

N-Channel Enhancement Mode MOSFET

TDM32020

DESCRIPTION

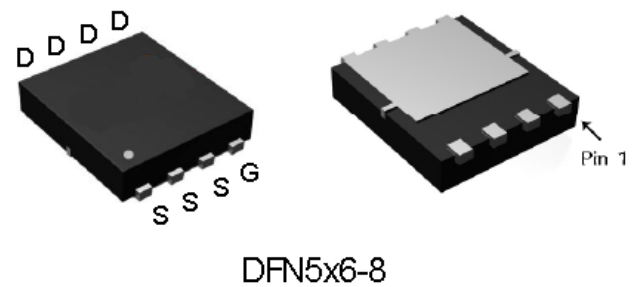
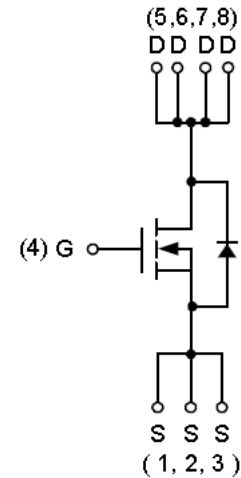
The TDM32020 uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- $R_{DS(ON)} < 70m\Omega$ @ $V_{GS}=10V$
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package

Application

- PWM applications
- Load switch
- Power management

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	200	V
Gate-Source Voltage	V_{GS}	± 25	V
Drain Current @ Continuous(Note 1)	I_D ($T_C=25^\circ\text{C}$)	23	A
	I_D ($T_C=100^\circ\text{C}$)	14	A
Drain Current @ Current-Pulsed (Note 2)	I_{DM} ($T_C=25^\circ\text{C}$)	48	A
Drain Current @ Continuous(Note 1)	I_D ($T_A=25^\circ\text{C}$)	5.3	A
	I_D ($T_A=70^\circ\text{C}$)	4.3	A
Maximum Power Dissipation ($T_A=25^\circ\text{C}$)	P_D	5	W
Maximum Operating Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 To 150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	50	$^\circ\text{C}/\text{W}$
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ELECTRICAL CHARACTERISTICS ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

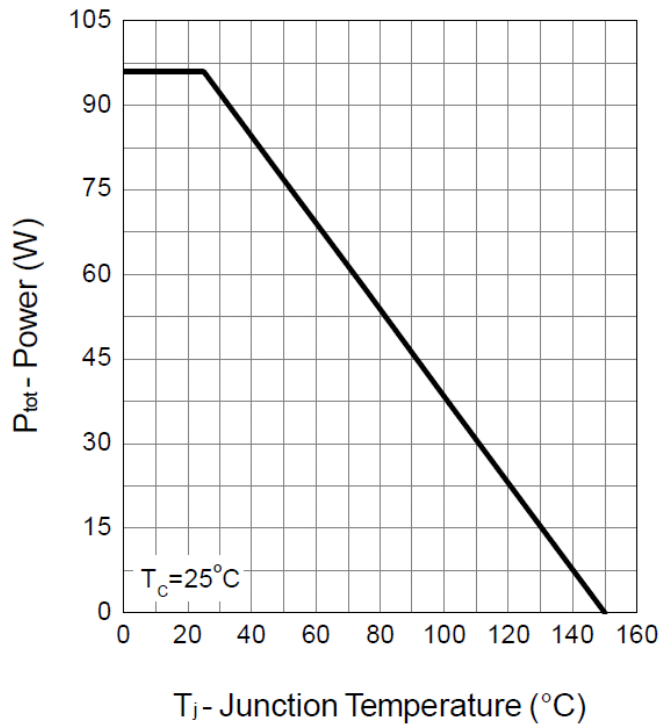
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	200			V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =160V,V _{GS} =0V			1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±25V,V _{DS} =0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} ,I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =11A		58	70	mΩ
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C _{iss}	V _{DS} =30V,V _{GS} =0V, F=1.0MHz		2350	3100	PF
Output Capacitance	C _{oss}			155		PF
Reverse Transfer Capacitance	C _{rss}			45		PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DS} =30V, R _L =30Ω, V _{GEN} =10V, R _G =6Ω I _D =1A		23	42	nS
Turn-on Rise Time	t _r			6	11	nS
Turn-Off Delay Time	t _{d(off)}			51	92	nS
Turn-Off Fall Time	t _f			30	54	nS
Total Gate Charge	Q _g	V _{DS} =100V,I _D =11A,V _{GS} =10V		40	56	nC
Gate-Source Charge	Q _{gs}			14		nC
Gate-Drain Charge	Q _{gd}			10		nC
Body Diode Reverse Recovery Time	T _{rr}	I _F =10A, dI/dt=100A/μs		75		nS
Body Diode Reverse Recovery Charge	Q _{rr}			255		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V _{SD}	V _{GS} =0V,I _S =20A		0.8	1.3	V

