N-Channel Enhancement Mode MOSFET TDM2358

DESCRIPTION

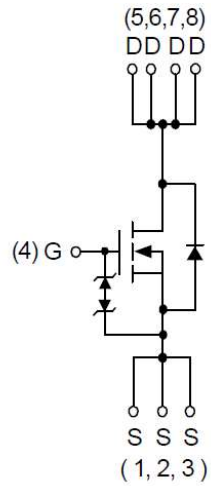
The TDM2358 uses advanced technology to provide excellent RDS(ON) and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

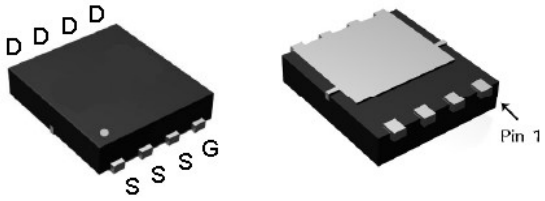
- RDS(ON) < 2.65mΩ @ VGS=10V
  RDS(ON) < 4.3mΩ @ VGS=4.5V
- High Power and current handling capability
- Lead free product is available
- ESD protection
- Surface Mount Package

Application

- Power Management in Desktop Computer
- DC/DC Converters



N-Channel MOSFET



DFN5x6-8

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Diode Continuous Forward Current	I_S（T_C=25℃）	31	A
Drain Current @ Continuous	I_D（T_C=25℃）	110	A
	I_D（T_C=100℃）	74	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM}	92	A
Maximum Power Dissipation	P_D(T_C=25℃)	56	W
	P_D(T_C=100℃)	22	W
Diode Continuous Forward Current	I_S（T_A=25℃）	1.9	A
Drain Current @ Continuous (Note 1)	I_D（T_A=25℃）	22.8	A
	I_D（T_A=70℃）	18.2	A
Maximum Power Dissipation (Note 1)	P_D(T_A=25℃)	2.08	W
	P_D(T_A=70℃)	1.33	W
Avalanche Current, Single pulse	I_{AS}(L=0.1mH)	36	A
Avalanche Energy, Single pulse	E_{AS}(L=0.1mH)	64	mJ

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$(t≤10s)	20	℃/W
	$R_{\theta JA}$(Steady State)	60	℃/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$(Steady State)	2.2	℃/W
Operating Junction Temperature range	T_J	-55 To 150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_A=25℃unless otherwise noted)

