

N-Channel Enhancement Mode MOSFET

TDM2370

DESCRIPTION

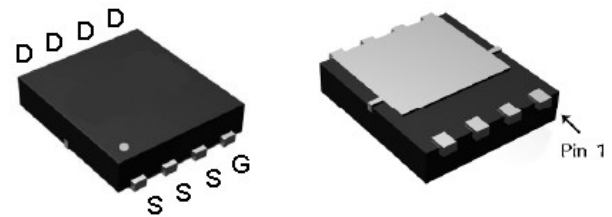
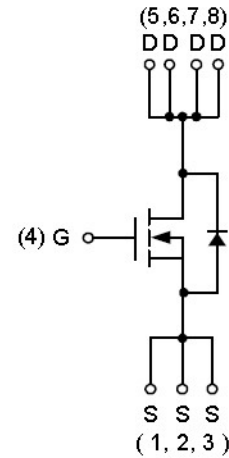
The TDM2370 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- $R_{DS(ON)} < 8.5m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 12m\Omega$ @ $V_{GS}=4.5V$
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- Power Management in Desktop Computer
- DC/DC Converters



DFN5x6-8

ABSOLUTE MAXIMUM RATINGS($T_A=25^\circ\text{C}$ 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 ($T_C=25^\circ\text{C}$)	20	A
Drain Current @ Continuous	I_D ($T_C=25^\circ\text{C}$)	49	A
	I_D ($T_C=100^\circ\text{C}$)	31	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM} ($T_C=25^\circ\text{C}$)	123	A
Maximum Power Dissipation	P_D ($T_C=25^\circ\text{C}$)	31	W
	P_D ($T_C=100^\circ\text{C}$)	12.5	W
Drain Current @ Continuous(Note 1)	I_D ($T_A=25^\circ\text{C}$)	14.4	A
	I_D ($T_A=70^\circ\text{C}$)	11.6	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM} ($T_A=25^\circ\text{C}$)	57.6	A
Maximum Power Dissipation(Note 1)	P_D ($T_A=25^\circ\text{C}$)	2.7	W
	P_D ($T_A=70^\circ\text{C}$)	1.7	W
Avalanche Current, Single pulse	$I_{AS}(L=0.1mH)$	20	A
Avalanche Energy, Single pulse	$E_{AS}(L=0.1mH)$	20	mJ

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THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}(t \leq 10s)$	20	°C/W
	$R_{\theta JA}(\text{Steady State})$	47	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}(\text{Steady State})$	3.9	°C/W
Operating Junction Temperature Range	T_J	-55 To 150	°C
Storage Temperature Range	T_{STG}	-55 To 150	°C

ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise noted)