NOTES:

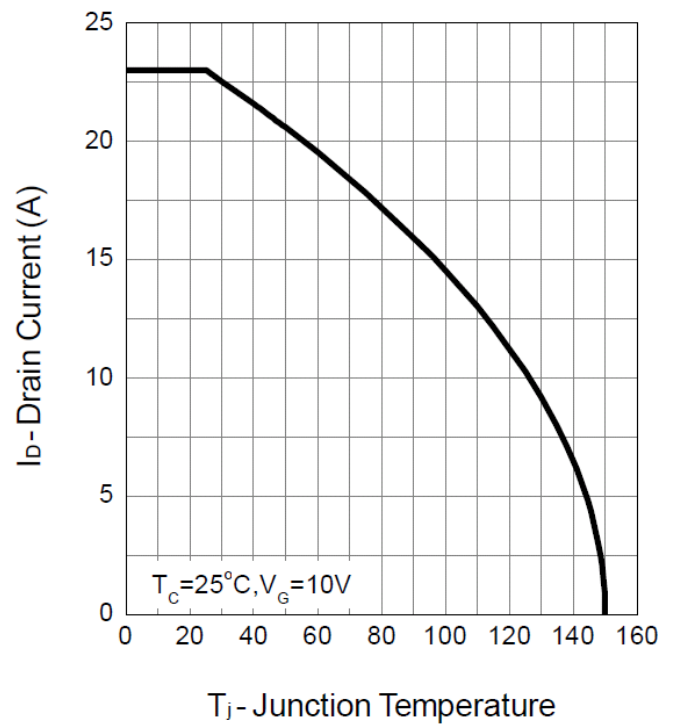
1. continue current is limited by bonding wire.
2. Pulse width limited by max. junction temperature.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production testing

