P-Channel 40 V (D-S) MOSFET

PRODUCT SUMMARY			
V_{DS} (V)	$R_{DS(on)}$ (Ω) Max.	I_D (A)	Q_g (Typ.)
- 40	0.012 at V_{GS} = - 10 V	- 15[d]	33 nC
	0.016 at V_{GS} = - 4.5 V	- 13[d]	

FEATURES

- 100% R_g and UIS Tested

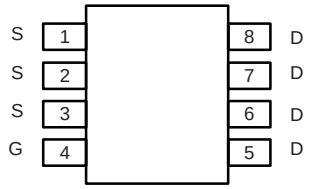
APPLICATIONS

- Adaptor Switch
- Load Switch
- Power Management
- Mobile Computing

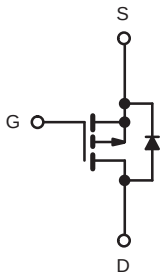
Pb-free

RoHS COMPLIANT

SO-8



Top View



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)	T_C = 25 °C	I_D	- 15[d]	A
	T_C = 70 °C		- 12[d]	
	T_A = 25 °C		- 11.7[a, b]	
	T_A = 70 °C		- 9.7[a, b]	
Pulsed Drain Current (t = 300 µs)		I_{DM}	- 65	
Continuous Source-Drain Diode Current	T_C = 25 °C	I_S	- 15[d]	
	T_A = 25 °C		- 2.5[a, b]	
Avalanche Current	L = 0.1 mH	I_{AS}	- 14.5	
Single-Pulse Avalanche Energy		E_{AS}	18	mJ
Maximum Power Dissipation	T_C = 25 °C	P_D	49	W
	T_C = 70 °C		31	
	T_A = 25 °C		3.4[a, b]	
	T_A = 70 °C		2.18[a, b]	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	- 55 to 150	°C
Soldering Recommendations (Peak Temperature)[e, f]			260	

THERMAL RESISTANCE RATINGS

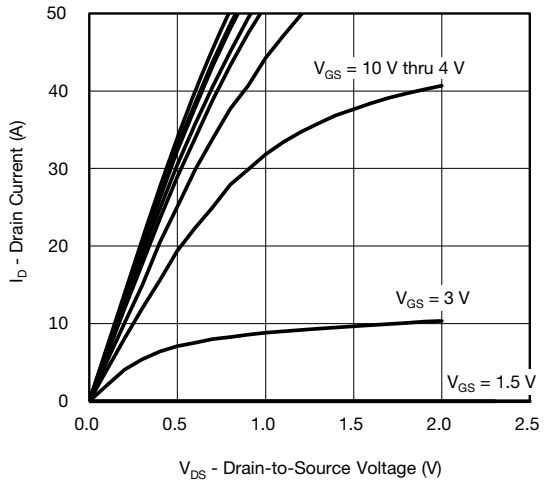
Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a, c]	t ≤ 10 s	R_{thJA}	28	35	°C/W
Maximum Junction-to-Case	Steady State	R_{thJC}	1.9	2.8	

Notes:
a. Surface mounted on 1" x 1" FR4 board.
b. t = 10 s.
c. Maximum under steady state conditions is 81 °C/W.
d. Package limited.

