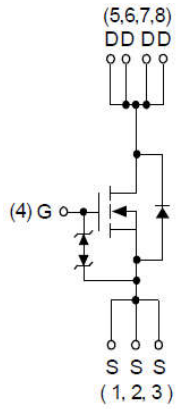
N-Channel Enhancement Mode MOSFET TDM2412

DESCRIPTION

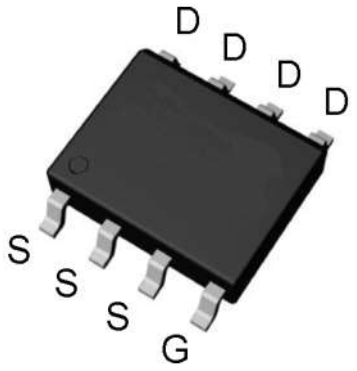
The TDM2412 uses advanced trench technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.



N-Channel MOSFET

GENERAL FEATURES

- RDS(ON) < 6.7mΩ @ VGS=10V
  RDS(ON) < 10.3mΩ @ VGS=4.5V
- High Power and current handling capability
- ESD protection
- Lead free product is available
- SOP-8 Package



Application

- Power Management in Desktop Computer or DC/DC Converters

ABSOLUTE MAXIMUM RATINGS(T_A=25℃unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	±20	V
Diode Continuous Forward Current	I_S (T_C=25℃)	20	A
Drain Current @ Continuous	I_D (T_C=25℃)	61	A
	I_D (T_C=100℃)	43	A
Drain Current @ Current-Pulsed	I_{DM} (T_C=25℃)	244	A
Maximum Power Dissipation	P_D (T_C=25℃)	50	W
	P_D (T_C=100℃)	23.5	W
Drain Current @ Continuous(Note 1)	I_D (T_A=25℃)	14.2	A
	I_D (T_A=70℃)	12	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM} (T_A=25℃)	57	A
Maximum Power Dissipation(Note 1)	P_D (T_A=25℃)	2.5	W
	P_D (T_A=70℃)	1.8	W
Avalanche Current, Single pulse(Note 3)	I_{AS}(L=0.1mH)	23	A
Avalanche Energy, Single pulse(Note 3)	E_{AS}(L=0.1mH)	26.5	mJ
Maximum Operating Junction Temperature	T_J	175	℃
Storage Temperature Range	T_{STG}	-55 To 175	℃

THERMAL CHARACTERISTICS

Thermal Resistance,Junction-to-Ambient (Note 1)	$R_{\theta JA}$（t≤10s）	25	℃/W
	$R_{\theta JA}$（Steady State）	60	℃/W
Thermal Resistance-Junction to Case	$R_{\theta JC}$（Steady State）	3.2	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	40	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=32V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±10	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=250μA	1.4	1.8	2.5	V
Drain-Source On-State Resistance(Note 4)	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	5.6	6.7	mΩ
		T_J=125℃	-	9.2	-	mΩ
		V_{GS}=4.5V, I_D=15A	-	7.9	10.3	mΩ
Forward Transconductance	Gfs	V_{DS}=5V, I_{DS}=15A	-	21	-	S
Dynamic Characteristics(Note 5)						
Gate Resistance	R_G	V_{DS}=0V,V_{GS}=0V, F=1.0MHz	-	1.5	-	Ω
Input Capacitance	Ciss	V_{DS}=20V,V_{GS}=0V, F=1.0MHz	-	911	1185	PF
Output Capacitance	Coss		-	222	-	PF
Reverse Transfer Capacitance	Crss		-	30	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=20V, R_L=20Ω, V_{GEN}=10V,R_G=6Ω I_{DS}=1A	-	11.3	21	nS
Turn-on Rise Time	t_r		-	8.2	15	nS
Turn-Off Delay Time	$t_{d(off)}$		-	22.6	41	nS
Turn-Off Fall Time	t_f		-	15.4	28	nS
Gate Charge Characteristics(Note 5)						
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A,V_{GS}=10V	-	15	21	nC
Total Gate Charge	Q_g	V_{DS}=20V,I_D=20A,V_{GS}=4.5V	-	7.1	-	nC
Gate-Source Charge	Q_{gs}		-	3.2	-	nC
Gate-Drain Charge	Q_{gd}		-	1.9	-	nC
Diode Characteristics						
Diode Forward Voltage (Note 4)	V_{SD}	V_{GS}=0V,I_S=20A	-	0.85	1.1	V
Reverse Recovery Time	t_{rr}	I_{DS}=20A, dI_{SD}/dt=100A/μs	-	18.3	-	ns
Charge Time	t_a		-	8	-	
Discharge Time	t_b		-	10.2	-	
Reverse Recovery Charge	Q_{rr}		-	6.4	-	nC

