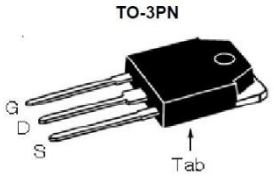
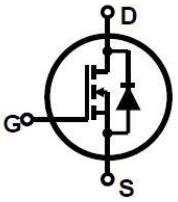
N-channel MOSFET

BV_{DSS}	I_D	$R_{DS(on)}$
800V	8A	< 1.4Ω

Features

- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- JEDEC Qualification





Device	Package	Marking	Remark
TMAN8N80	TO-3PN	TMAN8N80	RoHS

Absolute Maximum Ratings

Parameter		Symbol	TMAN8N80	Unit
Drain-Source Voltage		V_{DS}	800	V
Gate-Source Voltage		V_{GS}	30	V
Continuous Drain Current	T_C = 25	I_D	8	A
	T_C = 100		4.9	A
Pulsed Drain Current (Note 1)		I_{DM}	32	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	201	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	8	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	26.5	mJ
Power Dissipation	T_C = 25	P_D	265	W
	Derate above 25		2.12	W/
Peak Diode Recovery dv/dt (Note 3)		dv/dt	4.5	V/ns
Operating Junction and Storage Temperature Range		T_J, T_{STG}	-55~150	
Maximum lead temperature for soldering purposes,		T_L	300	

* Limited only by maximum junction temperature

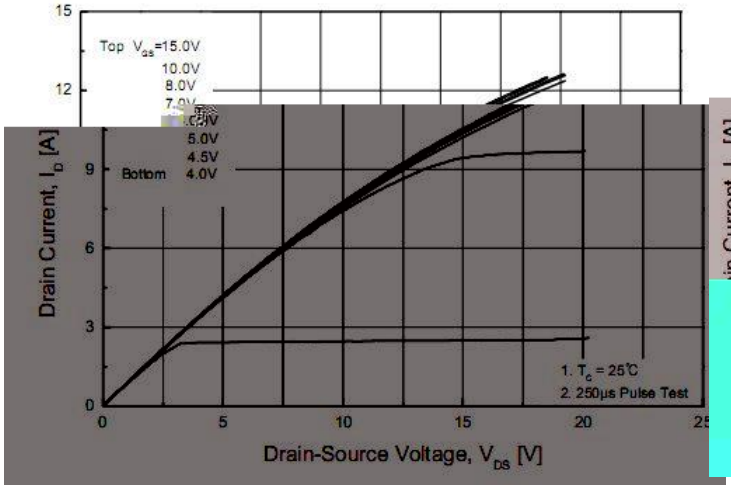
Thermal Characteristics

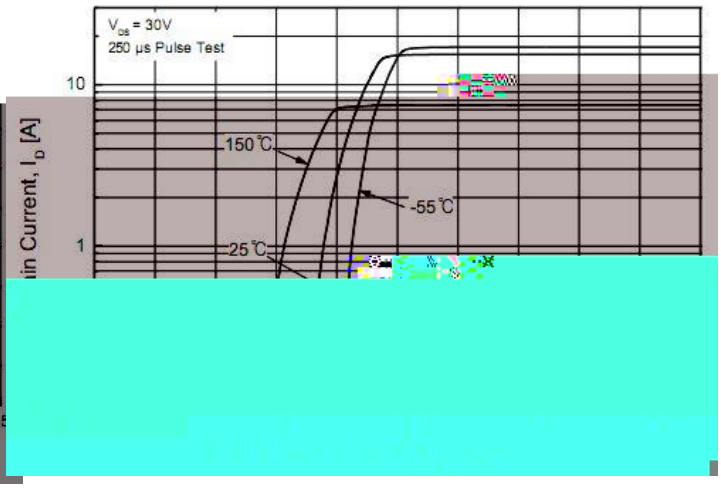
Parameter	Symbol	TMAN8N80	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	0.47	/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	/W

