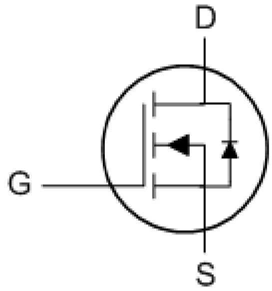
Techcode®

DATASHEET

N-Channel Enhancement Mode MOSFET TDM31090

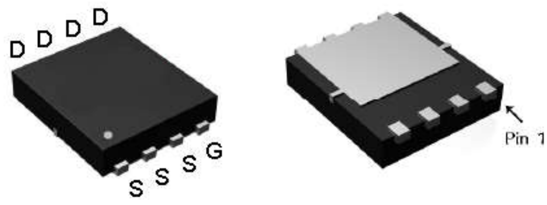
DESCRIPTION

The TDM31090 is the high cell density trenched Nch MOSFETs, which provide excellent RDSON and gate charge for most of the Synchronous Rectification for AC/DC Quick Charger.



GENERAL FEATURES

- RDS(ON) < 8mΩ @ VGS=10V
  RDS(ON) < 10.5mΩ @ VGS=4.5V
- High Power and current handling capability
- Lead free product is available
- Surface Mount Package



DFN5x6-8

Application

- PWM applications
- Load switch
- DC/DC in Telecoms and Industrial
- Hard Switched and High Frequency Circuits

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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	100	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current @ Continuous	I_D (Tc=25℃) Note1,5	74	A
	I_D (Tc=100℃) Note1,5	47	A
Pulsed Drain Current	I_{DM} Note2	260	A
Avalanche Current, Single pulse	I_{AS} Note2	31	A
Avalanche Energy, Single pulse	E_{AS} Note3	240	mJ
Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	1.5	℃/W
Thermal Resistance,Junction-to-Ambient	$R_{\theta JA}$ Note1	50	℃/W
Total Power Dissipation	$P_{D(Tc=25℃)}$ Note4	83	W
Maximum Operating Junction Temperature	T_J	150	℃
Storage Temperature Range	T_{STG}	-55 To 150	℃

ELECTRICAL CHARACTERISTICS (T_J=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	100	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=80V,V_{GS}=0V	-	-	1	μA
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	1.4	1.7	2.4	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	6.5	8	mΩ
	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=10A	-	8.8	10.5	mΩ
Forward Transconductance	Gfs	V_{DS}=5V,I_D=10A	-	60	-	S
Gate Resistance	R_G	V_{GS}=0V, V_{DS} Open, f=1MHz	-	1.3	-	Ω
Input Capacitance	C_{iss}	V_{DS}=50V,V_{GS}=0V, F=1.0MHz	-	1876	-	PF
Output Capacitance	C_{oss}		-	348	-	PF
Reverse Transfer Capacitance	C_{rss}		-	5.6	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V,R_G=10Ω I_D=20A	-	7	-	nS
Turn-on Rise Time	t_r		-	4	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	20	-	nS
Turn-Off Fall Time	t_f		-	3	-	nS
Total Gate Charge	Q_g	V_{DS}=50V,I_D=20A,V_{GS}=4.5V	-	16	-	nC
Total Gate Charge	Q_g	V_{DS}=50V,I_D=20A,V_{GS}=10V	-	32	-	nC
Gate-Source Charge	Q_{gs}		-	6	-	nC
Gate-Drain Charge	Q_{gd}		-	4	-	nC
Body Diode Reverse Recovery Time	T_{rr}	I_F=20A, dI/dt=500A/μs	-	40	-	nS
Body Diode Reverse Recovery Charge	Q_{rr}		-	160	-	nC
Diode Forward Voltage (Note 2)	V_{SD}	V_{GS}=0V,I_S=1A	-	-	1.2	V

NOTES:

1. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%
3. The EAS data shows Max. rating. The test condition is V_{DD}=25V, V_{GS}=10V, L=0.3mH, I_{AS}=35A
4. The power dissipation is limited by junction temperature
5. The maximum current rating is package limited.