NOTES:

1,Surface mounted on 1in^2 pad area, steady state t = 999s.

2,Pulse width limited by max. junction temperature.

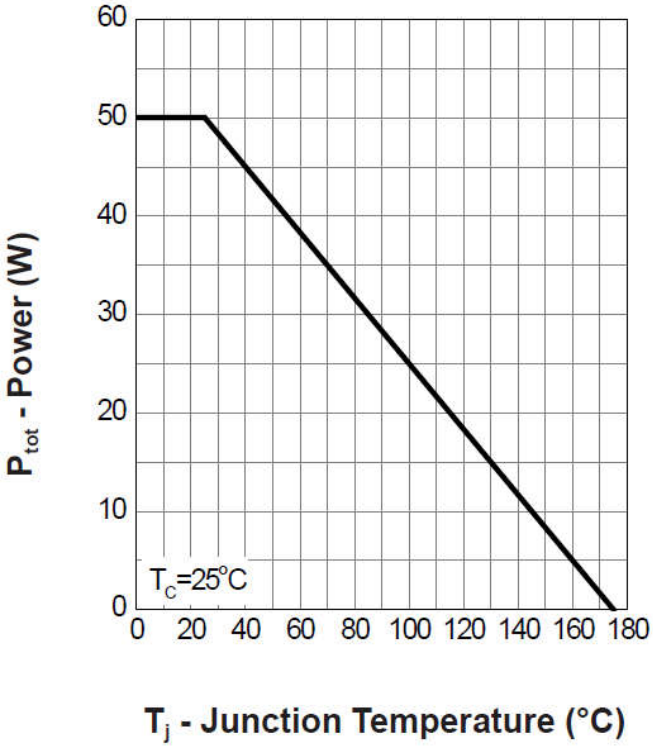
3,UIS tested and pulse width limited by maximum junction temperature 175°C (initial temperature Tj=25°C).

4,Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.

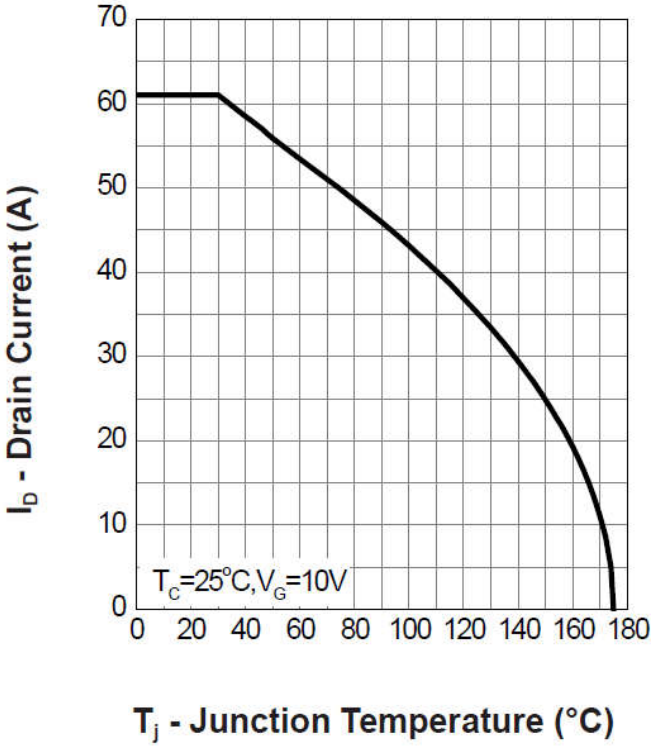
3, Guaranteed by design, not subject to production testing