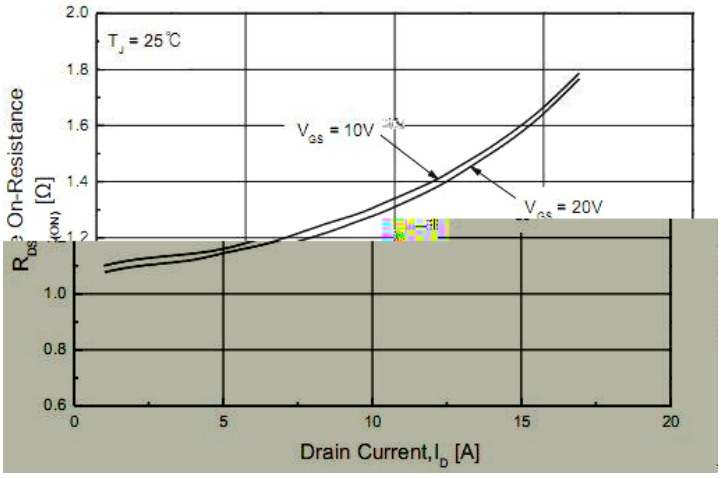
Electrical Characteristics : T_C=25 , unless otherwise noted

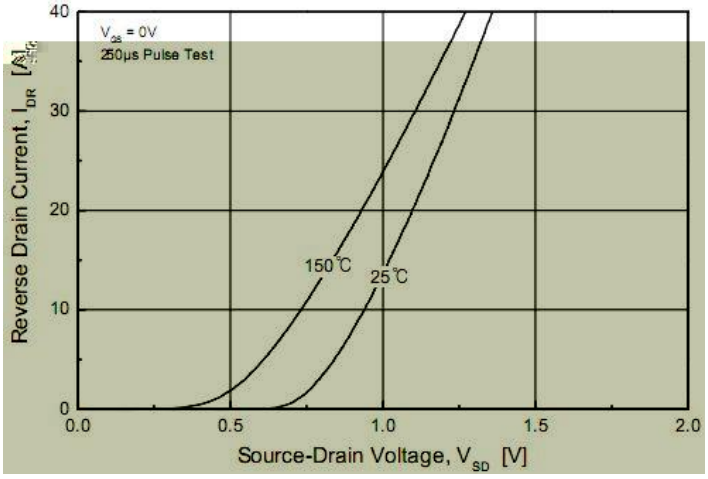
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 800 V, V_{GS} = 0 V	--	--	1	µA
		V_{DS} = 640 V, T_C = 125°C	--	--	10	µA
Forward Gate-Source Leakage Current	I_{GSSF}	V_{GS} = 30 V, V_{DS} = 0 V	--	--	100	nA
Reverse Gate-Source Leakage Current	I_{GSSR}	V_{GS} = -30 V, V_{DS} = 0 V	--	--	-100	nA
ON						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250 µA	2	--	4	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10 V, I_D = 4 A	--	1.1	1.4	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 4 A	--	7	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1921	--	pF
Output Capacitance	C_{oss}		--	146	--	pF
Reverse Transfer Capacitance	C_{rss}		--	12	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 400 V, I_D = 8 A, R_G = 25	--	31	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	30	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	172	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	37	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 640 V, I_D = 8 A, V_{GS} = 10 V	--	46	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	7	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	15	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	--	--	8	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	--	--	32	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 8 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 8 A, dI_F / dt = 100 A/µs	--	479	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	5.5	--	µC

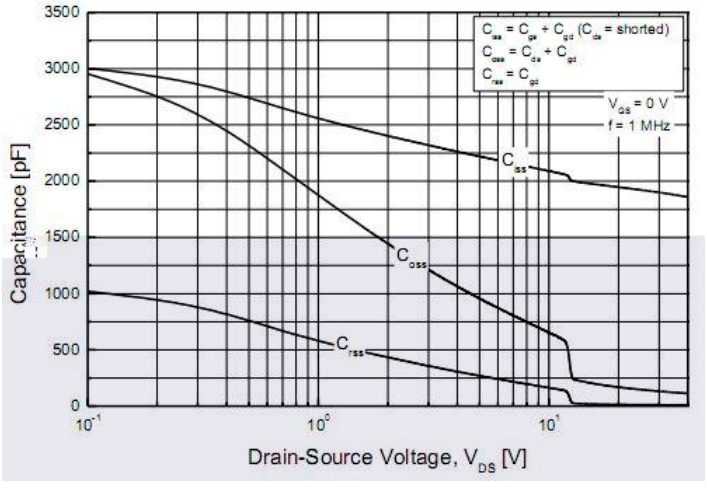
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=5.9mH, I_{AS} = 8A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25
3 I_{SD} 8A, di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