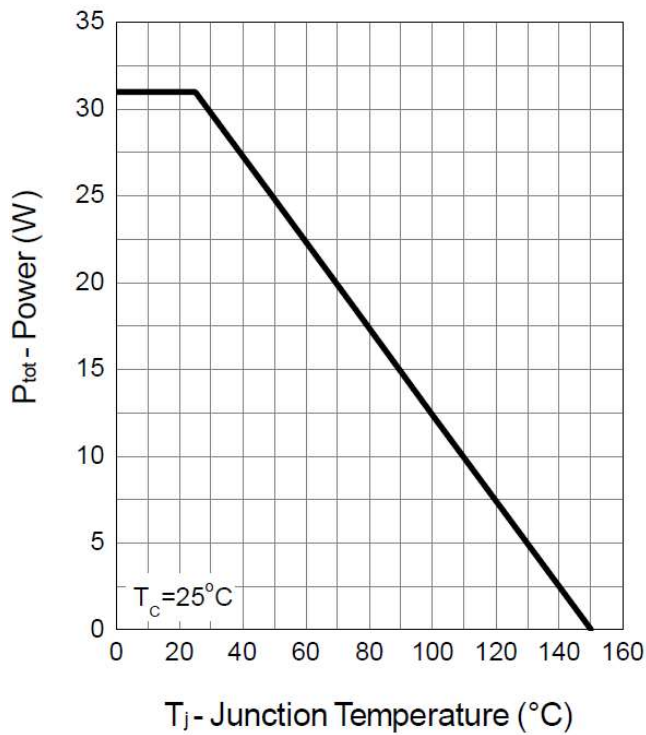
Parameter	Symbol	Condition	Min	Typ	Max	Unit
STATIC CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =24V, V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	± 100	nA
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.5	1.8	2.5	V
Drain-Source On-State Resistance (Note 3)	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	7	8.5	mΩ
		T _J =125 °C	-	10.5	-	mΩ
		V _{GS} =4.5V, I _D =10A	-	9.2	12	mΩ
Forward Transconductance	G _{fs}	V _{DS} =5V, I _{DS} =10A	-	40	-	S
DYNAMIC CHARACTERISTICS (Note4)						
Gate Resistance	R _G	V _{DS} =0V, V _{GS} =0V, F=1.0MHz	-	0.9	2	Ω
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	930	1100	PF
Output Capacitance	C _{oss}		-	147	200	PF
Reverse Transfer Capacitance	C _{rss}		-	94	120	PF
Turn-on Delay Time	t _{d(on)}	V _{DS} =15V, R _L =15 Ω, V _{GEN} =10V, R _G =6 Ω I _D =1A	-	12	18	nS
Turn-on Rise Time	t _r		-	10	15	nS
Turn-Off Delay Time	t _{d(off)}		-	24	40	nS
Turn-Off Fall Time	t _f		-	5.5	8	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =20A, V _{GS} =4.5V	-	8	12	nC
Total Gate Charge	Q _g	V _{DS} =15V, I _D =20A, V _{GS} =10V	-	16	-	nC
Threshold Gate Charge	Q _{gth}		-	1.3	-	nC
Gate-Source Charge	Q _{gs}		-	2.8	-	nC
Gate-Drain Charge	Q _{gd}		-	3.7	-	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V, I _S =15A	-	0.81	1.1	V
Reverse Recovery Time	T _{rr}	I _F =20A, dI/dt=100A/μs	-	12.1	-	nS
Reverse Recovery Charge	Q _{rr}		-	4.9	-	nC

NOTES:

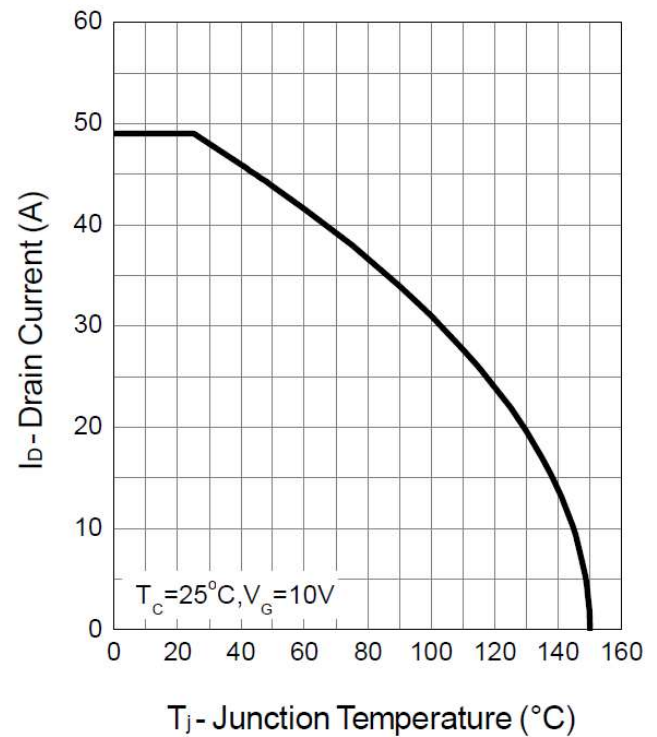
1. Surface Mounted on 1in^2 pad area, $t \leq 10\text{sec}$. $R_{\theta JA}$ steady state $t=999s$.
2. Pulse width limited by max. junction temperature.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