Typical Operating Characteristics

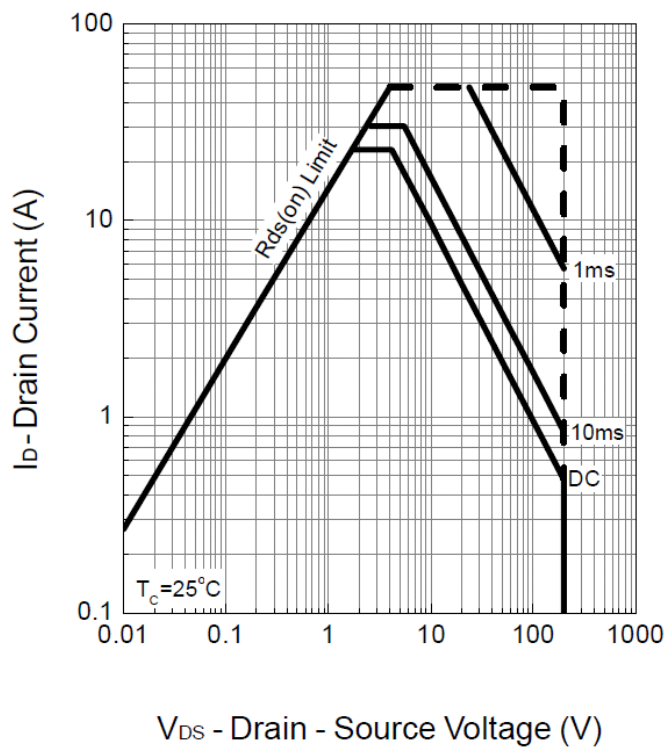
Power Dissipation



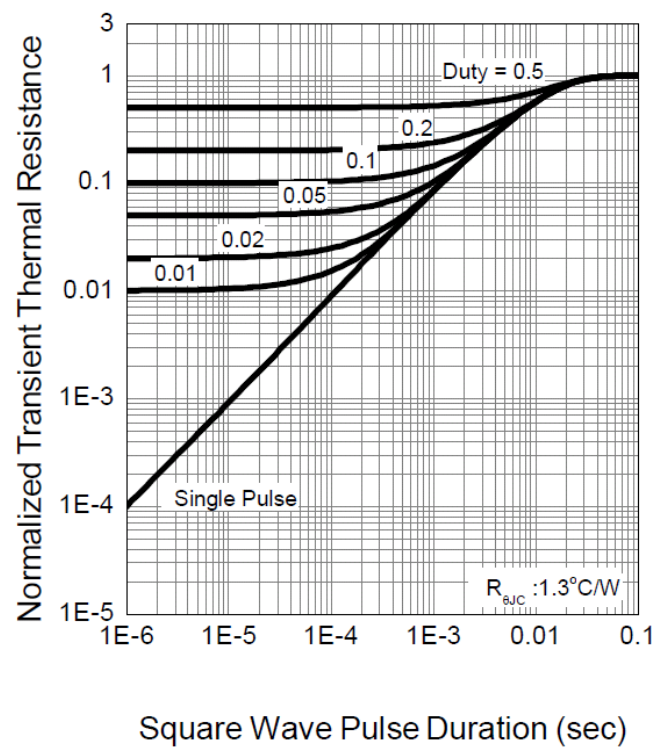
Drain Current



Safe Operation Area

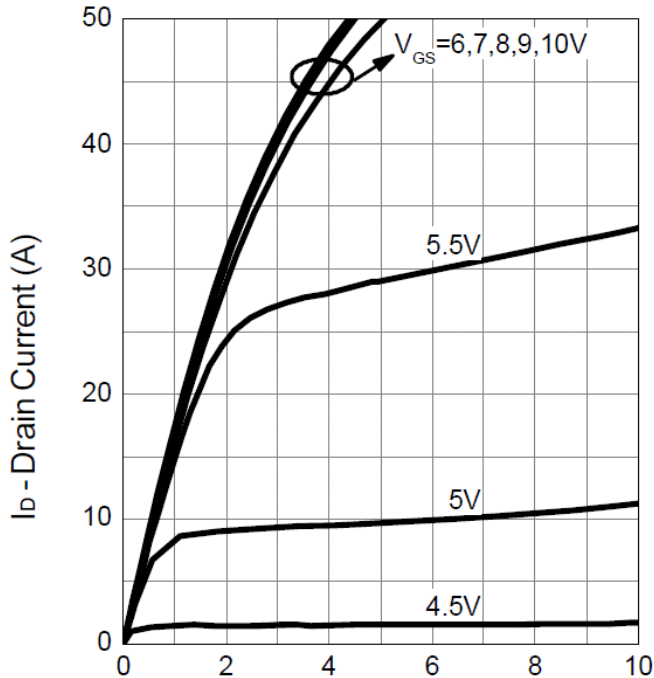


Thermal Transient Impedance

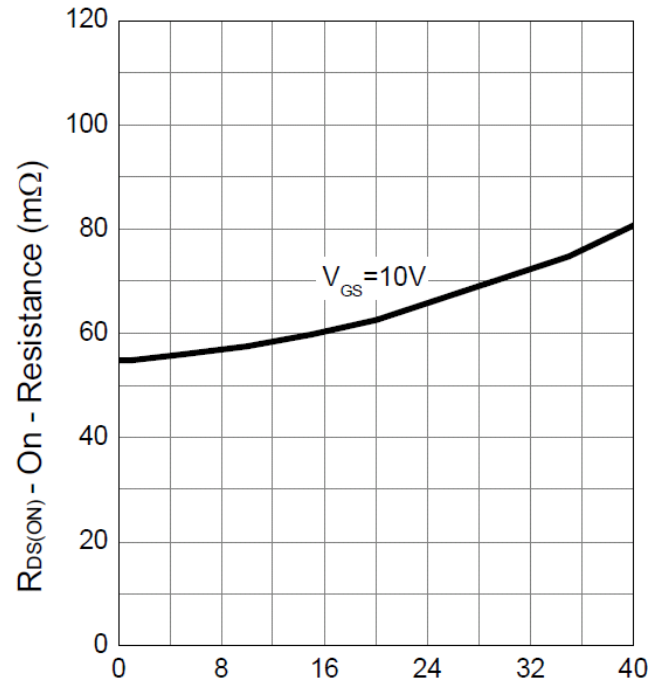


Typical Operating Characteristics(Cont.)