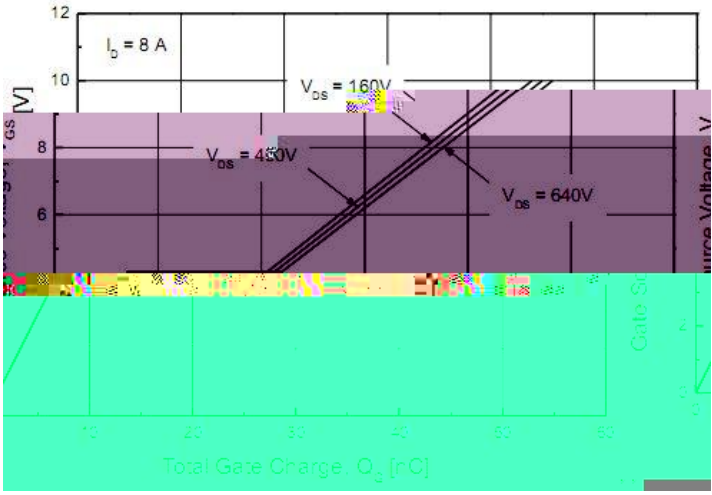

Top V_GS=15.0V
10.0V
8.0V
5.0V
4.5V
Bottom 4.0V
1. T_C = 25℃
2. 250μs Pulse Test
Drain Current, I_D [A]
Drain-Source Voltage, V_DS [V]

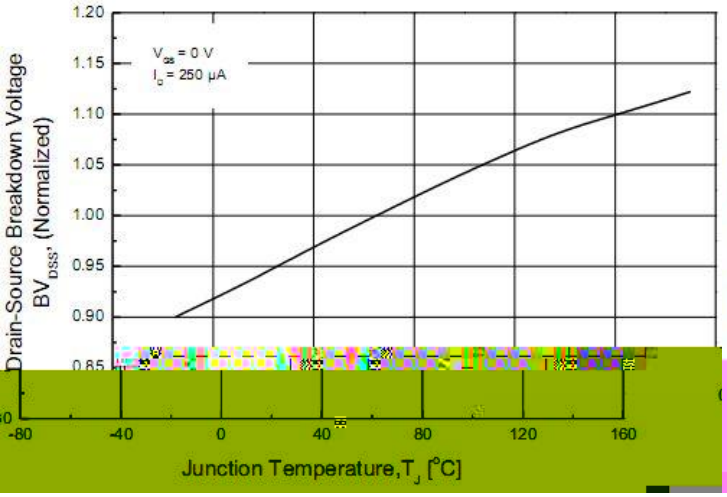

V_DS = 30V
250 μs Pulse Test
150℃
-55℃
25℃
Drain Current, I_D [A]

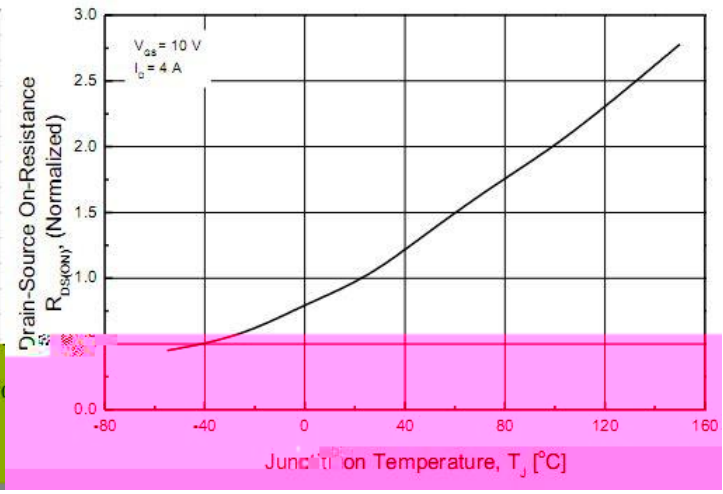

T_J = 25℃
V_GS = 10V
V_GS = 20V
Drain Current, I_D [A]