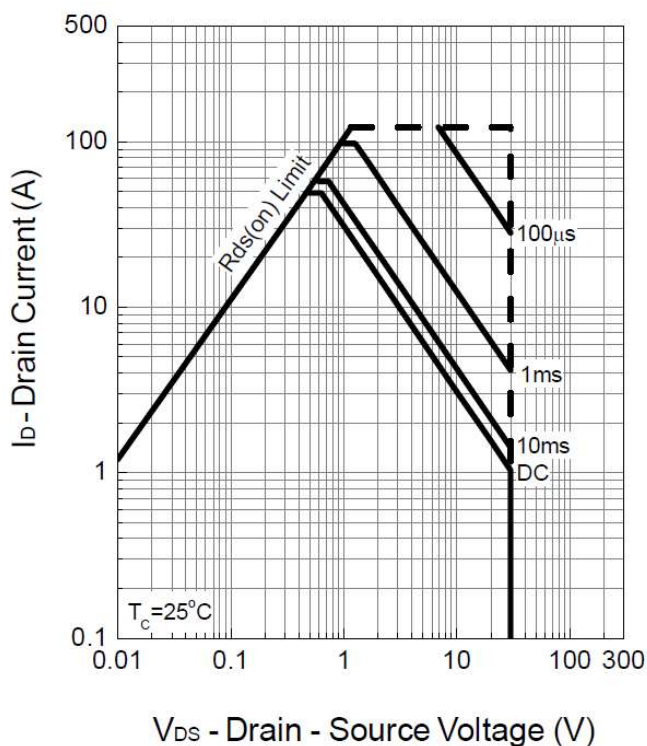
Power Dissipation



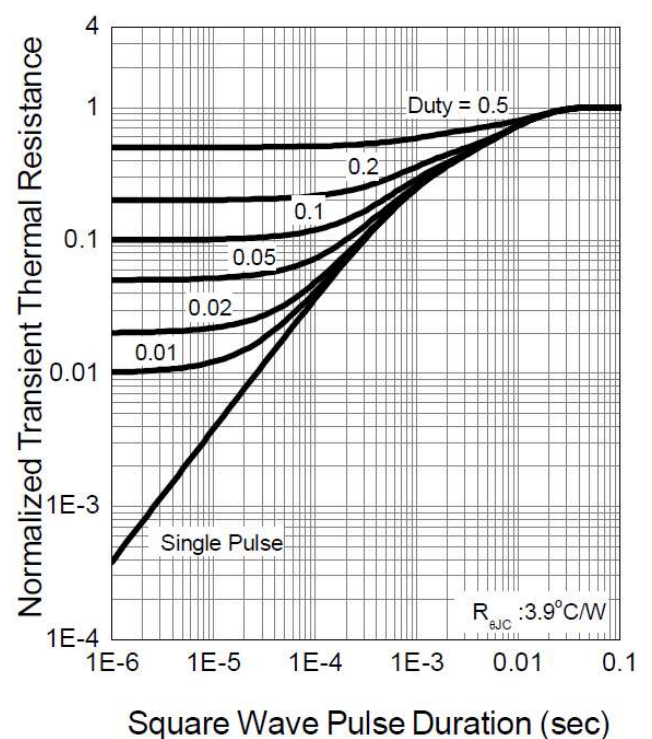
Drain Current



Safe Operation Area

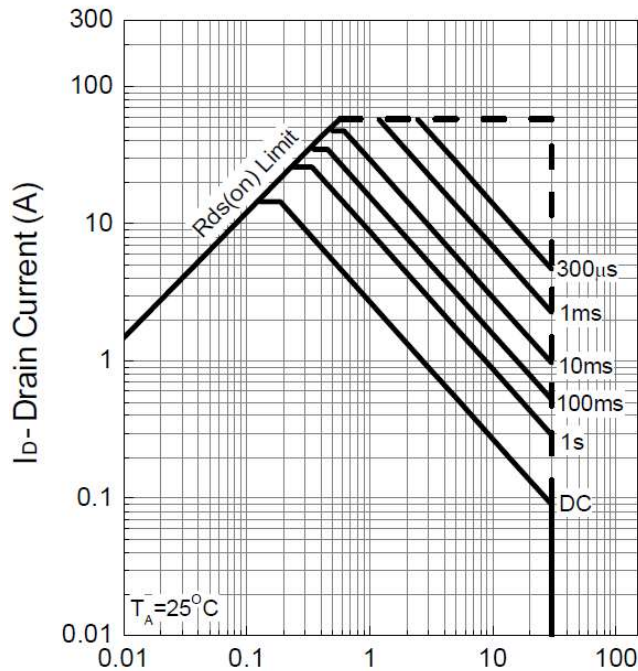


Thermal Transient Impedance