Typical Operating Characteristics

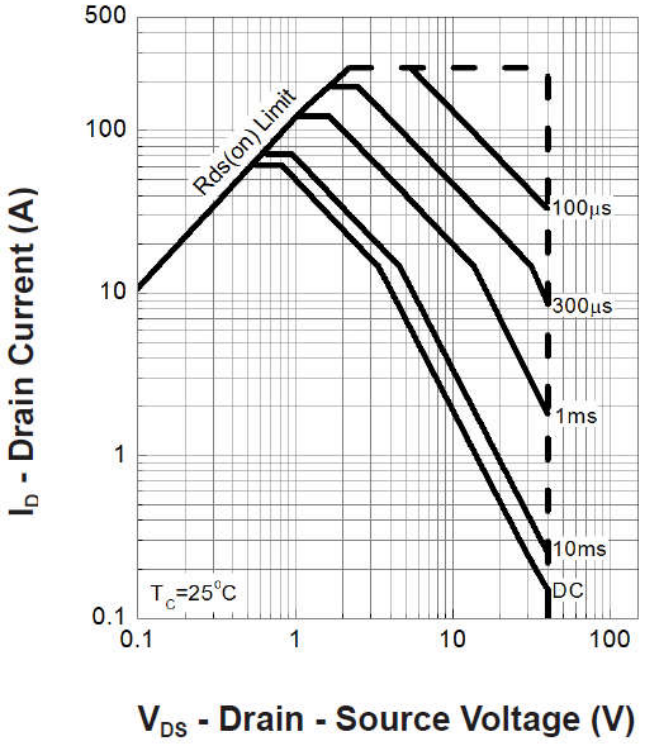
Power Dissipation



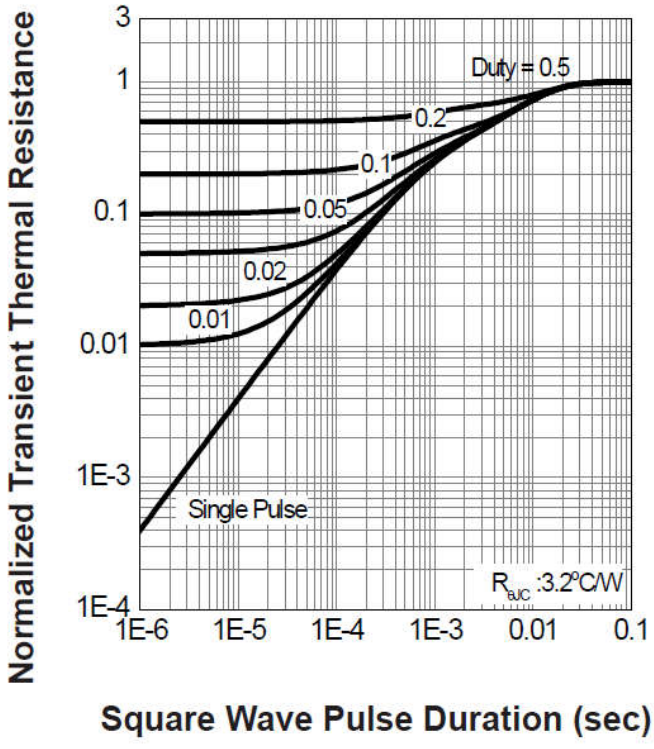
Drain Current



Safe Operation Area