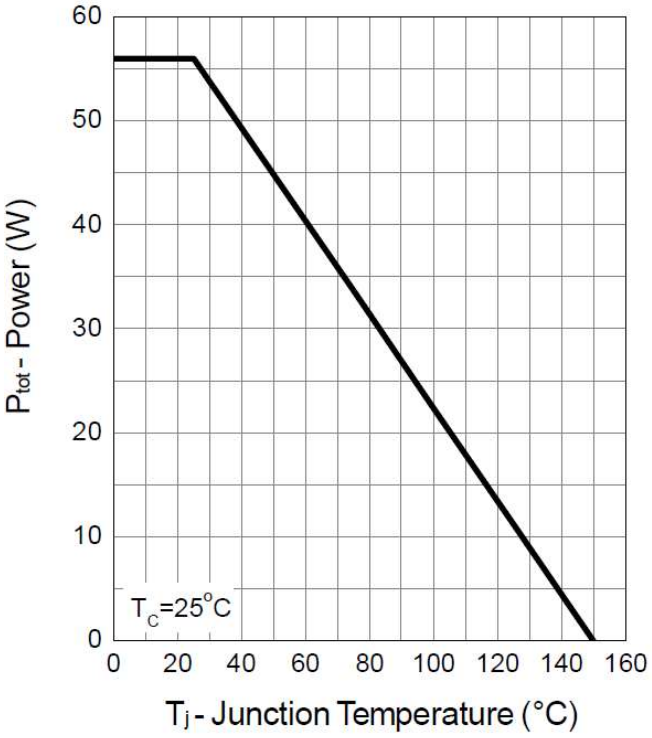
Parameter	Symbol	Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	-	-	±12	μA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=VGS,I_D=250μA	1.4	1.7	2.5	V
Drain-Source On-State Resistance(Note3)	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.2	2.65	mΩ
		T_J=125℃	-	3.3	-	mΩ
		V_{GS}=4.5V, I_D=15A	-	3.3	4.3	mΩ
Forward Transconductance	Gfs	V_{DS}=5V, I_{DS}=15A	-	30	-	S
DYNAMIC CHARACTERISTICS (Note4)						
Gate Resistance	R_G	V_{DS}=0V,V_{GS}=0V, F=1.0MHz	-	0.9	2.1	Ω
Input Capacitance	Ciss	V_{DS}=15V,V_{GS}=0V, F=1.0MHz	-	1860	2400	PF
Output Capacitance	Coss		-	1220	1586	PF
Reverse Transfer Capacitance	Crss		-	92	120	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DS}=15V, R_L=15 Ω, V_{GEN}=10V,	-	15	-	nS
Turn-on Rise Time	t_r	R_G=6 Ω I_D=1A	-	8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	38	-	nS
Turn-Off Fall Time	t_f		-	54	-	nS
Total Gate Charge	Q_g	V_{DS}=15V, I_D=20A, V_{GS}=10V	-	30	-	nC
Total Gate Charge	Q_g	V_{DS}=15V, I_D=20A, V_{GS}=4.5V	-	14	-	nC
Threshold Gate Charge	Q_{gth}		-	3	-	nC
Gate-Source Charge	Q_{gs}		-	5.3	-	nC
Gate-Drain Charge	Q_{gd}		-	3.6	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=20A	-	0.81	1.1	V
Reverse Recovery Time	Trr	I_F=5A, dI/dt=100A/μs	-	39	-	nS
Reverse Recovery Charge	Qrr		-	33	-	nC

NOTES:

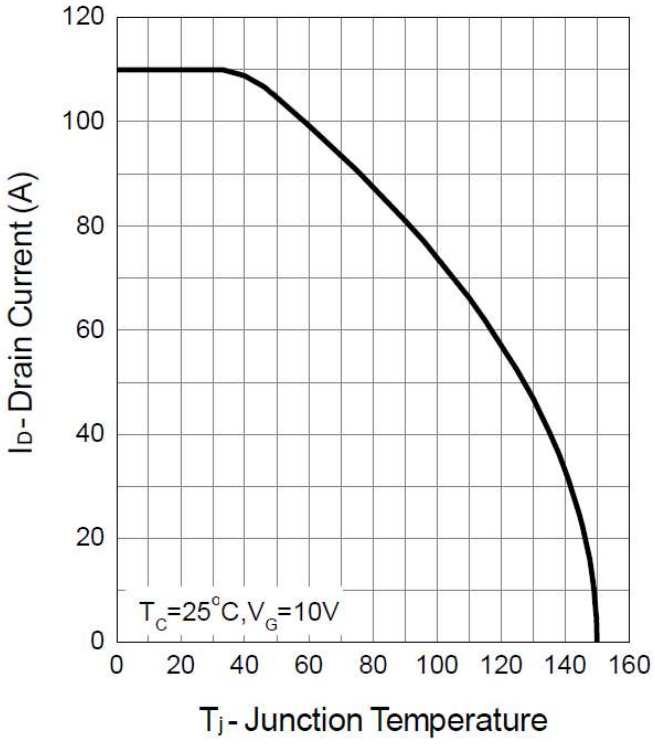
1. Surface Mounted on 1in² pad area, t ≤ 10sec. $R_{\theta JA}$ steady state t=999s.
2. Pulse width limited by max. junction temperature.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