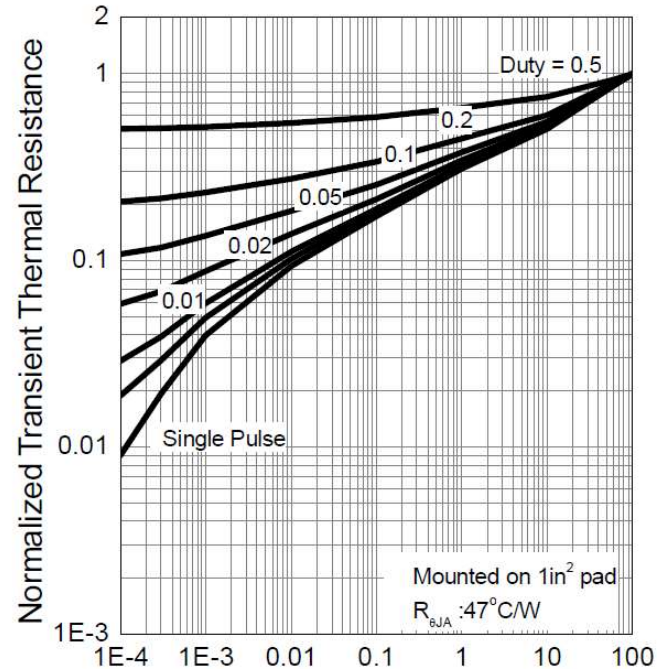


Typical Operating Characteristics(Cont.)

Safe Operation Area

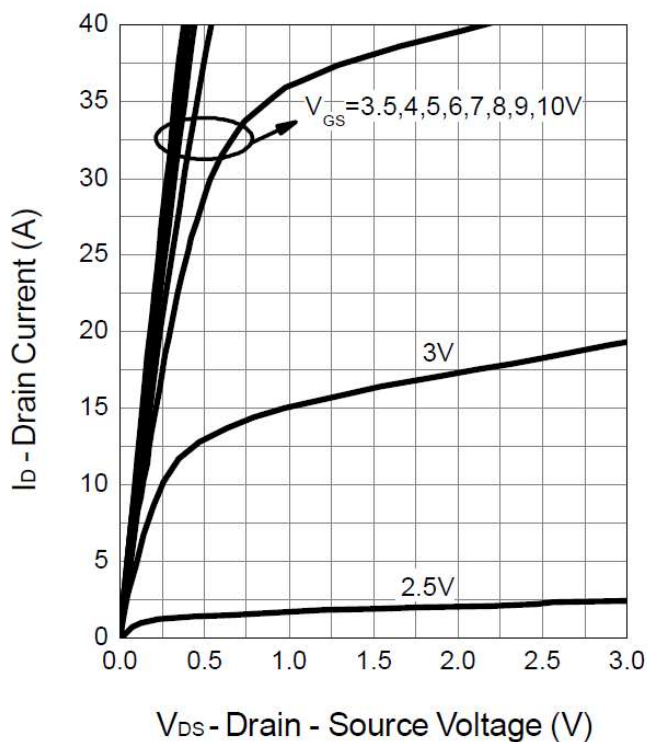
 V_{DS} - Drain - Source Voltage (V)