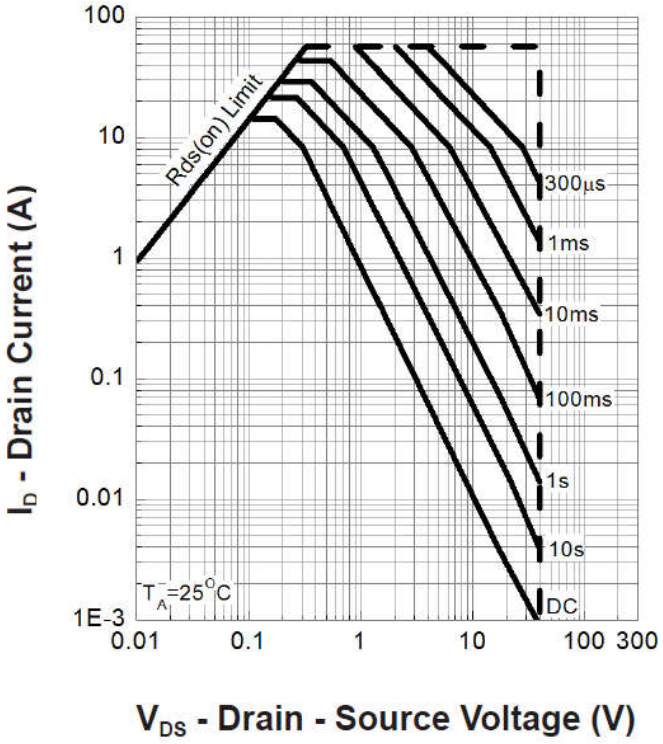


Thermal Transient Impedance

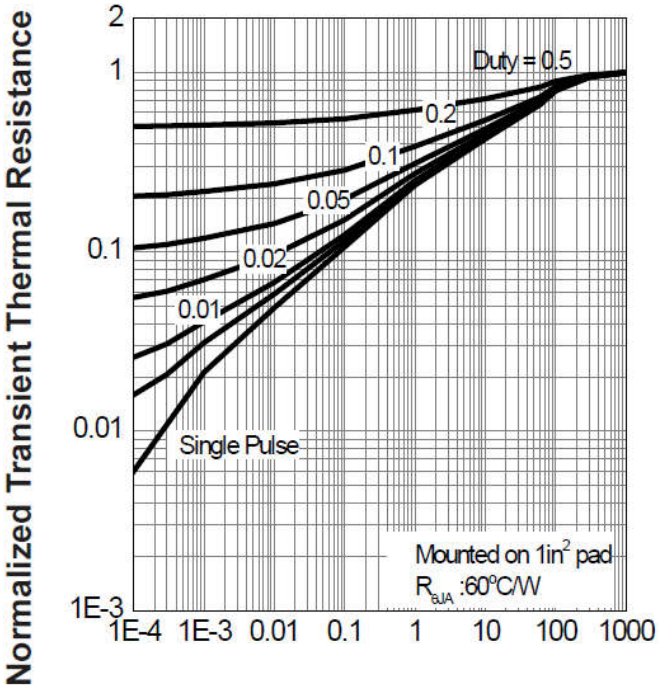


Typical Operating Characteristics(Cont.)