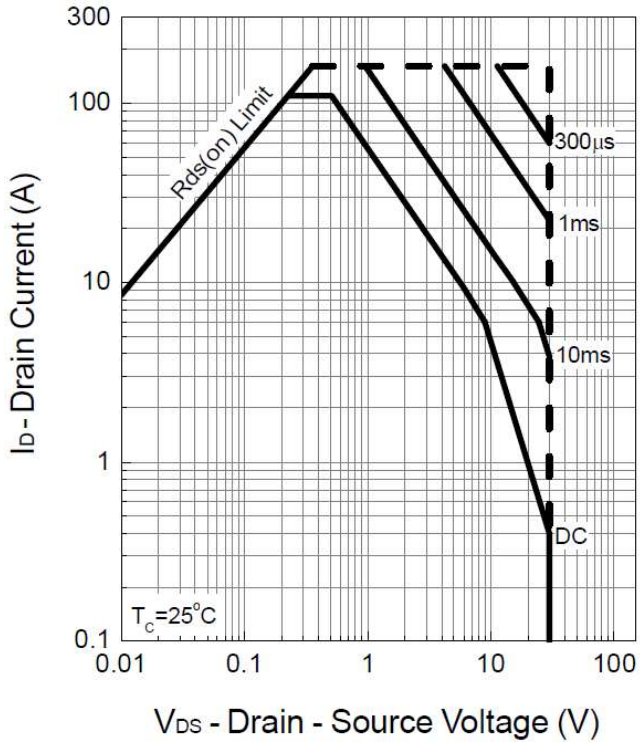
Power Dissipation



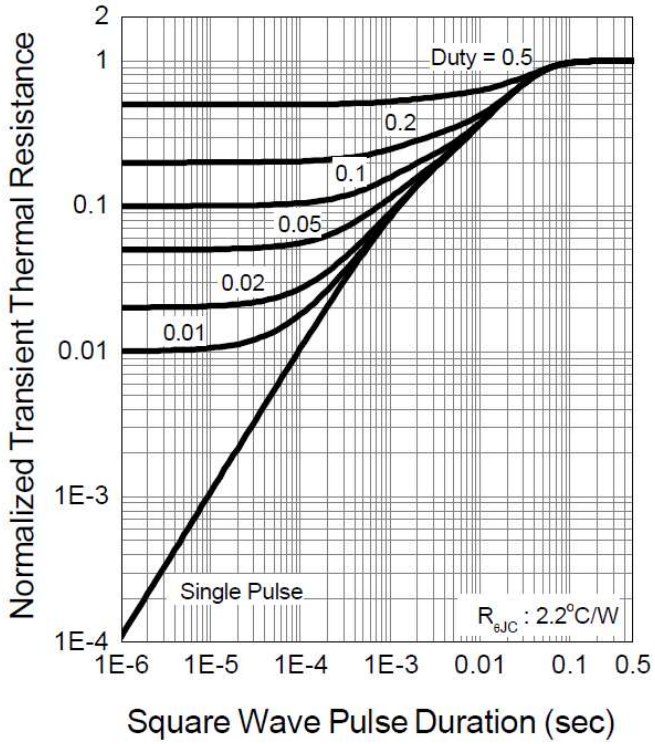
Drain Current



Safe Operation Area