Thermal Transient Impedance

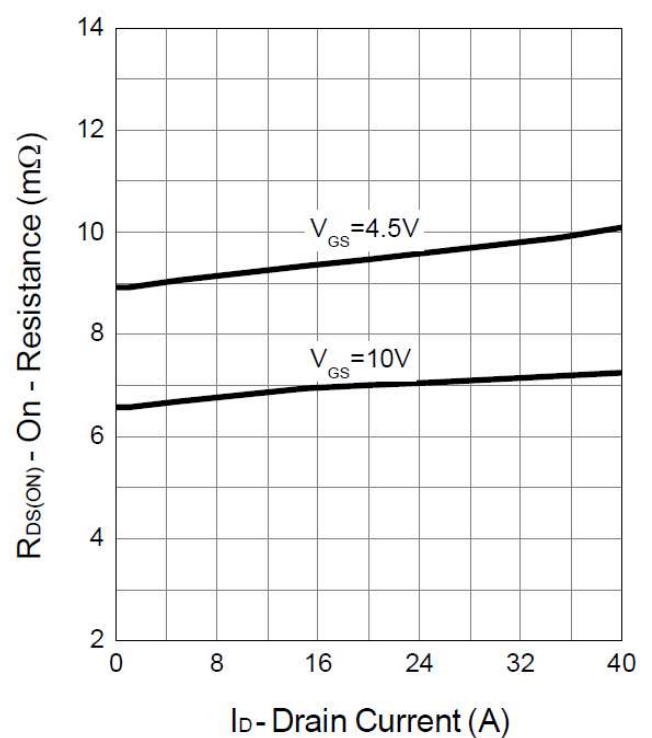


Square Wave Pulse Duration (sec)

Output Characteristics

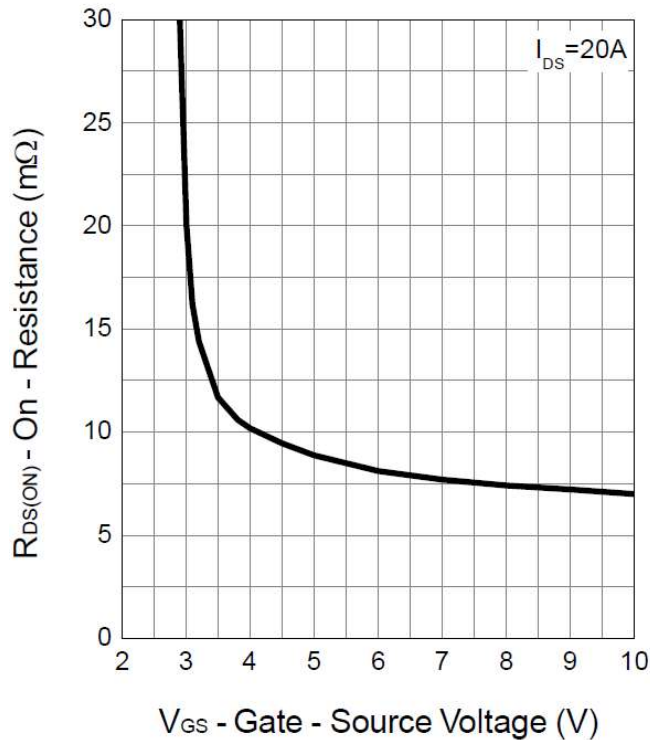
 V_{DS} - Drain - Source Voltage (V)

