

N-Channel Enhancement Mode MOSFET

TDM2330

DESCRIPTION

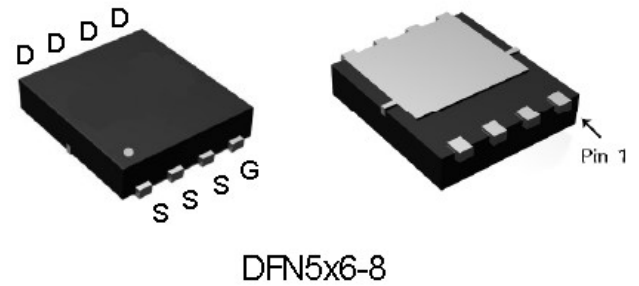
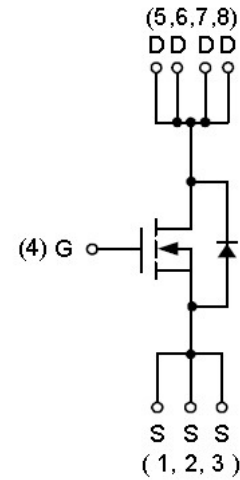
The TDM2330 uses advanced technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

GENERAL FEATURES

- 30V/120A
 $R_{DS(ON)} < 3.1m\Omega$ @ $V_{GS}=10V$
 $R_{DS(ON)} < 4.5m\Omega$ @ $V_{GS}=4.5V$
- Low $R_{DS(on)}$ & FOM
- Extremely low switching loss
- Excellent stability and uniformity
- Lead free product is available
- Surface Mount Package

Application

- High Frequency Switching.
- Synchronous Rectification.

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current @ Current-Pulsed note1	I_{DM} ($T_c=25^\circ\text{C}$)	480	A
Drain Current @ Continuous note2	I_D ($T_c=25^\circ\text{C}$)	120	A
	I_D ($T_c=100^\circ\text{C}$)	78	A
Power Dissipation note3	P_D ($T_c=25^\circ\text{C}$)	68	W
Avalanche Energy, Single pulse note1, 4	$E_{AS}(L=0.5mH)$	333	mJ

THERMAL CHARACTERISTICS

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	1.83	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	T_J	-55 To 150	$^\circ\text{C}$
Operating Junction and Storage Temperature Range	T_{STG}	-55 To 150	$^\circ\text{C}$

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ELECTRICAL CHARACTERISTICS (T_J=25 °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	30	-	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =30V, V _{GS} =0V	-	-	1	μ A
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.5	2.2	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =20A	-	2.6	3.1	mΩ
		V _{GS} =4.5V, I _D =15A	-	3.6	4.5	mΩ
DYNAMIC CHARACTERISTICS						
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1.0MHz	-	4000	-	PF
Output Capacitance	C _{oss}		-	437	-	PF
Reverse Transfer Capacitance	C _{rss}		-	396	-	PF
SWITCHING CHARACTERISTICS						
Turn-on Delay Time	t _{d(on)}	V _{DS} =15V, V _{GS} =10V, R _L =3Ω, I _D =30A	-	14	-	nS
Turn-on Rise Time	t _r		-	18	-	nS
Turn-Off Delay Time	t _{d(off)}		-	40	-	nS
Turn-Off Fall Time	t _f		-	12	-	nS
Total Gate Charge	Q _g	V _{DS} =15V, I _D =30A, V _{GS} =10V	-	72	-	nC
Gate-Source Charge	Q _{gs}		-	46	-	nC
Gate-Drain Charge	Q _{gd}		-	13	-	nC
DIODE CHARACTERISTICS						
Continuous Source Current	I _s		-	-	120	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}		-	-	480	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _s =20A	-	0.7	1.2	V
Reverse recovery time, I _F =30A dI/dt=100A/μs	T _{rr}		-	48	-	ns
Reverse recovery charge, I _F =30A dIF/dt=100A//μs	Q _{rr}		-	80	-	nC

Notes:

- Single pulse width limited by junction temperature T_{J(MAX)}=150°C.
- The maximum current rating is package limited.
- The power dissipation P_D is based on T_{J(MAX)}=150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
- The EAS data shows Max. rating. The test condition is VDD=15V, V_{GS}=10V, L=0.5mH.
- The value of R_{θJC} is measured in a still air environment with T_A =25°C and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user's specific board design.