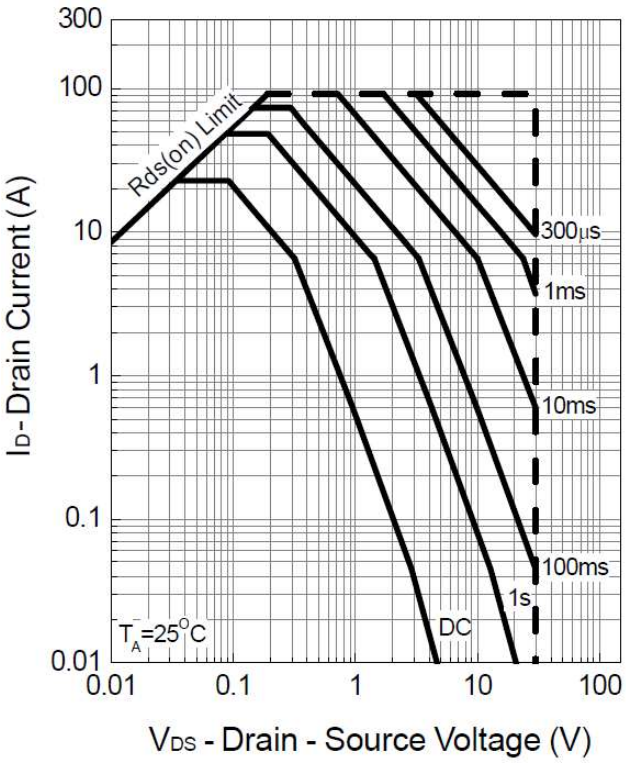


Thermal Transient Impedance

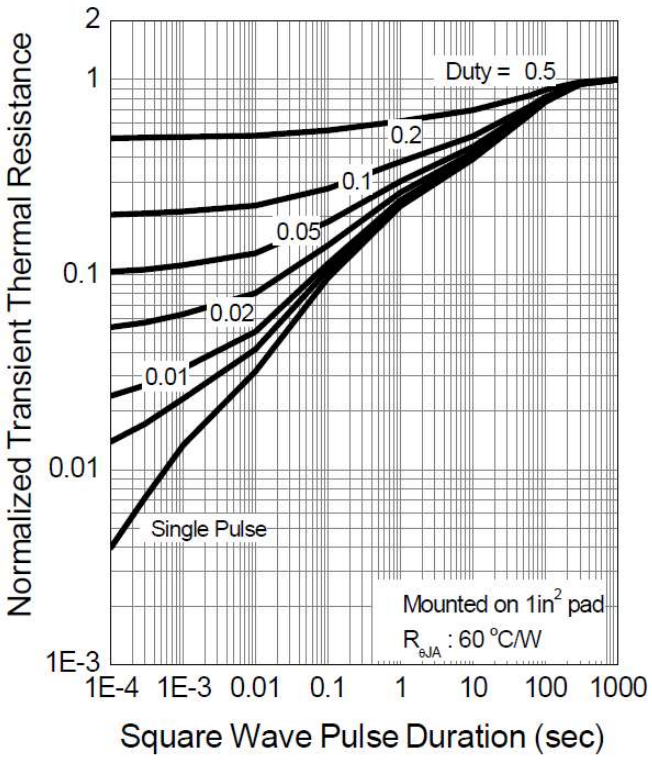


Typical Operating Characteristics(Cont.)