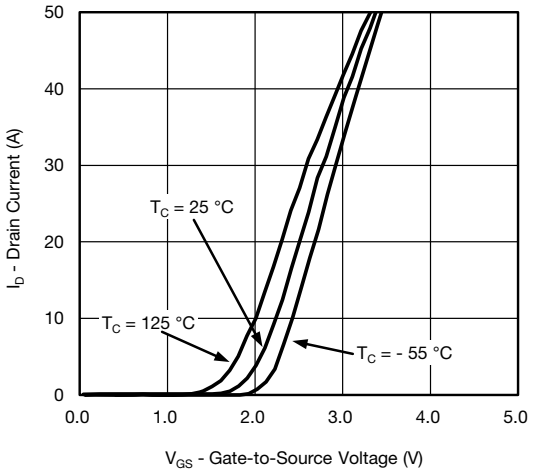
SPECIFICATIONS (T_J = 25 °C, unless otherwise noted)						
Parameter	**Symbol**	**Test Conditions**	**Min.**	**Typ.**	**Max.**	**Unit**
Static						
Drain-Source Breakdown Voltage	V_{DS}	V_{GS} = 0 V, I_D = - 250 µA	- 40			V
V_{DS} Temperature Coefficient	$\Delta V_{DS}/T_J$	I_D = - 250 µA		- 25		mV/°C
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}/T_J$			4.6		
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250 µA	- 1		- 2.5	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} = - 40 V, V_{GS} = 0 V			- 1	µA
		V_{DS} = - 32 V, V_{GS} = 0 V, T_J = 55 °C			- 5	
On-State Drain Current[a]	$I_{D(on)}$	$V_{DS} \geq$ - 10 V, V_{GS} = - 10 V	- 30			A
Drain-Source On-State Resistance[a]	$R_{DS(on)}$	V_{GS} = - 10 V, I_D = - 10 A		0.012	0.018	Ω
		V_{GS} = - 4.5 V, I_D = - 7 A		0.018	0.026	
Forward Transconductance[a]	g_{fs}	V_{DS} = - 10 V, I_D = - 10 A		48		S
Dynamic[b]						
Input Capacitance	C_{iss}	V_{DS} = - 20 V, V_{GS} = 0 V, f = 1 MHz		2982		pF
Output Capacitance	C_{oss}			385		
Reverse Transfer Capacitance	C_{rss}			189		
Total Gate Charge	Q_g	V_{DS} = - 20 V, V_{GS} = - 10 V, I_D = - 10 A		70	115	nC
		V_{DS} = - 20 V, V_{GS} = - 4.5 V, I_D = - 10 A		33	57	
Gate-Source Charge	Q_{gs}			9.4		
Gate-Drain Charge	Q_{gd}			10.6		
Gate Resistance	R_g	f = 1 MHz	0.4	1.6	3.2	Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 20 V, R_L = 1.5 Ω $I_D \cong$ - 10 A, V_{GEN} = - 10 V, R_g = 1 Ω		12		ns
Rise Time	t_r			12		
Turn-Off DelayTime	$t_{d(off)}$			49		
Fall Time	t_f			11		
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = - 20 V, R_L = 1.5 Ω $I_D \cong$ - 10 A, V_{GEN} = - 4.5 V, R_g = 1 Ω		62		
Rise Time	t_r			85		
Turn-Off DelayTime	$t_{d(off)}$			41		
Fall Time	t_f			15		
Drain-Source Body Diode Characteristics						
Continous Source-Drain Diode Current	I_S	T_C = 25 °C			- 15	A
Pulse Diode Forward Current	I_{SM}				- 65	
Body Diode Voltage	V_{SD}	I_S = - 3 A, V_{GS} = 0 V		- 0.7	- 1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = - 10 A, dI/dt = 100 A/µs, T_J = 25 °C		23		ns
Body Diode Reverse Recovery Charge	Q_{rr}			10		nC
Reverse Recovery Fall Time	t_a			9		ns
Reverse Recovery Rise Time	t_b			15		

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

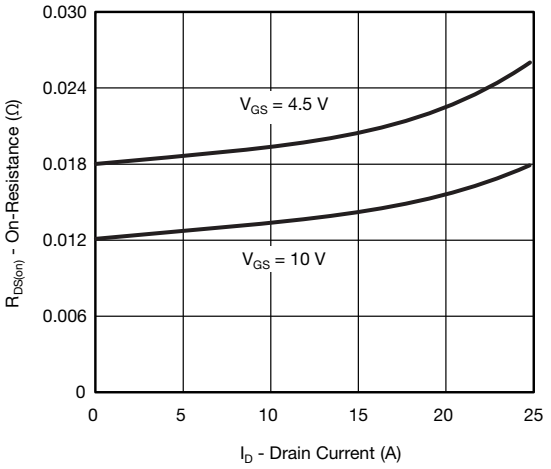
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