Drain-Source On Resistance

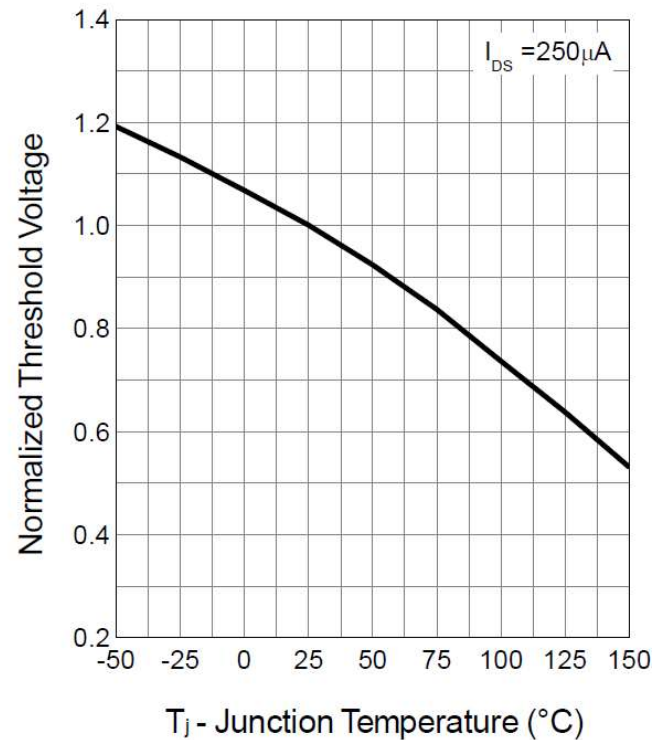
 I_D - Drain Current (A)

Typical Operating Characteristics (Cont.)