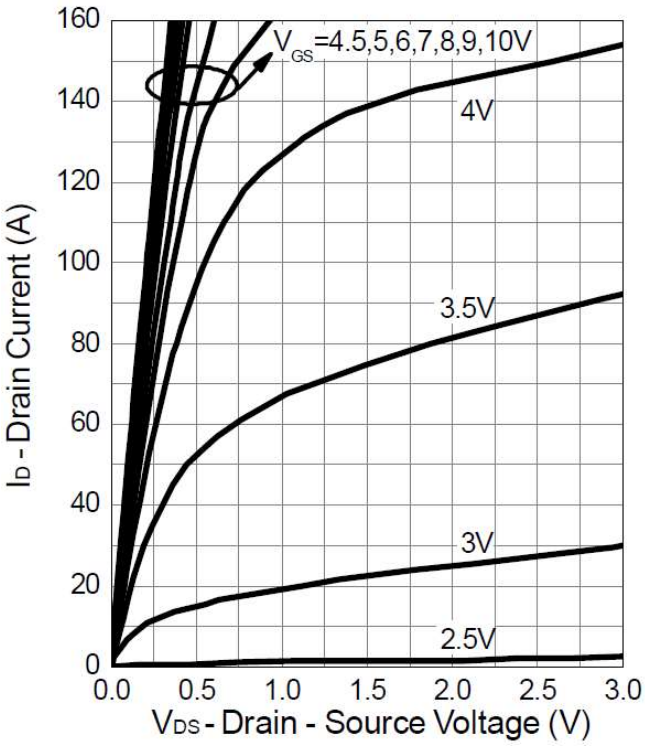
Safe Operation Area



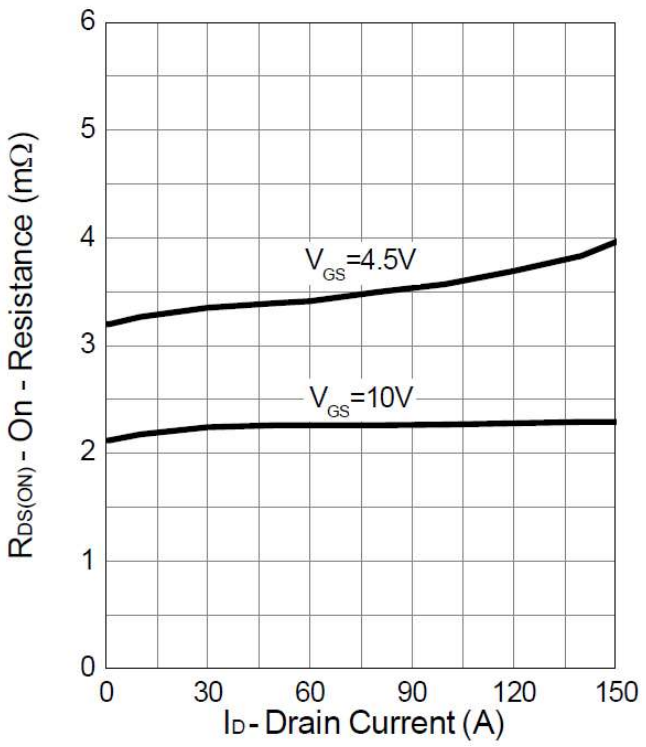
Thermal Transient Impedance



Output Characteristics

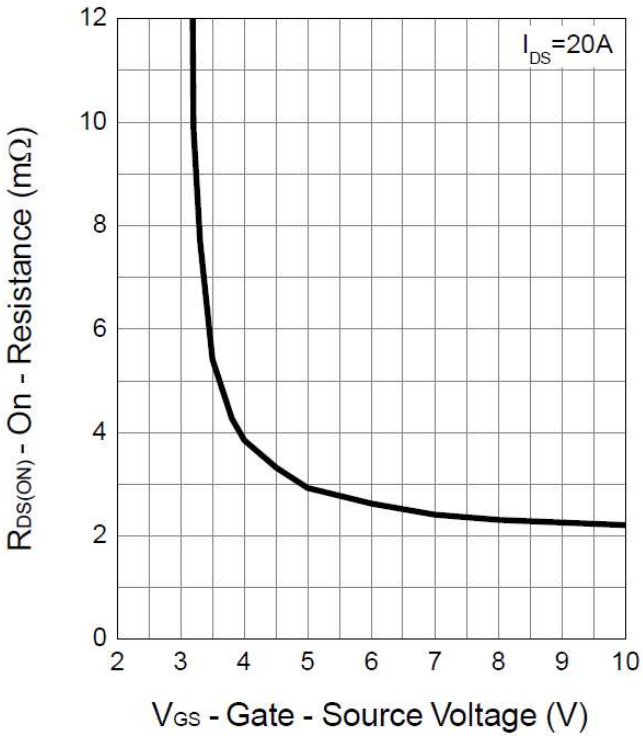


Drain-Source On Resistance

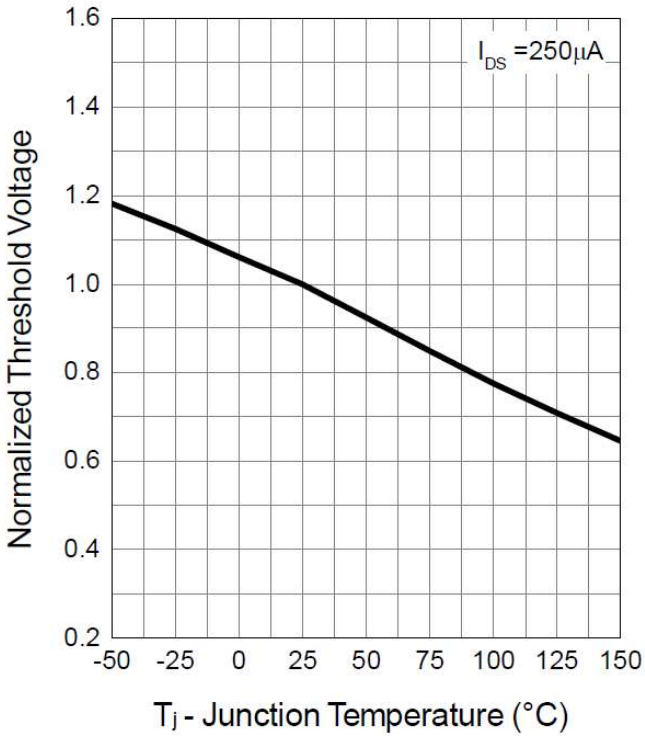


Typical Operating Characteristics (Cont.)