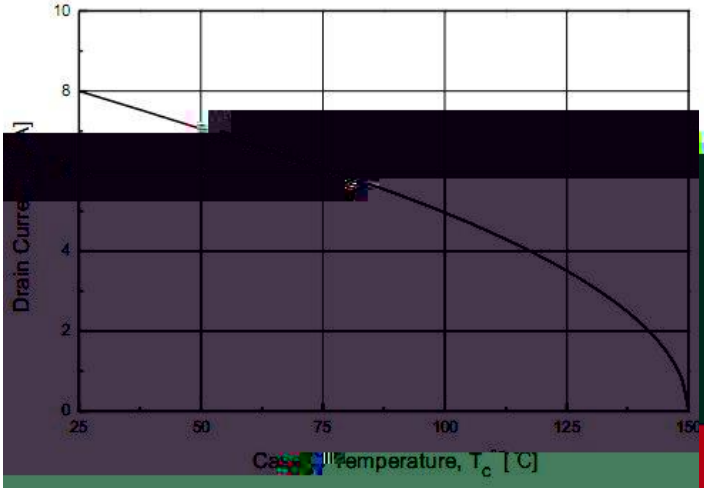

V_GS = 0V
250μs Pulse Test
150℃
25℃
Reverse Drain Current, I_DR [A]
Source-Drain Voltage, V_SD [V]

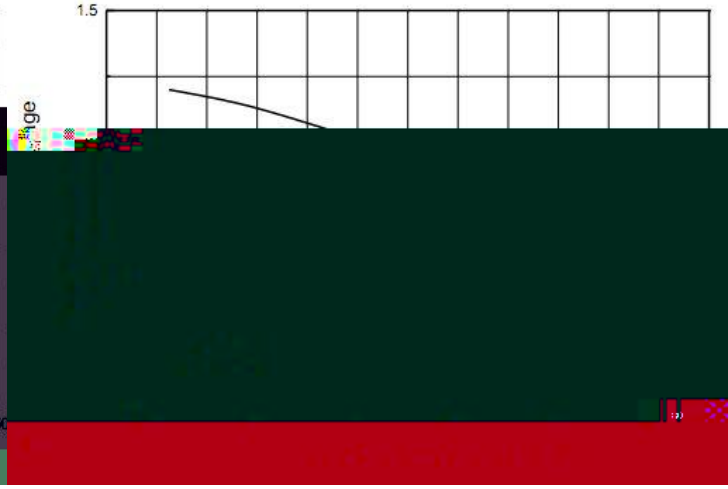

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
f = 1 MHz
C_iss
C_oss
C_rss
Capacitance [pF]
Drain-Source Voltage, V_DS [V]

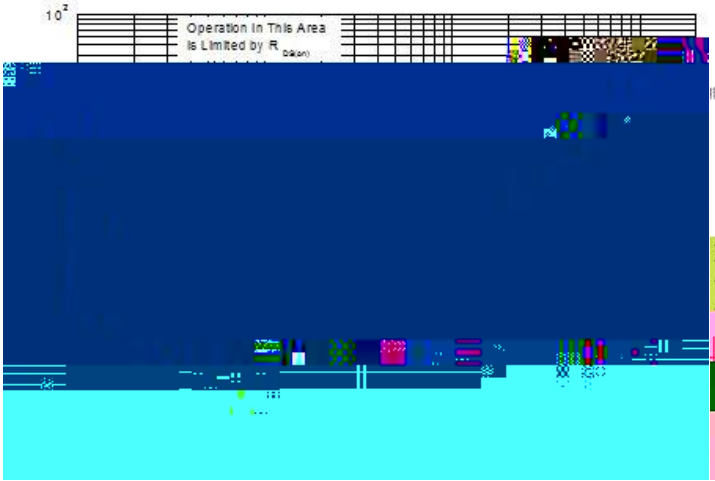

I_D = 8 A
V_DS = 160V
V_DS = 400V
V_DS = 640V
Total Gate Charge, Q_g [nC]