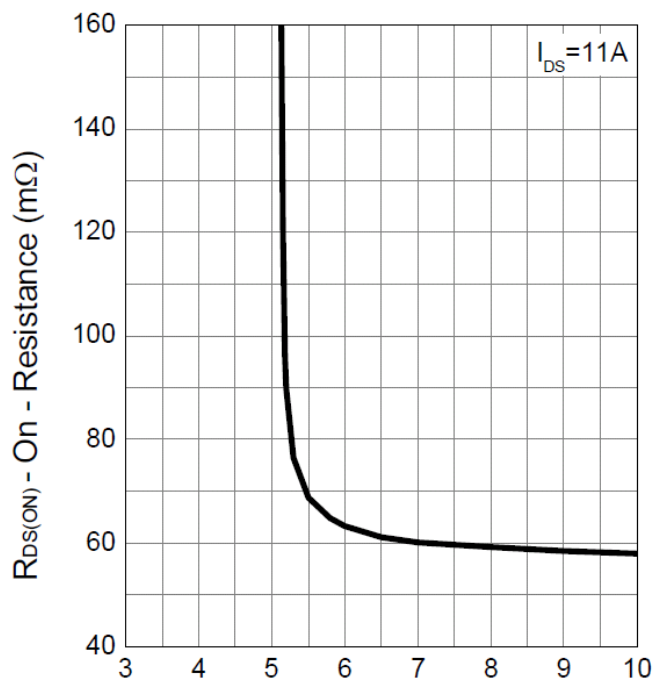
Output Characteristics

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

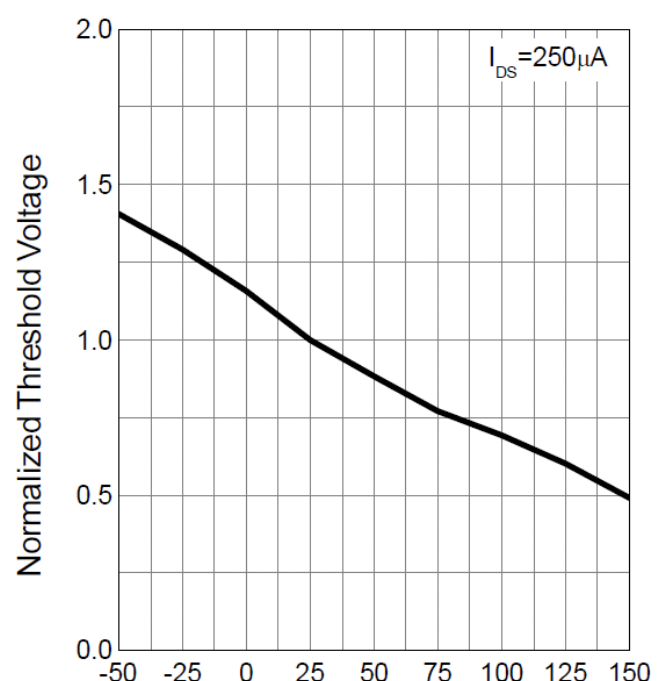
Drain-Source On Resistance

 I_D - Drain Current (A)