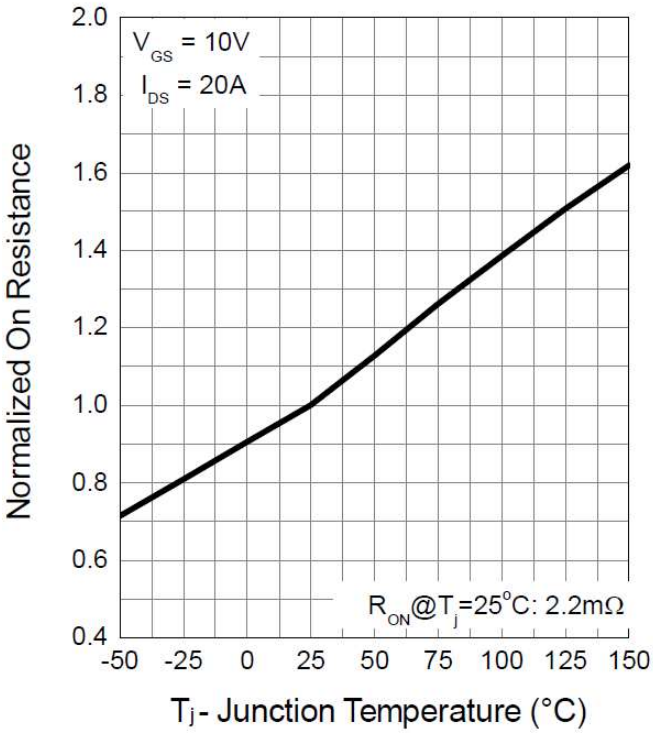
Gate-Source On Resistance



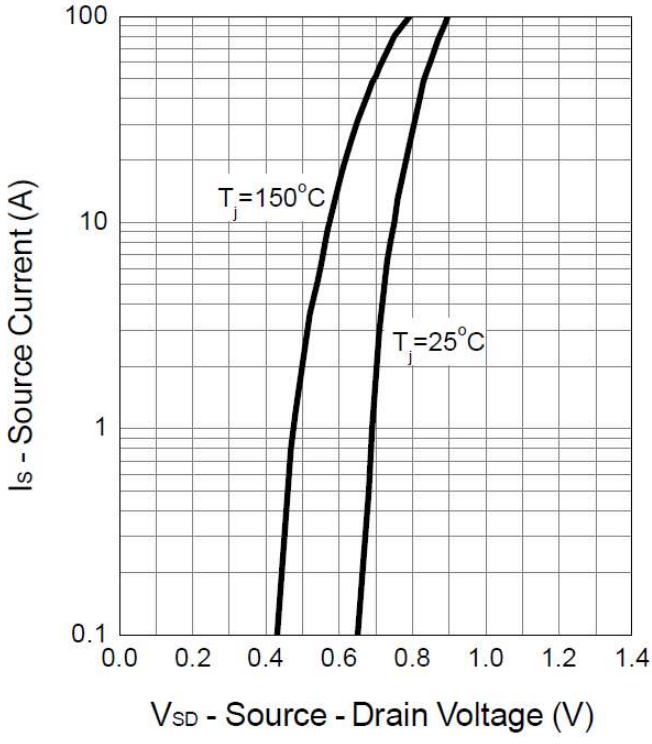
Gate Threshold Voltage



Drain-Source On Resistance