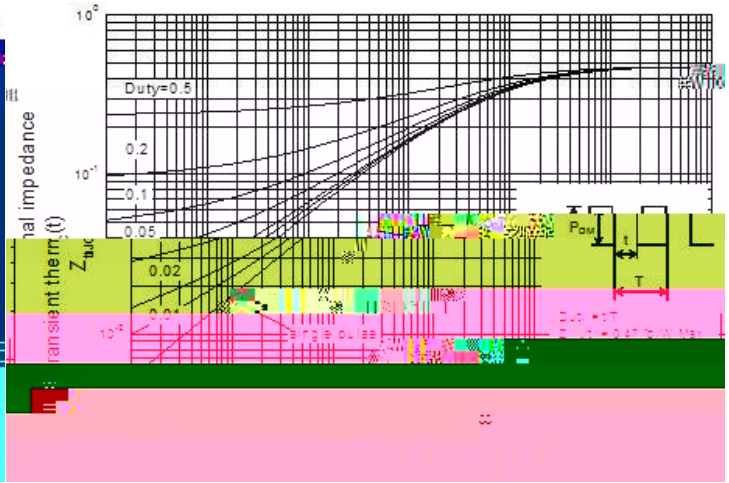

V_{GS} = 0 V
I_D = 250 μA
Drain-Source Breakdown Voltage
BV_{DSS}, (Normalized)
Junction Temperature, T_J [°C]


V_{GS} = 10 V
I_D = 4 A
Drain-Source On-Resistance
$R_{DS(ON)}$, (Normalized)
Junction Temperature, T_J [°C]

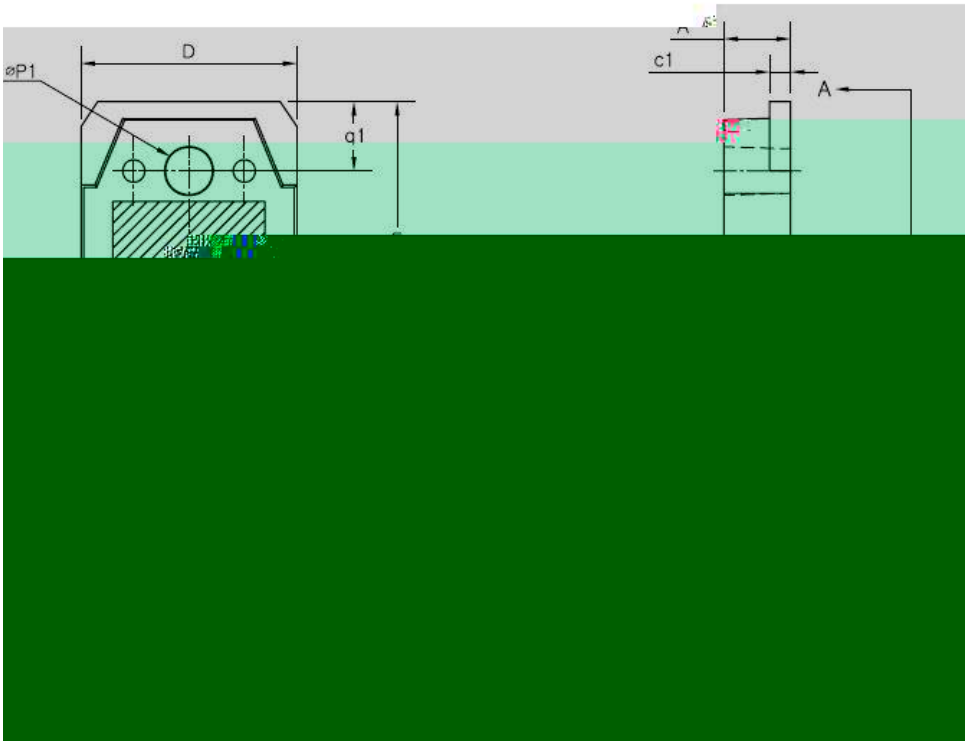

Drain Current
Case Temperature, T_C [°C]

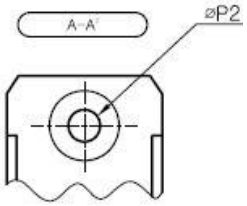



Operation In This Area
Is Limited by $R_{DS(on)}$


Duty=0.5
0.2
0.1
0.05
0.02
P_{DM}
t
T
Transient thermal impedance
Z_{thJC}

TO-3PN MECHANICAL DATA





SYMBOL	MIN	NOM	MAX
A	4.60	4.80	5.00
øP1	3.30	3.40	3.50