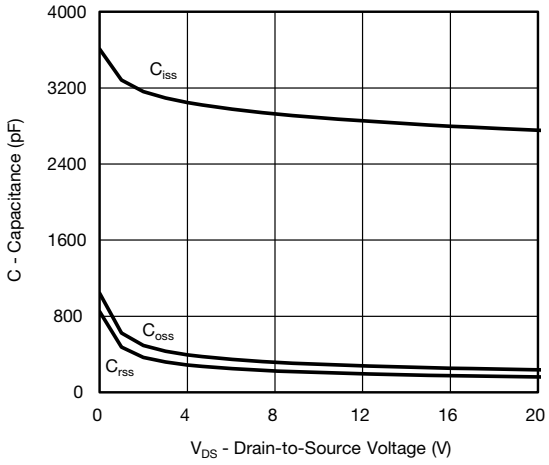
Output Characteristics



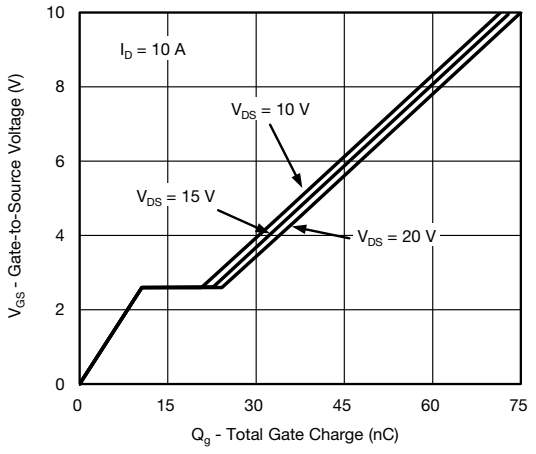
Transfer Characteristics



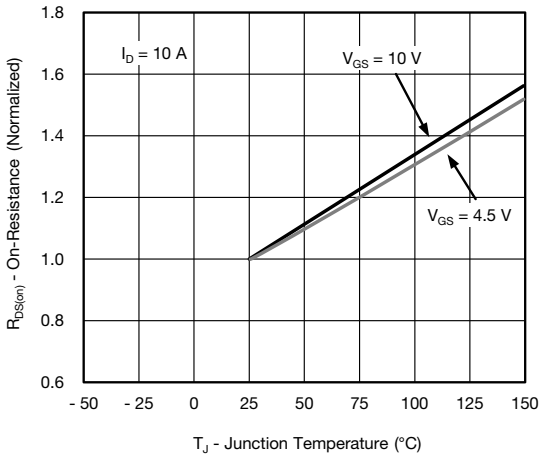
On-Resistance vs. Drain Current



Capacitance

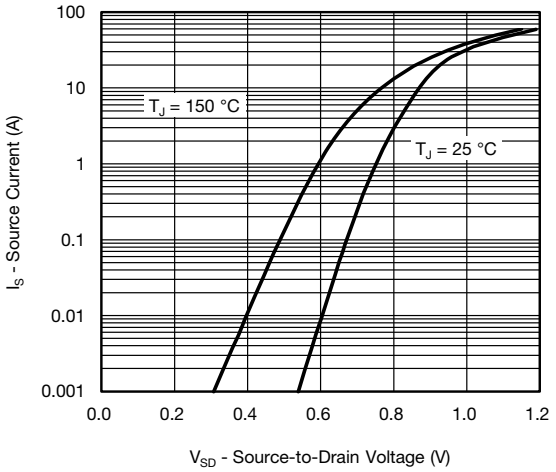


Gate Charge

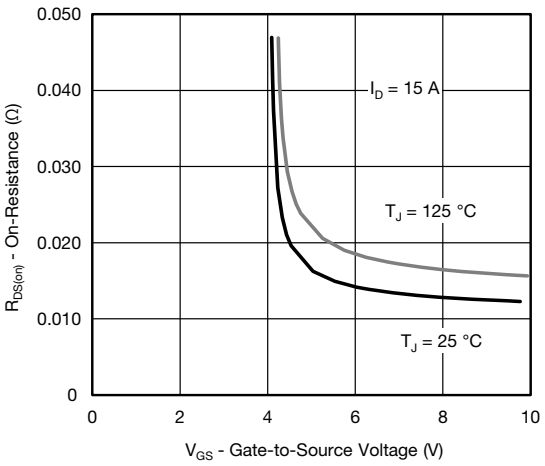


On-Resistance vs. Junction Temperature

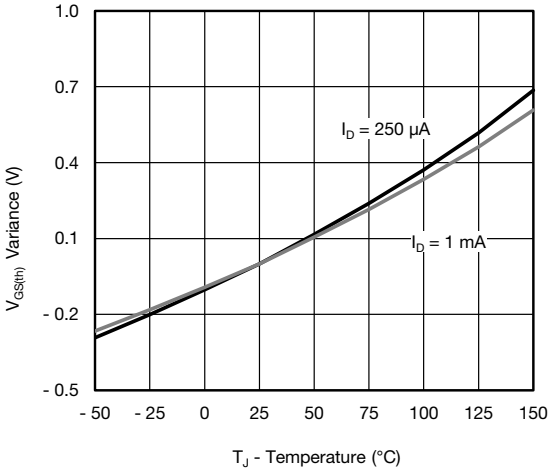
TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