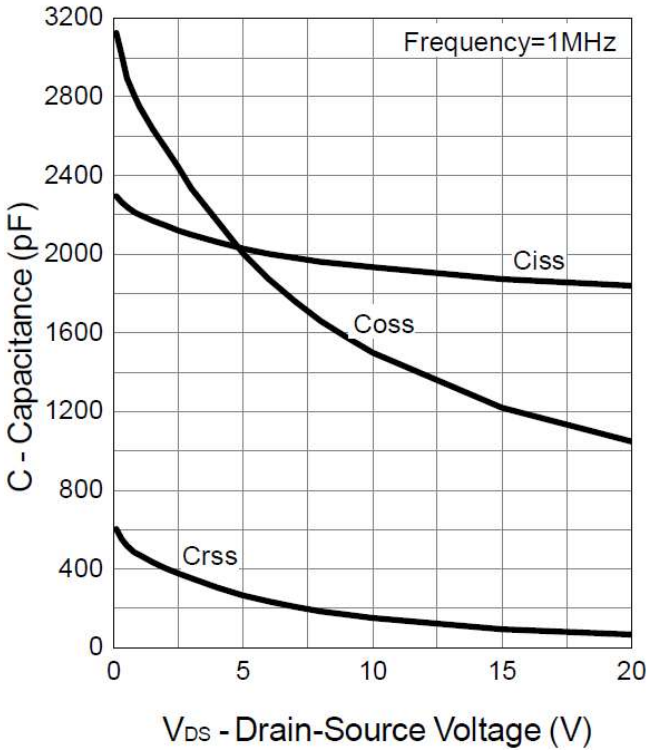


Source-Drain Diode Forward

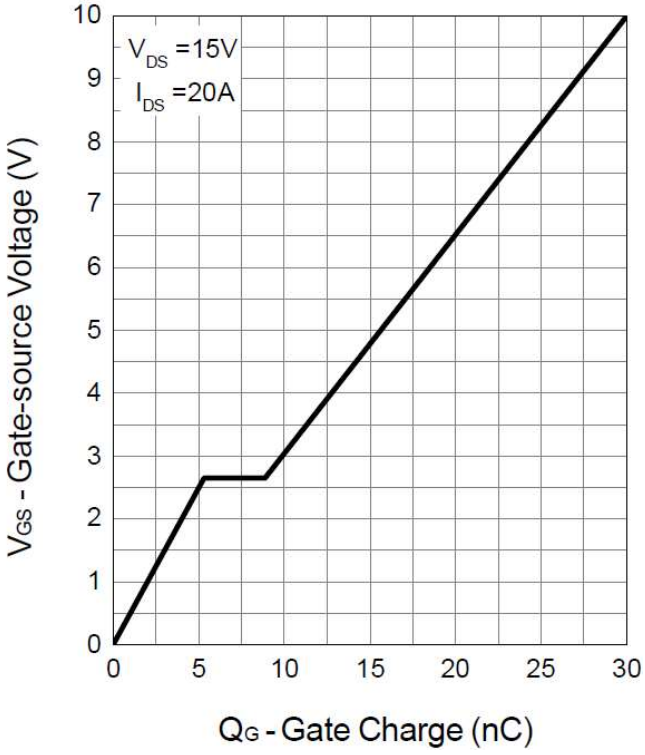


Typical Operating Characteristics (Cont.)