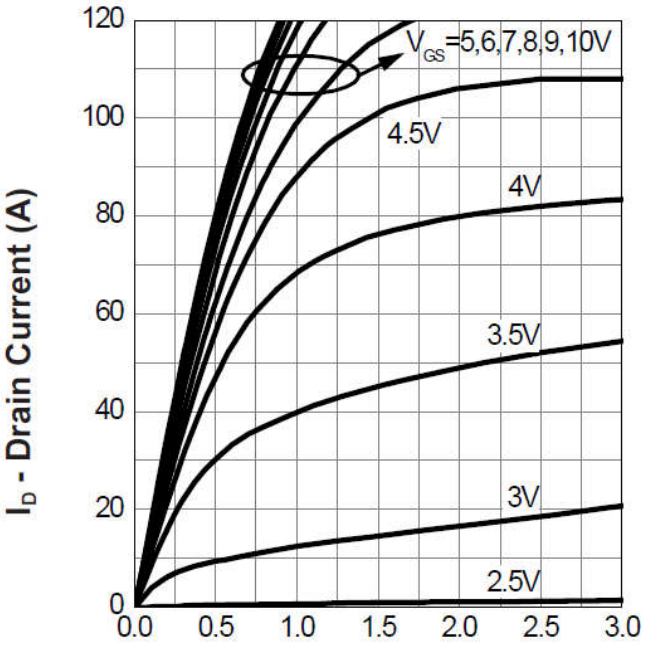
Safe Operation Area



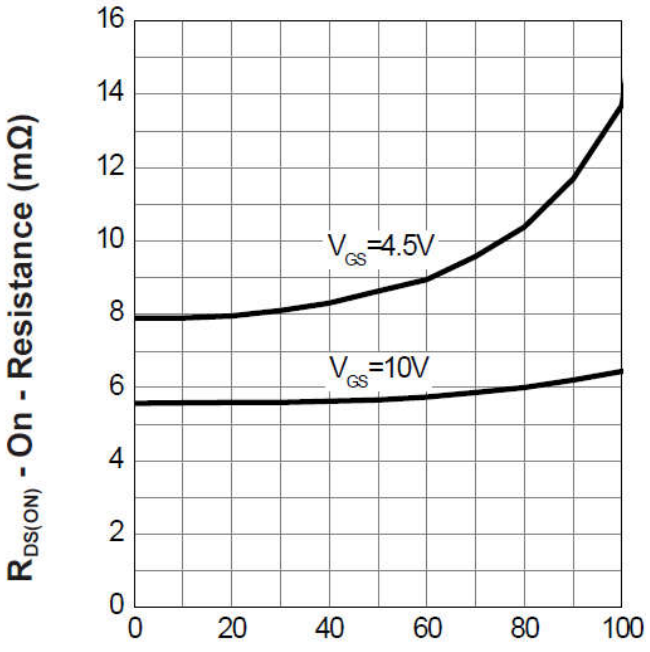
Thermal Transient Impedance



Output Characteristics

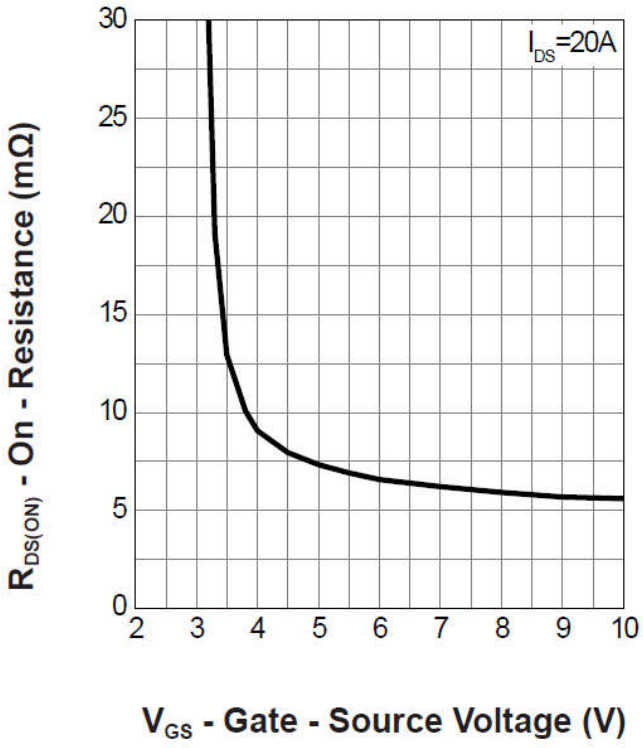


Drain-Source On Resistance

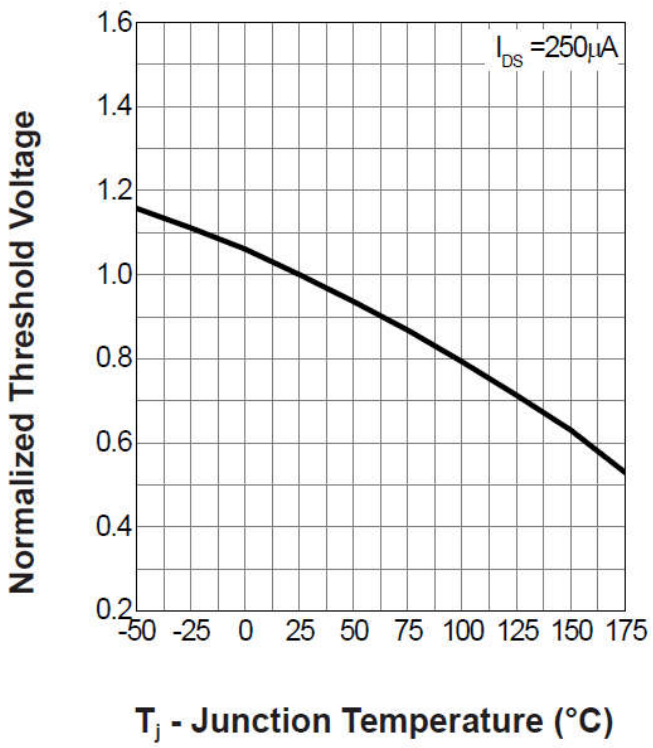


Typical Operating Characteristics(Cont.)