Gate-Source On Resistance

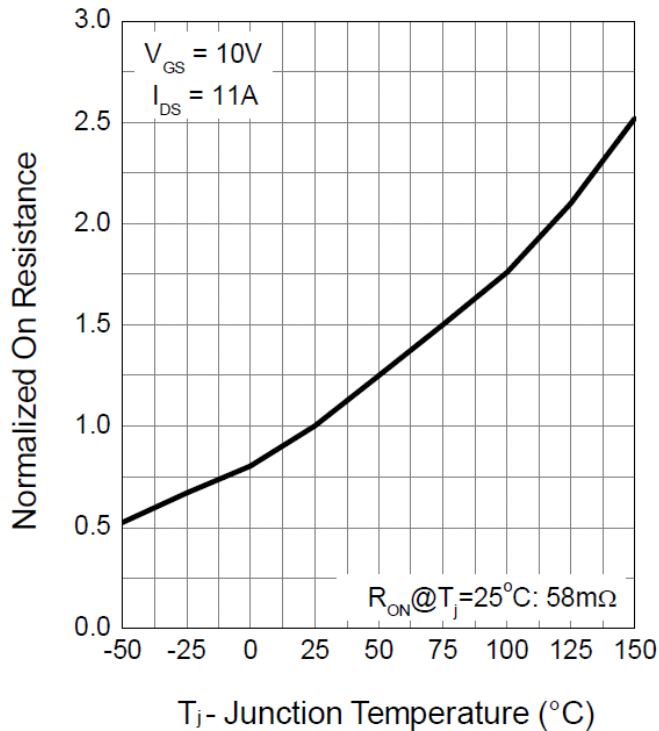
 V_{GS} - Gate - Source Voltage (V)

Gate Threshold Voltage

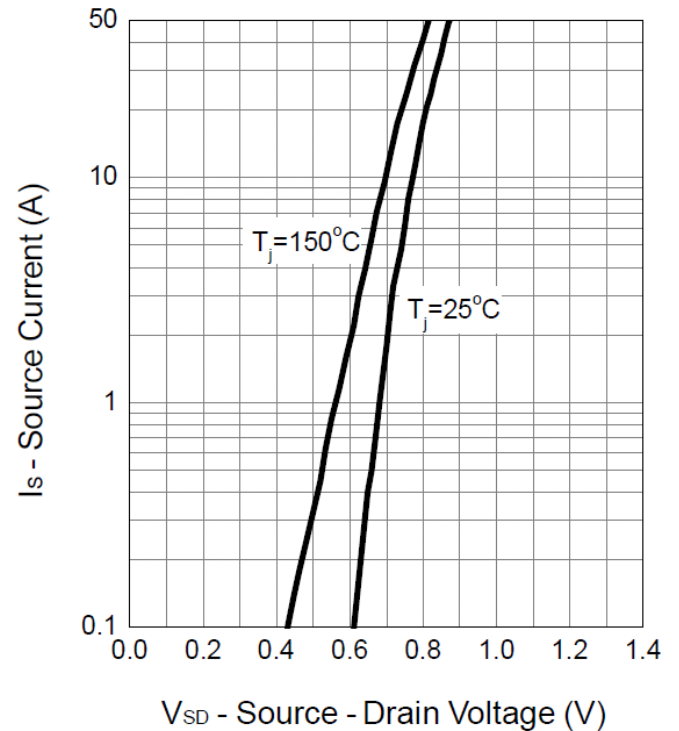
 T_J - Junction Temperature ($^{\circ}C$)

Typical Operating Characteristics (Cont.)