Typical Operating Characteristics

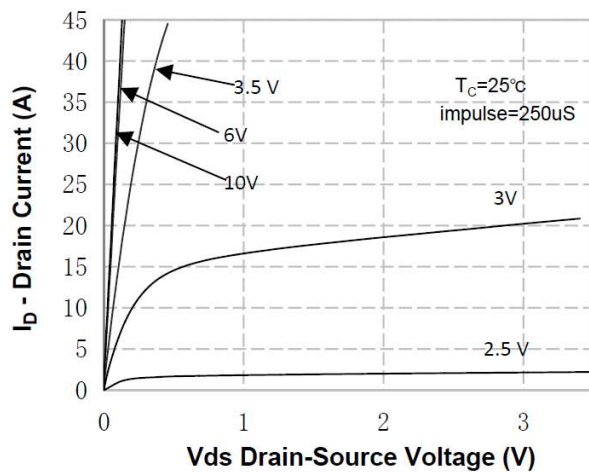


Figure 1. On-Region Characteristics

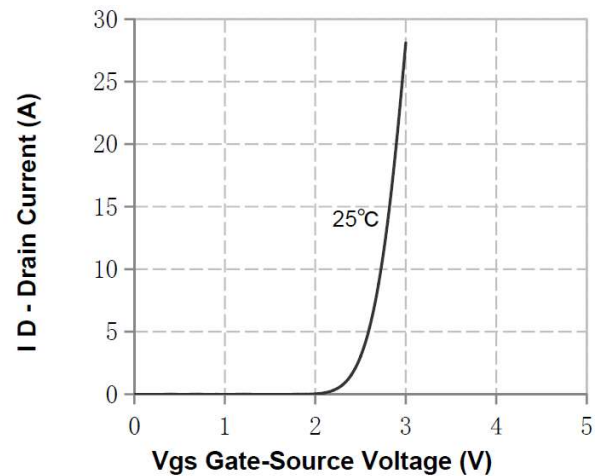


Figure 2. Transfer Characteristics

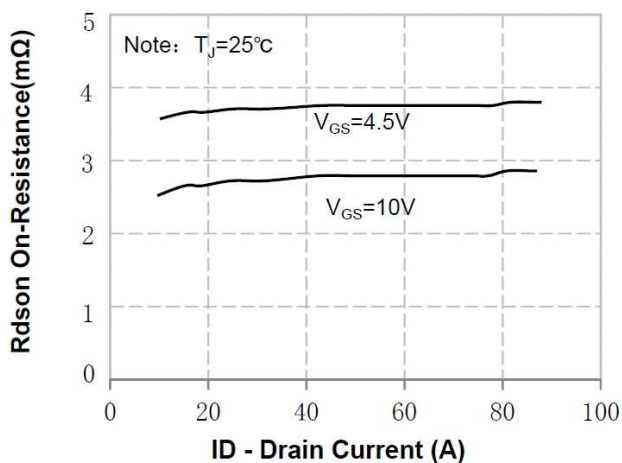


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

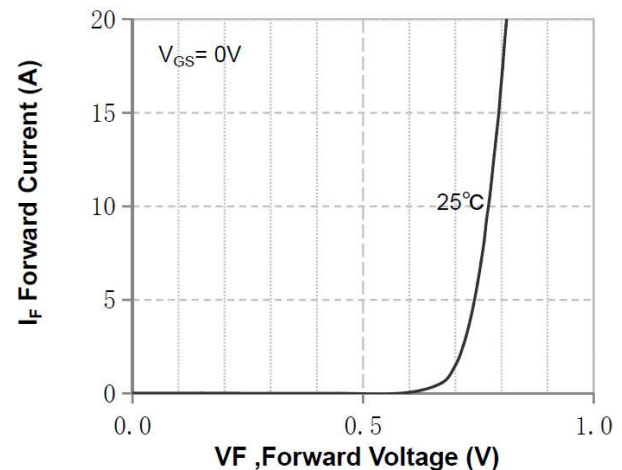


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

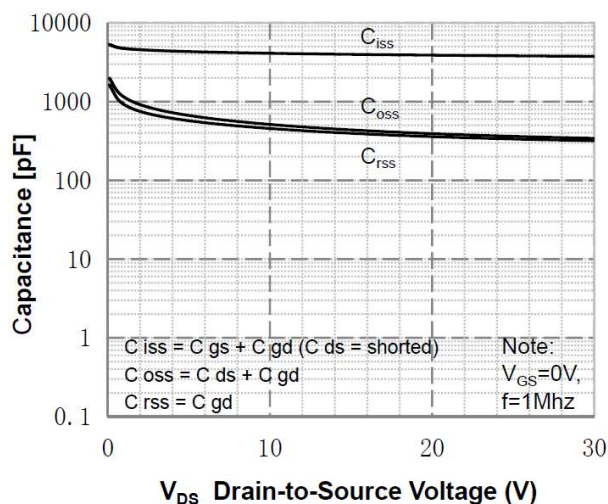


Figure 5. Capacitance Characteristics

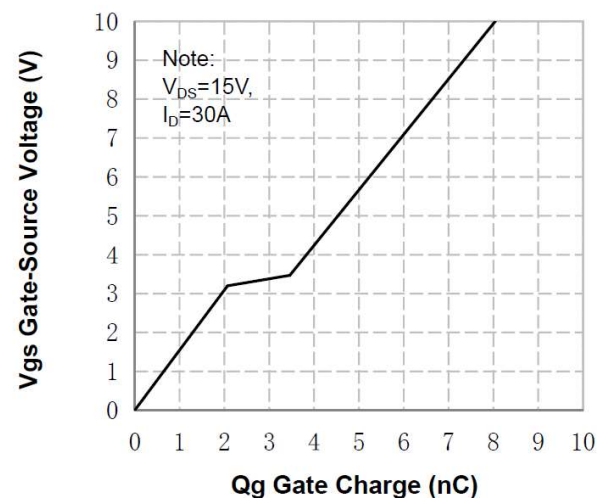


Figure 6. Gate Charge Characteristics

Typical Operating Characteristics(Cont.)