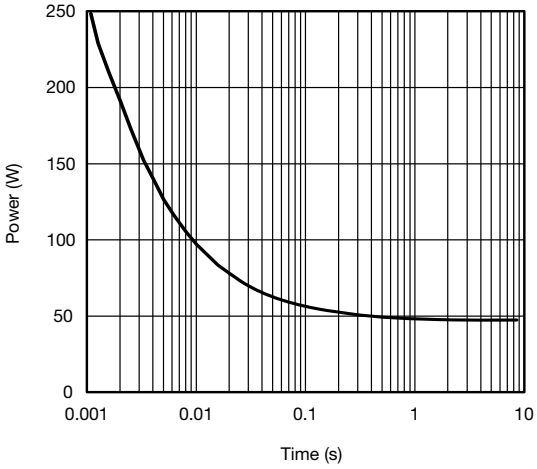
Source-Drain Diode Forward Voltage



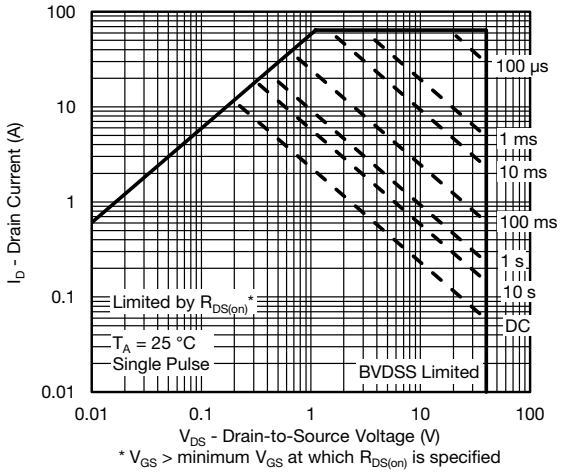
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

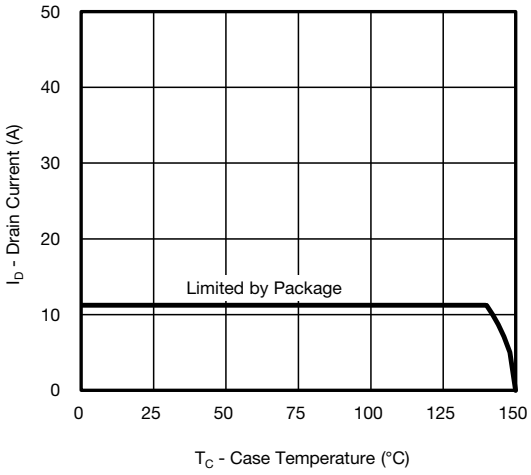


Single Pulse Power, Junction-to-Ambient

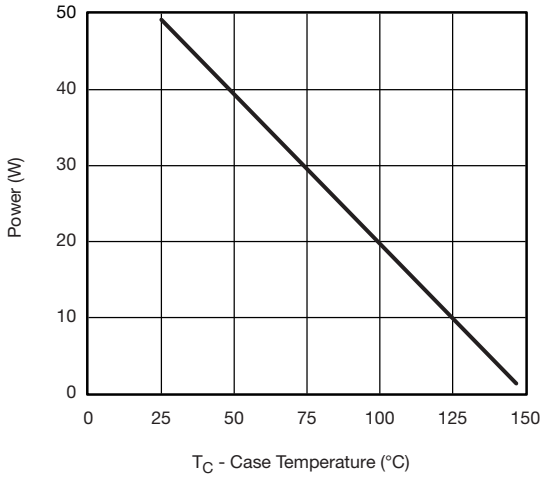


Safe Operating Area

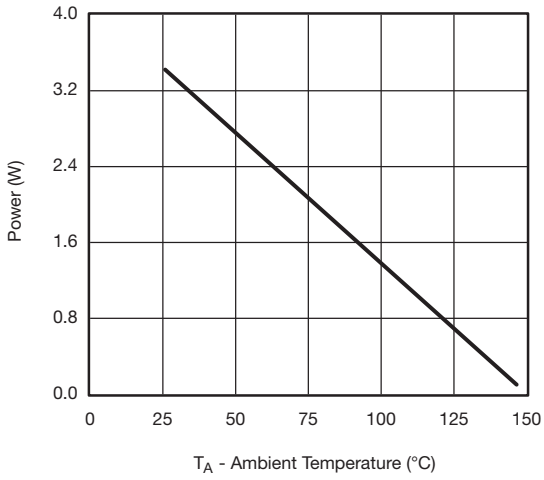
MOSFET TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



