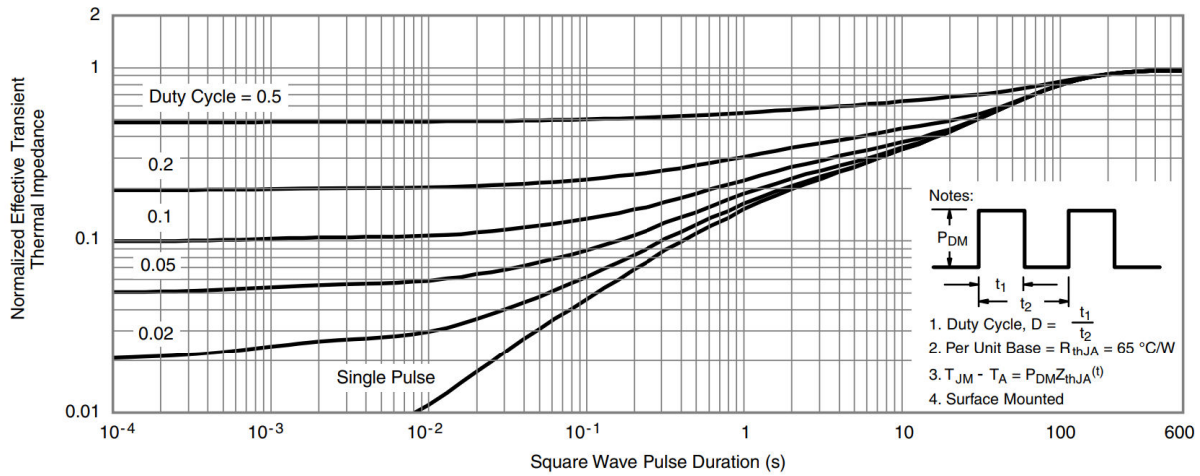
T_C - Case Temperature
Current Derating



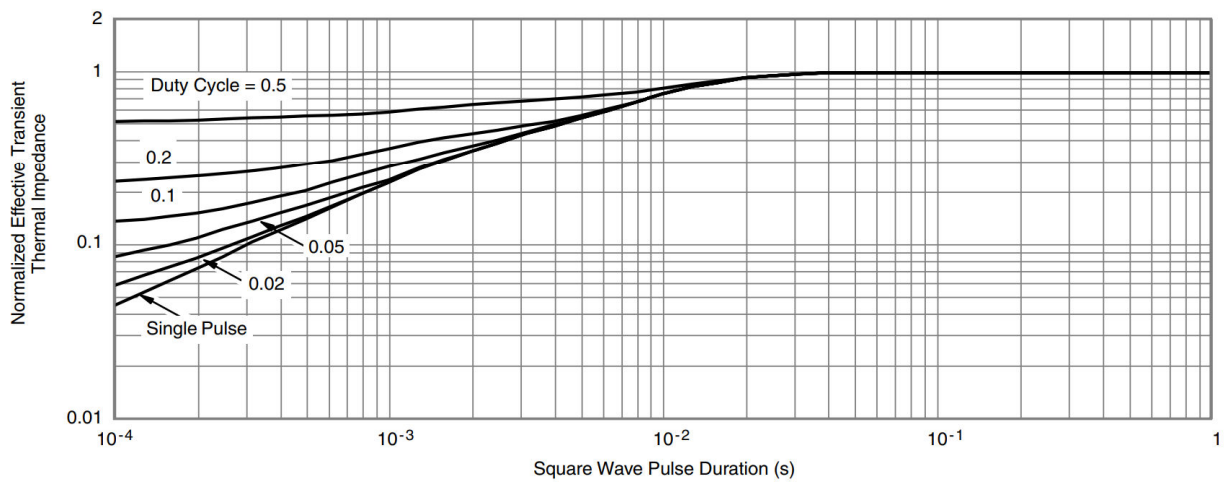
T_C - Case Temperature
Power Derating



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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