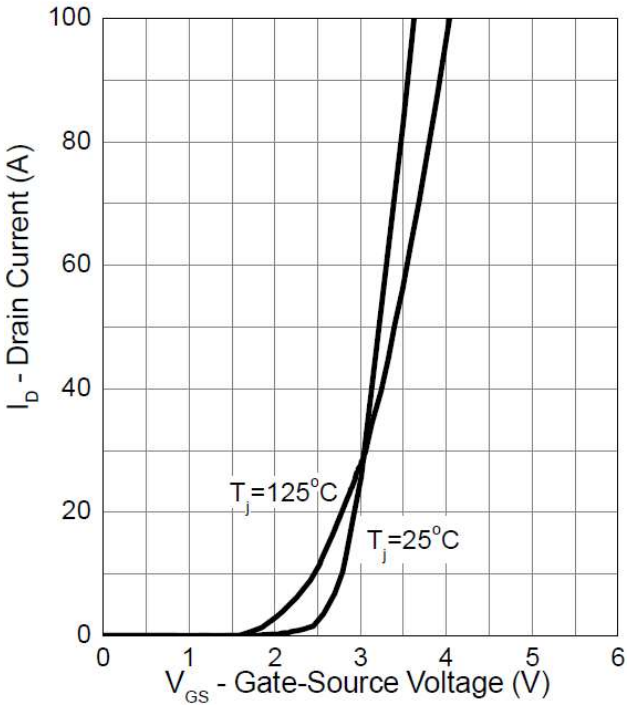
Capacitance



Gate Charge

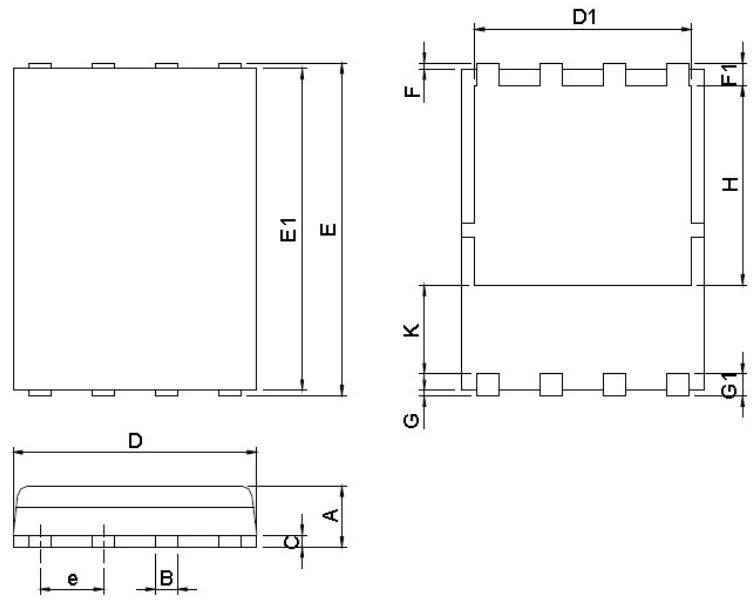


Transfer Characteristics



Package Information

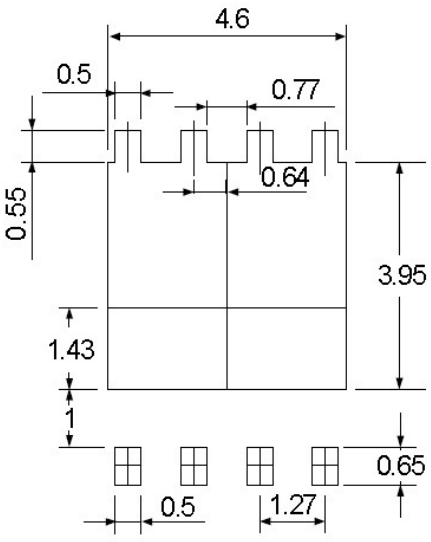
DFN5*6-8 Package



SYMBOL	DFN5x6-8			
	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	0.90	1.20	0.035	0.047
B	0.3	0.51	0.012	0.020
C	0.19	0.25	0.007	0.010
D	4.80	5.30	0.189	0.209
D1	4.00	4.40	0.157	0.173
E	5.90	6.20	0.232	0.244
E1	5.50	5.80	0.217	0.228
e	1.27 BSC		0.050 BSC	
F	0.05	0.30	0.002	0.012
F1	0.35	0.75	0.014	0.030
G	0.05	0.30	0.002	0.012
G1	0.35	0.75	0.014	0.030
H	3.34	3.9	0.131	0.154
K	0.762	-	0.03	-

Note : 1.Dimension D, D1,D2 and E1 do not include mold flash or protrusions.
Mold flash or protrusions shall not exceed 10 mil.

RECOMMENDED LAND PATTERN



UNIT: mm

Design Notes