Typical Operating Characteristics

Fig 1. Typical Output Characteristics

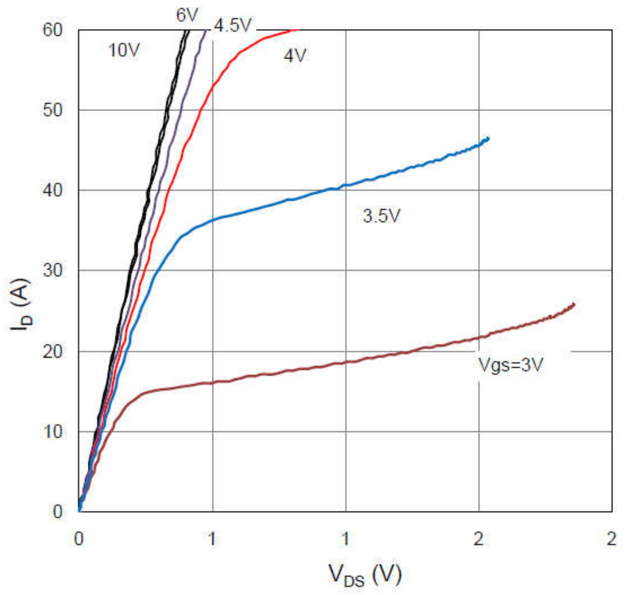


Figure 2. On-Resistance vs. Gate-Source Voltage

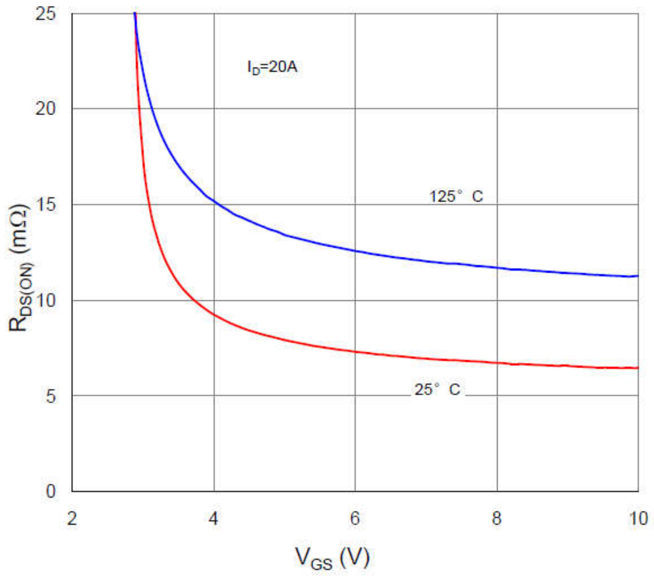


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

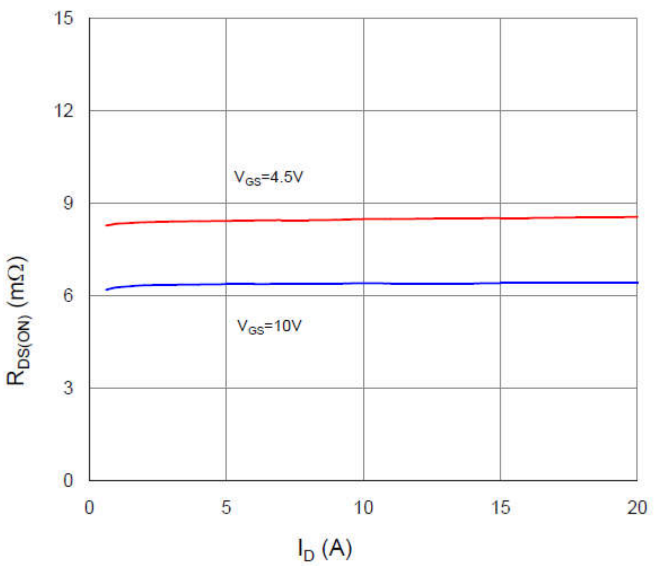
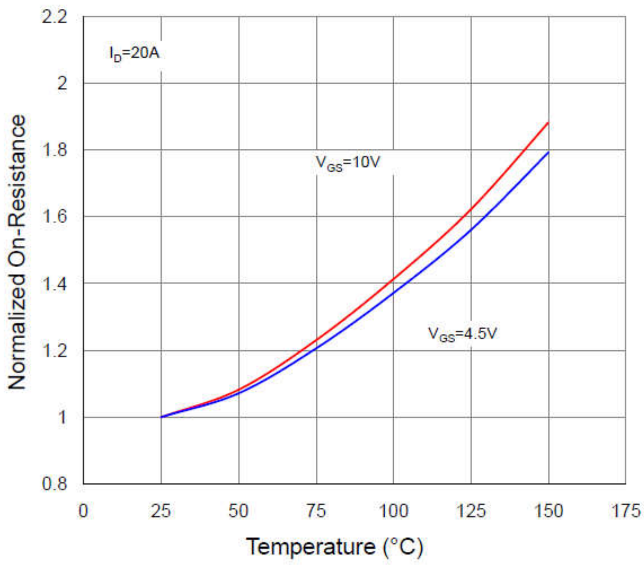


Figure 4. Normalized On-Resistance vs. Junction Temperature



Typical Operating Characteristics (Cont.)