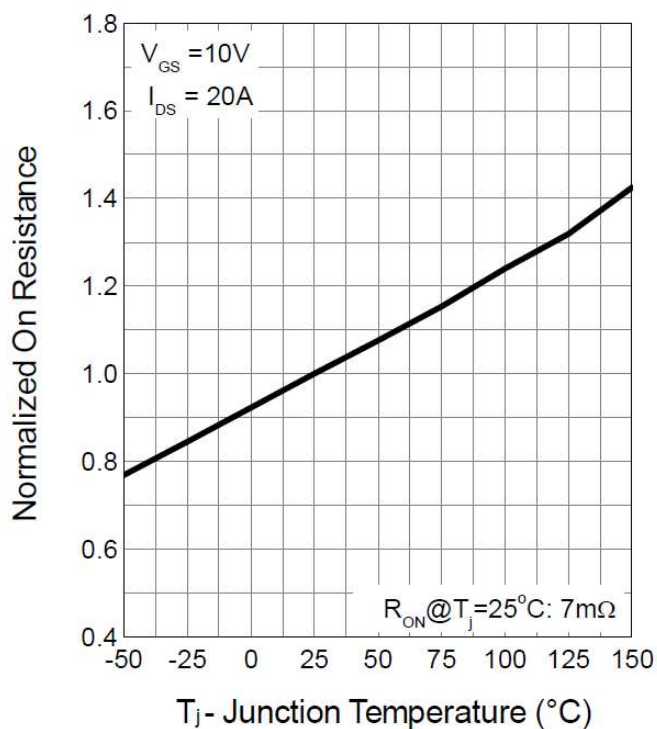
Gate-Source On Resistance



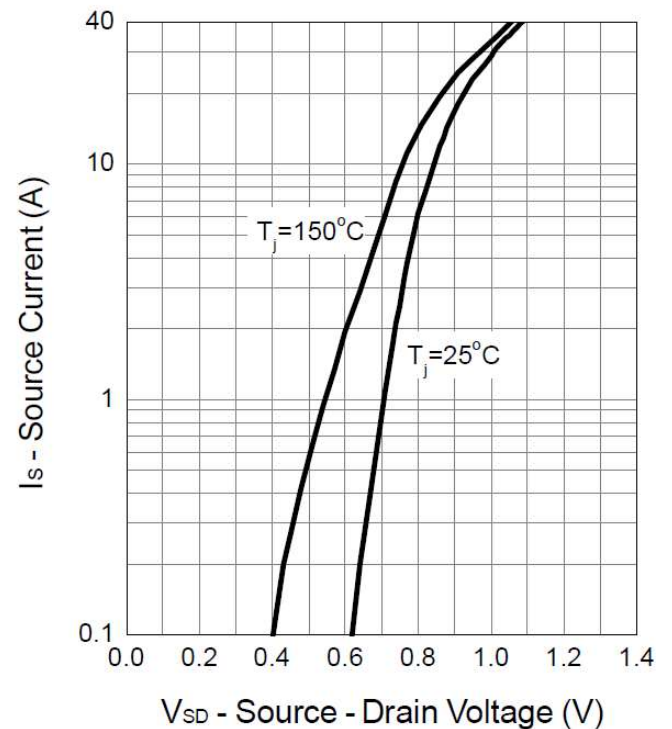
Gate Threshold Voltage



Drain-Source On Resistance

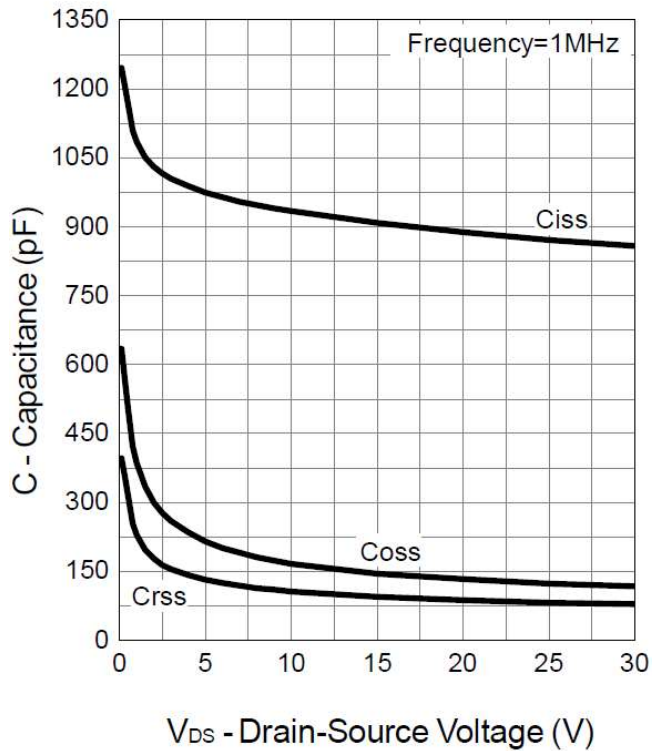


Source-Drain Diode Forward

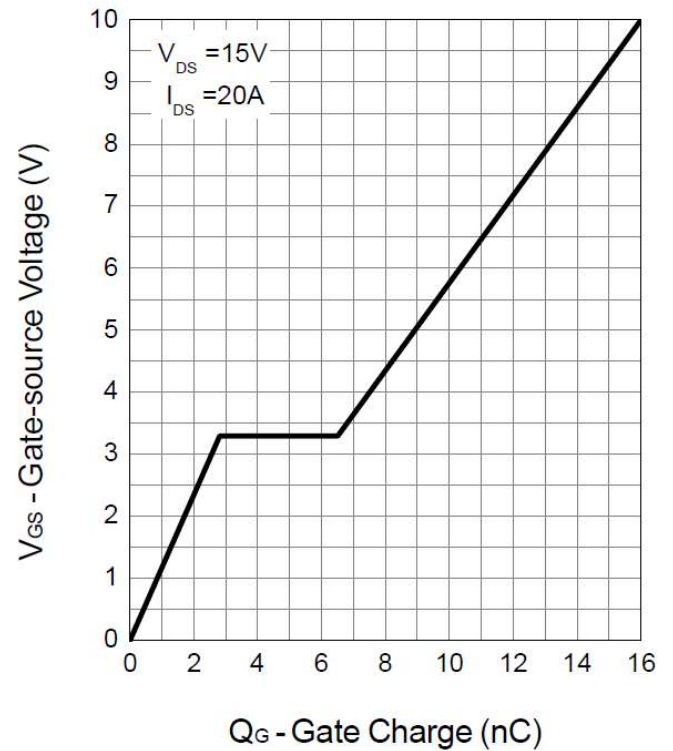


Typical Operating Characteristics (Cont.)