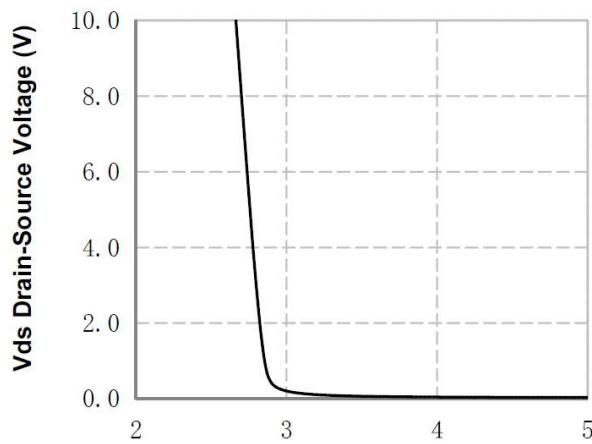


Figure 7. V_{DS} Drain-Source Voltage vs Gate Voltage

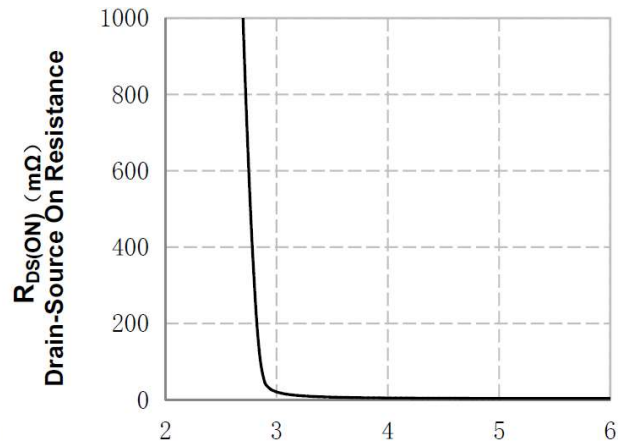


Figure 8. On-Resistance vs Gate Voltage

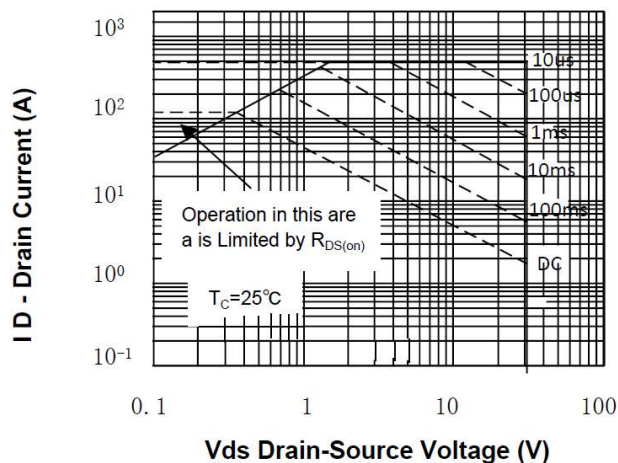


Figure 9. Maximum Safe Operating Area

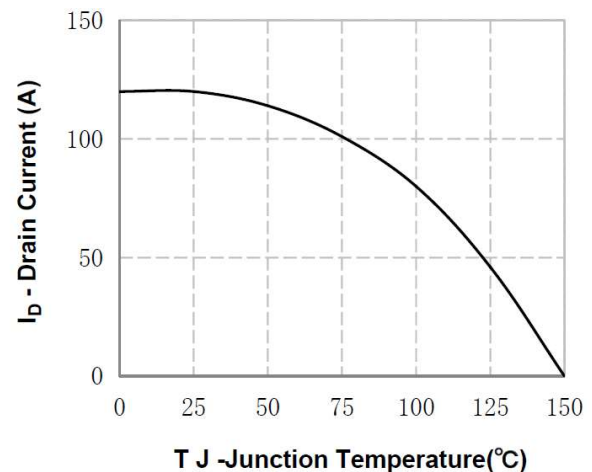