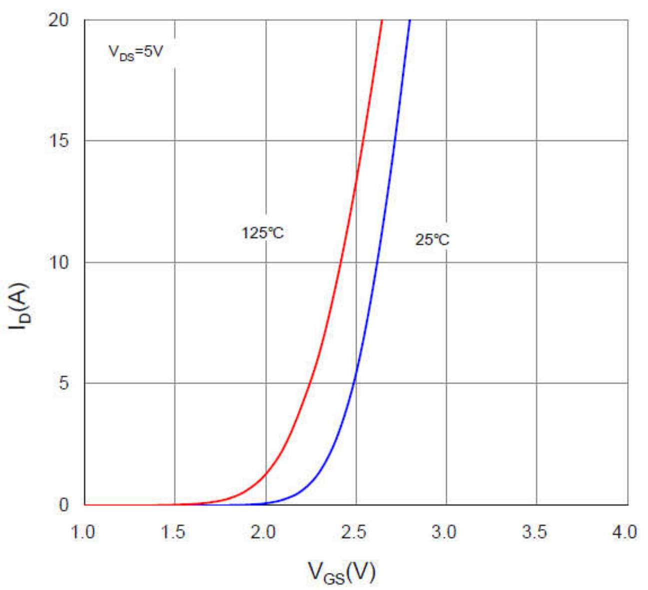
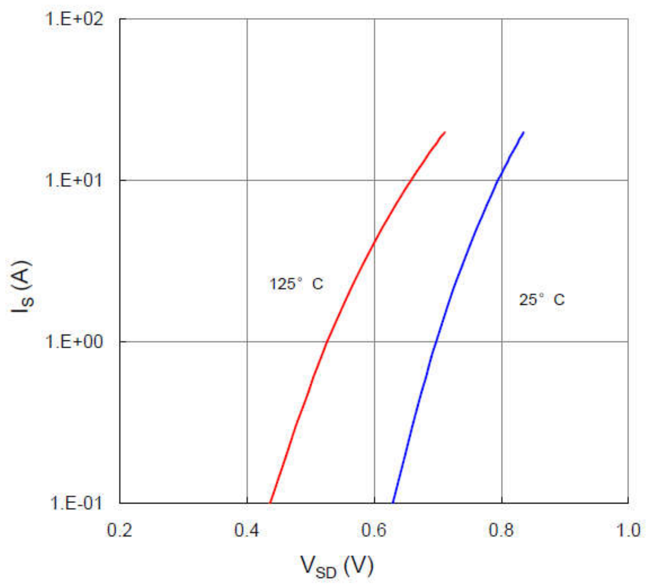
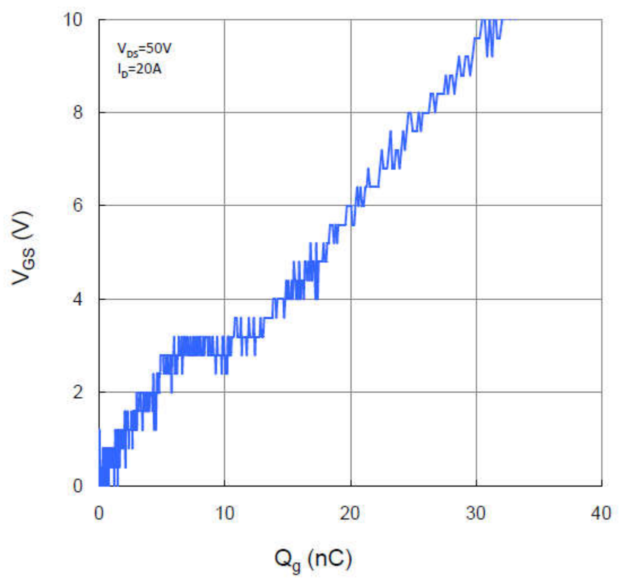
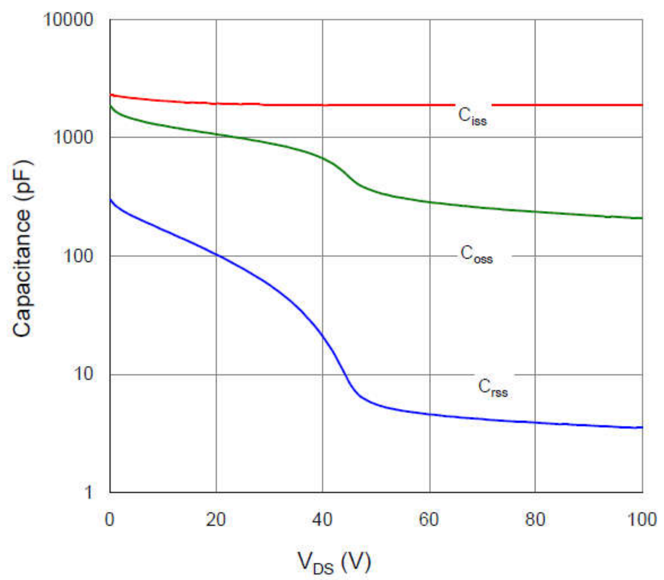
Figure 5. Typical Transfer Characteristics	Figure 6. Typical Source-Drain Diode Forward Voltage
	

Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage	Figure 8. Typical Capacitance vs. Drain-to-Source Voltage
	

Typical Operating Characteristics (Cont.)

Figure 9. Maximum Safe Operating Area

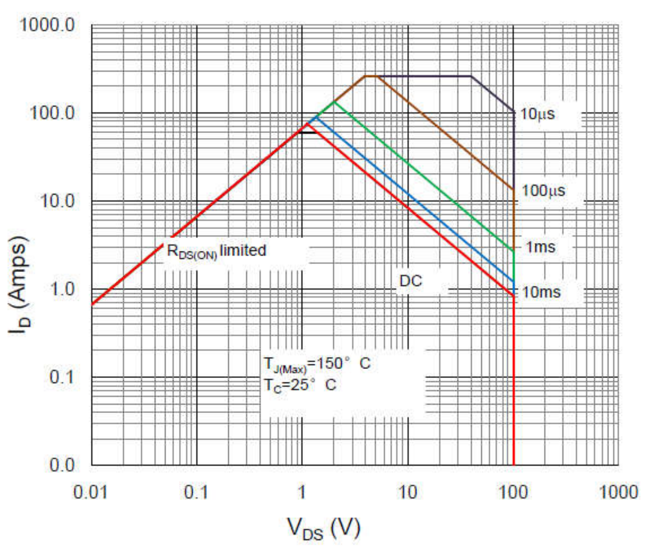


Figure 10. Maximun Drain Current vs. Case Temperature