Current Derating*



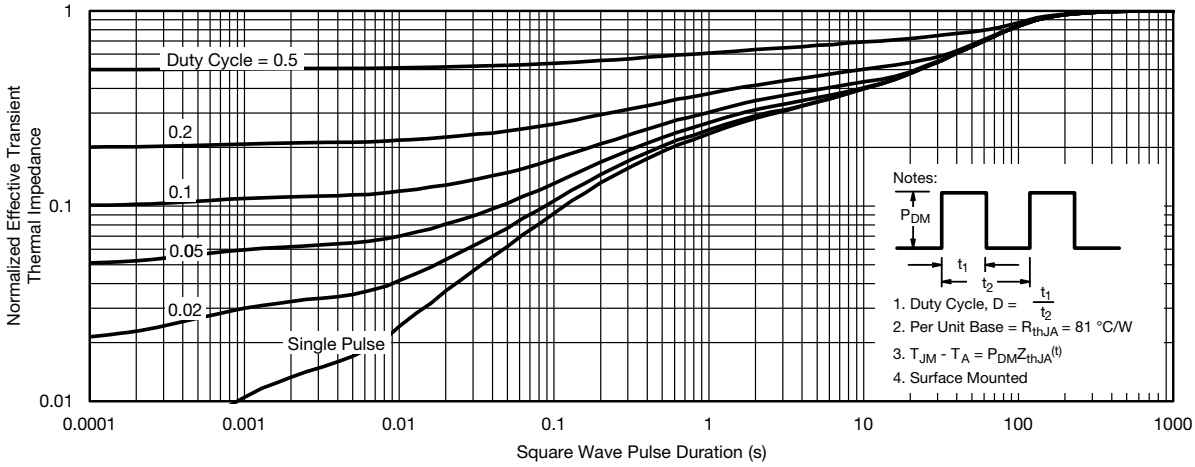
Power, Junction-to-Case



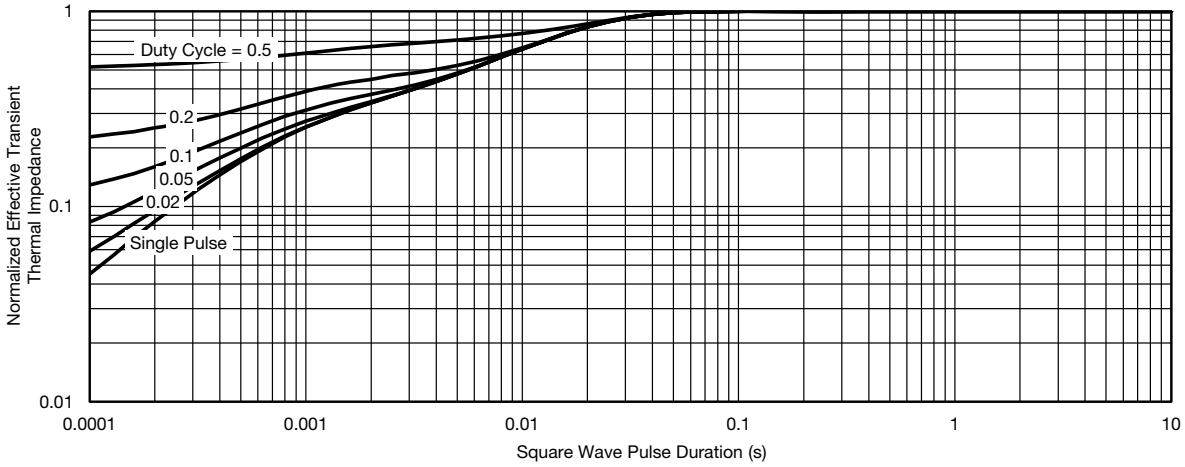
Power, Junction-to-Ambient

* 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

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