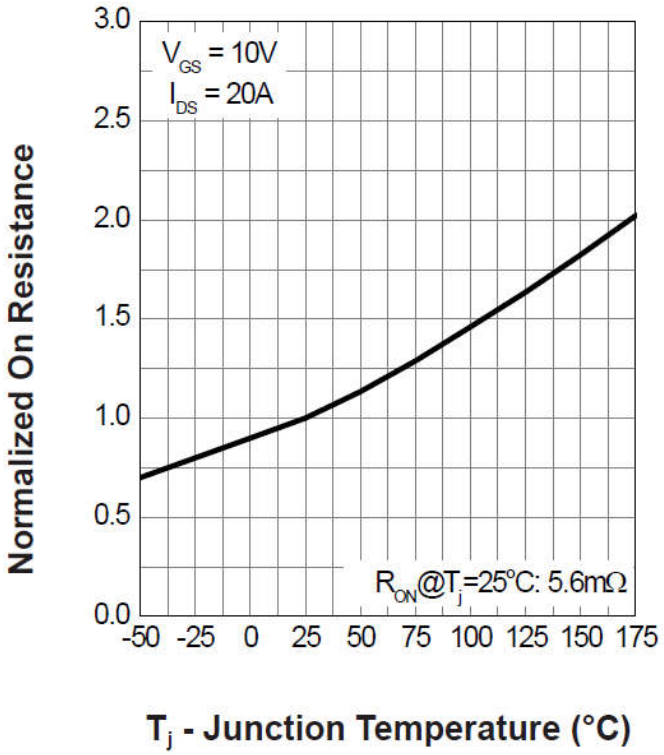
Gate-Source On Resistance



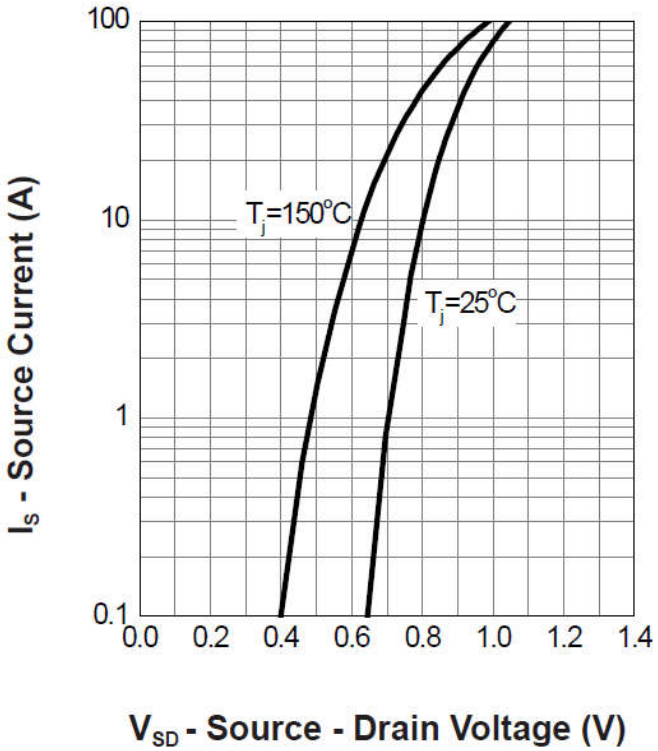
Gate Threshold Voltage



Drain-Source On Resistance