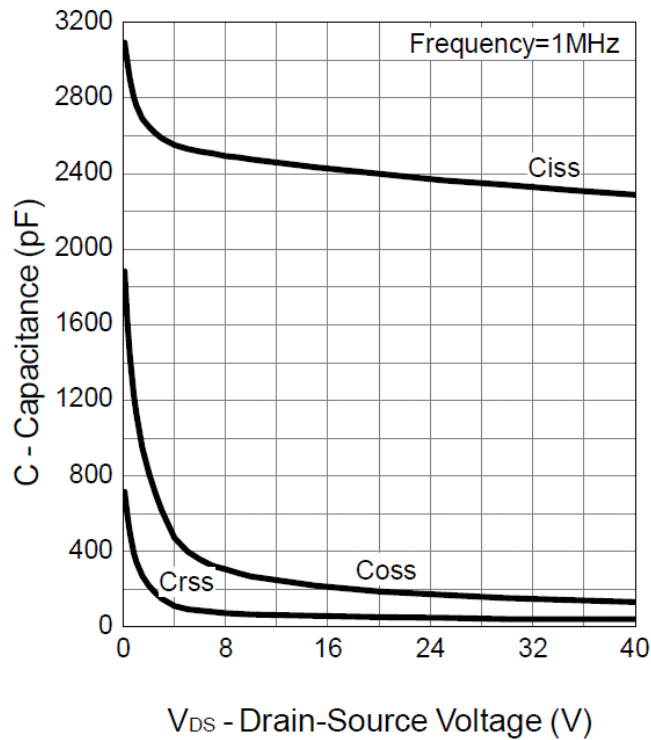
Drain-Source On Resistance



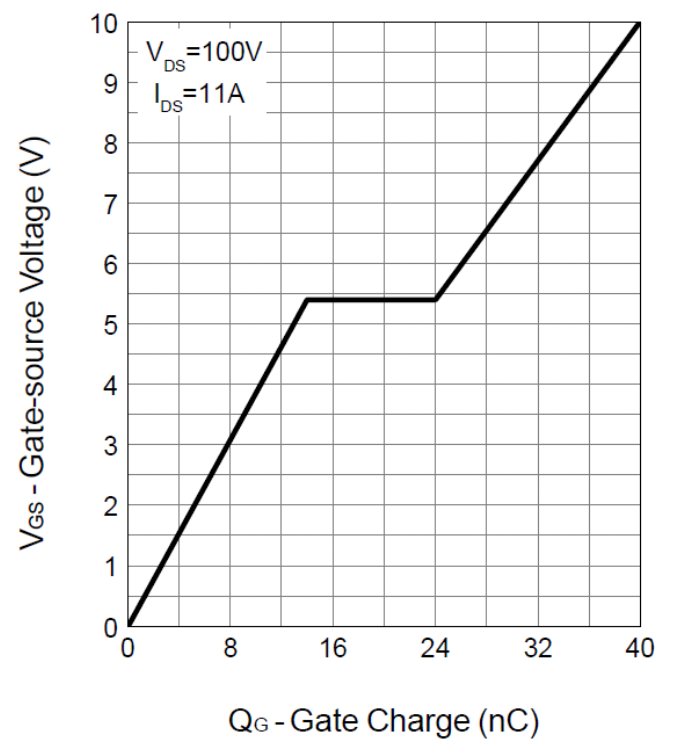
Source-Drain Diode Forward



Capacitance



Gate Charge

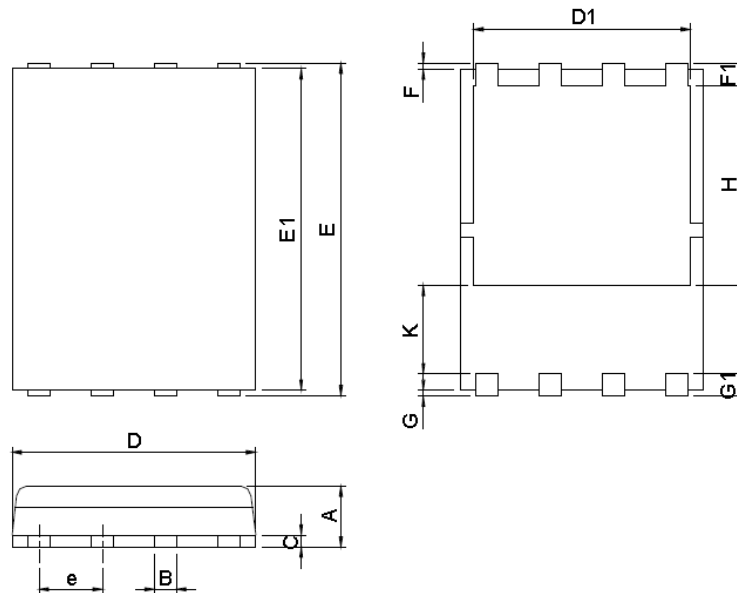


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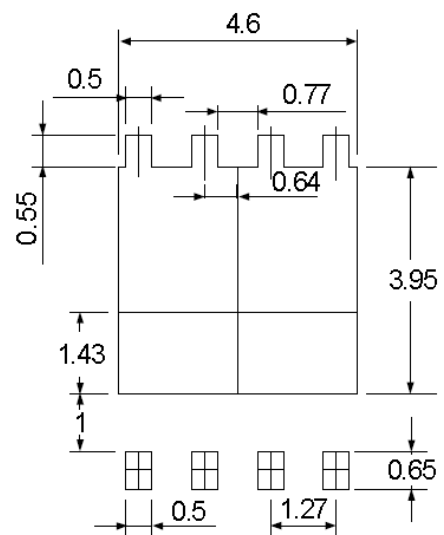
Package Information

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