Figure 10. Maximum Continuous Drain Current vs Temperature

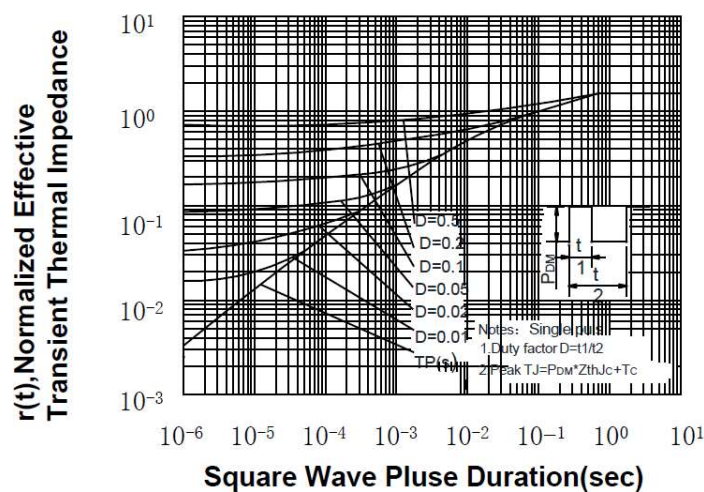


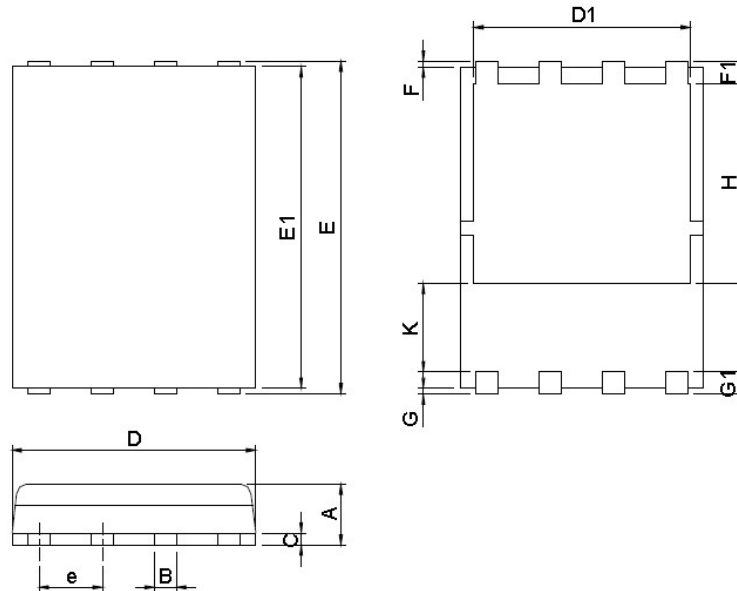
Figure 11. Transient Thermal Response Curve

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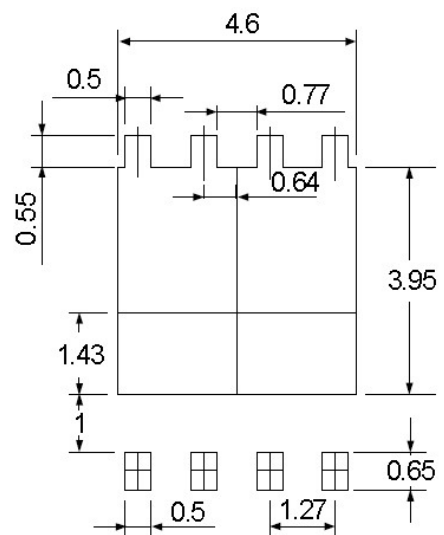
Package Information

DFN5X6-8 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