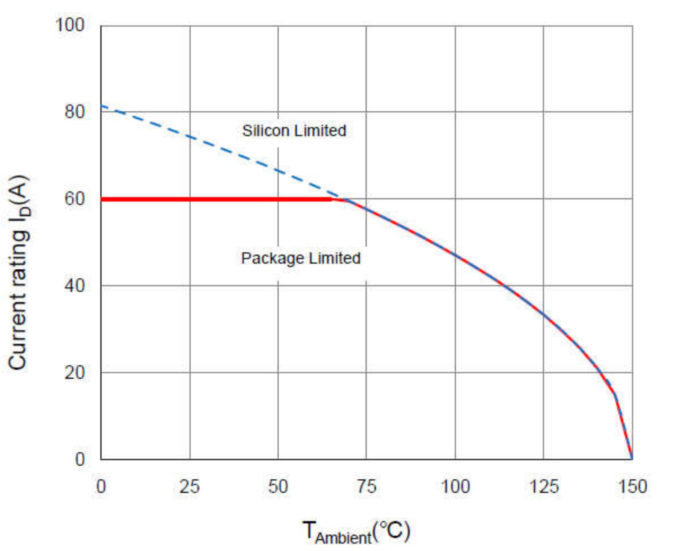
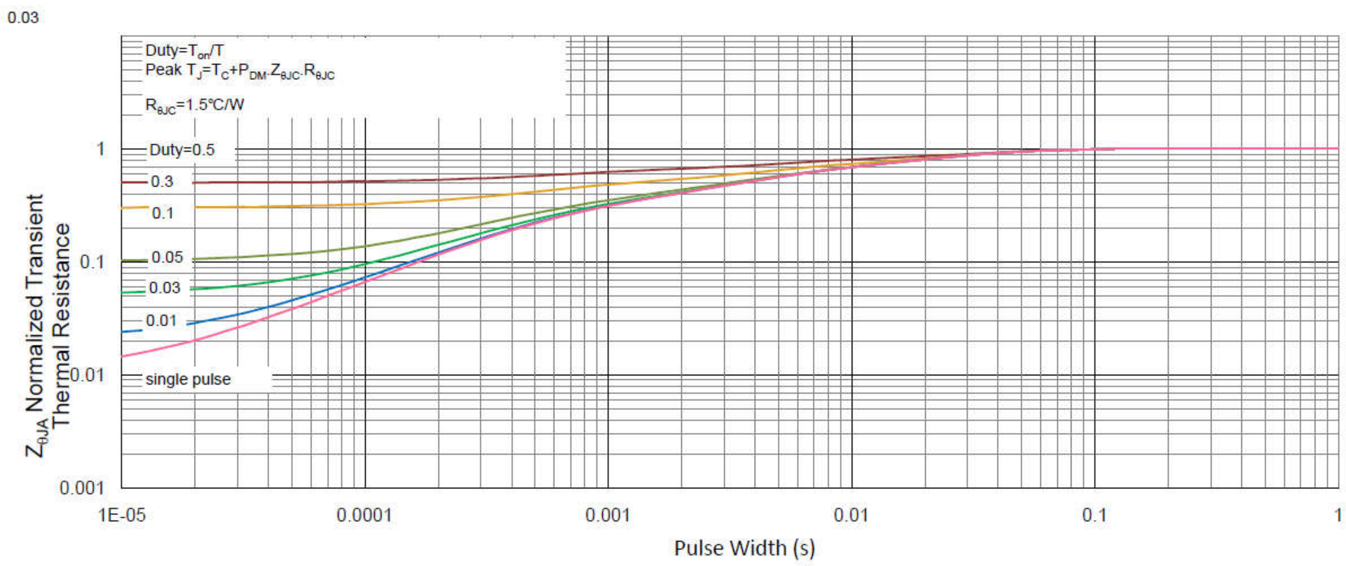
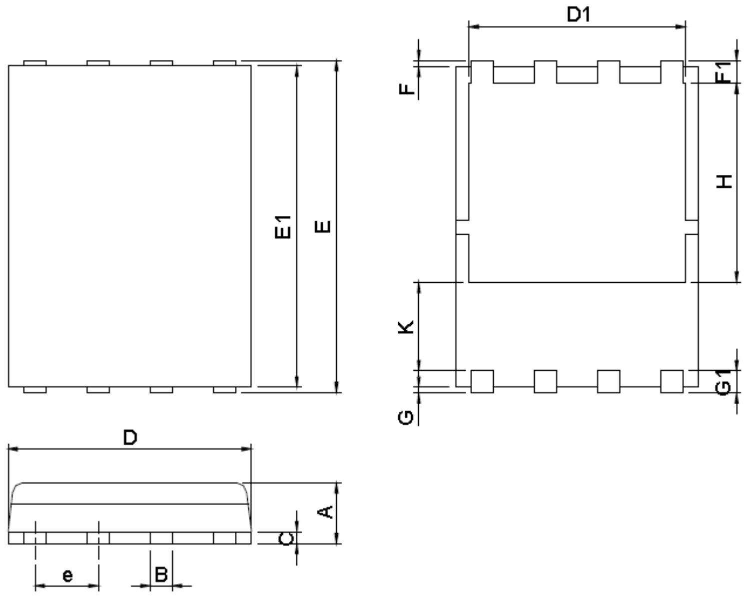


Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



Package Information

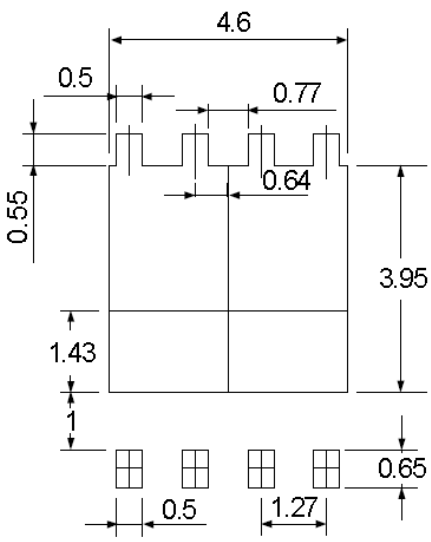
DFN5*6-8 Package



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