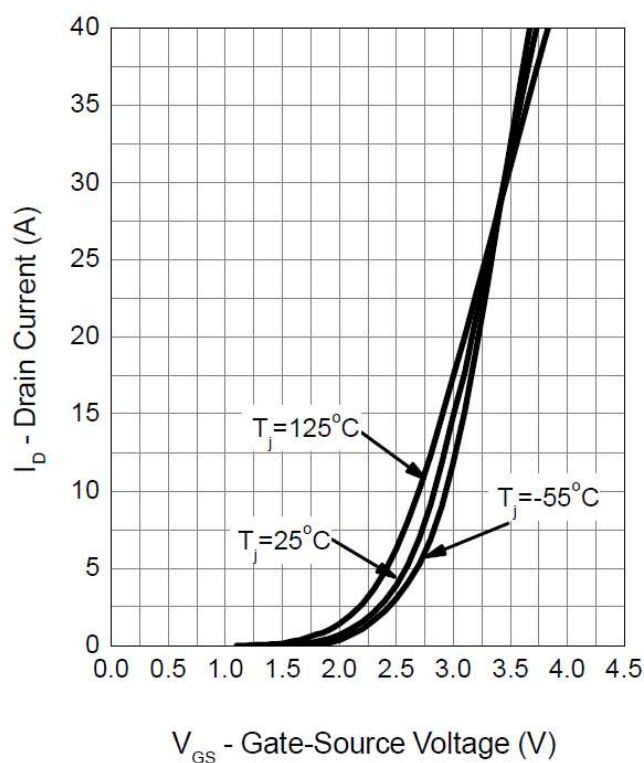
Capacitance



Gate Charge



Transfer Characteristics

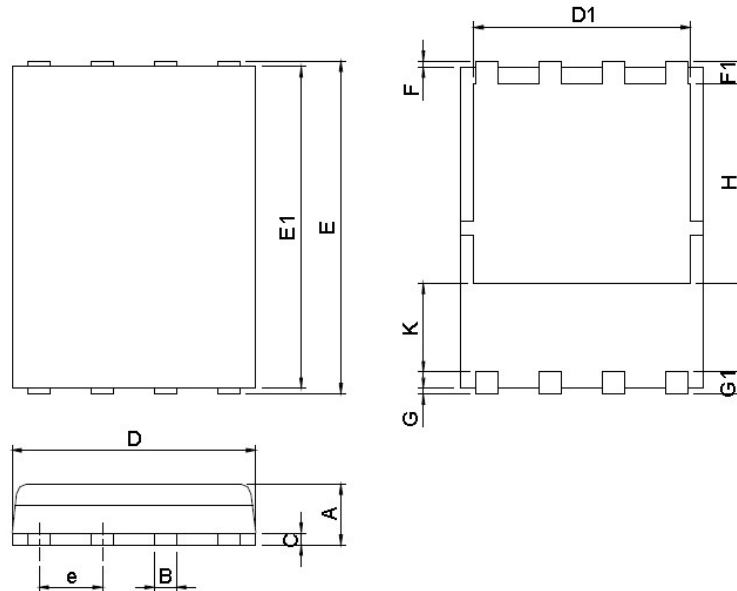


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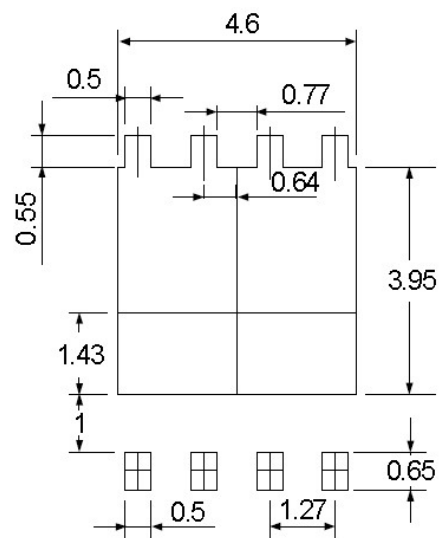
Package Information

DFN5*6-8 Package



DIMENSIONS	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	-

RECOMMENDED LAND PATTERN



UNIT: mm

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

Design Notes