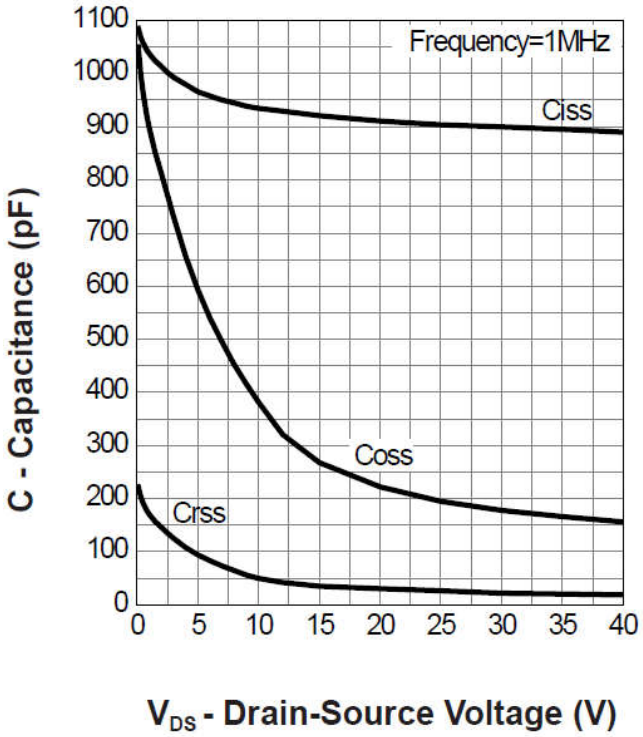


Source-Drain Diode Forward

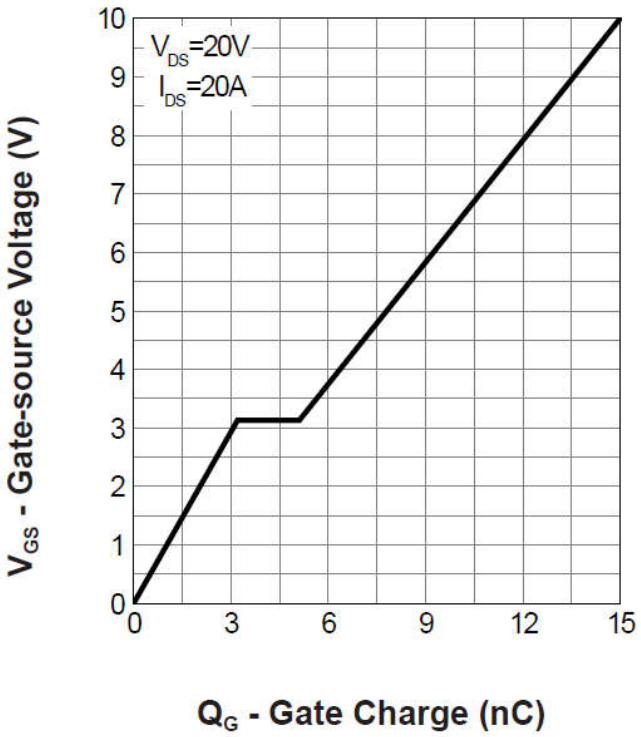


Typical Operating Characteristics(Cont.)

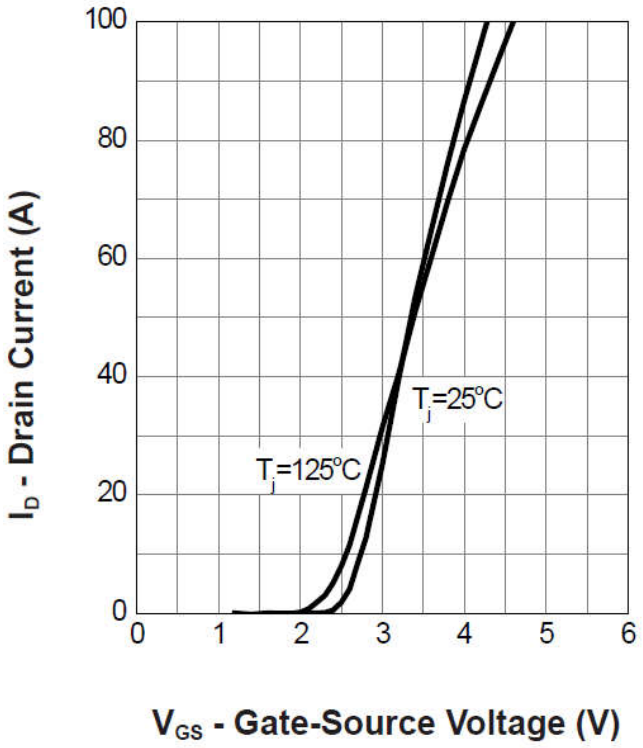
Capacitance



Gate Charge

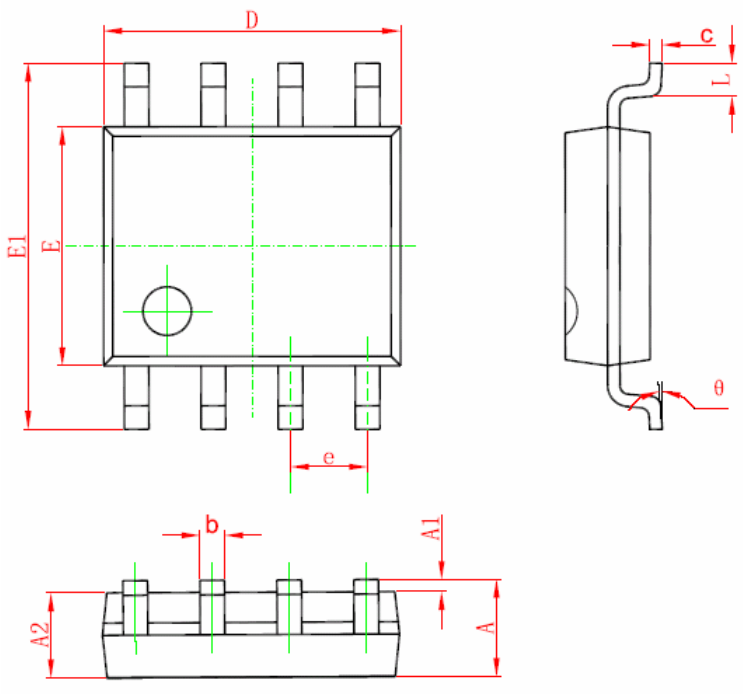


Transfer Characteristics



Package Information

SOP-8 Package



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Design Notes