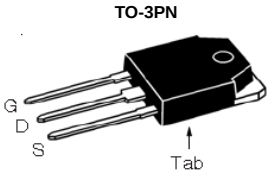
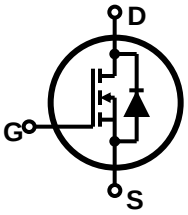
N-channel MOSFET

BV_{DSS}	I_D	$R_{DS(on)}$
900V	9.5A	< 1.4Ω

Features

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





Device	Package	Marking	Remark
TMAN9N90	TO-3PN	TMAN9N90	RoHS

Absolute Maximum Ratings

Parameter		Symbol	TMAN9N90	Unit
Drain-Source Voltage		V_{DS}	900	V
Gate-Source Voltage		V_{GS}	30	V
Continuous Drain Current	T_C = 25	I_D	9.5	A
	T_C = 100		5.9	A
Pulsed Drain Current (Note 1)		I_{DM}	36	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	210	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	9.5	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	31.2	mJ
Power Dissipation	T_C = 25	P_D	312	W
	Derate above 25		2.5	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, 1/8" from case for 5 seconds		T_L	300	

* Limited only by maximum junction temperature

Thermal Characteristics

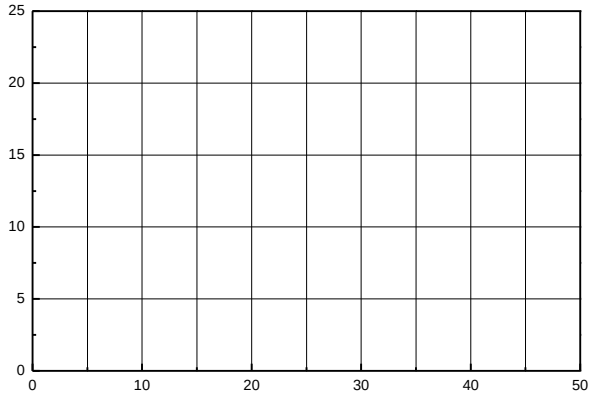
Parameter	Symbol	TMAN9N90	Unit
Maximum Thermal resistance, Junction to Case	$R_{\theta JC}$	0.4	/W
Typical Thermal resistance, Case to Sink(Typical)	$R_{\theta CS}$	0.24	/W
Maximum Thermal resistance, Junction to Ambient	$R_{\theta JA}$	40	/W

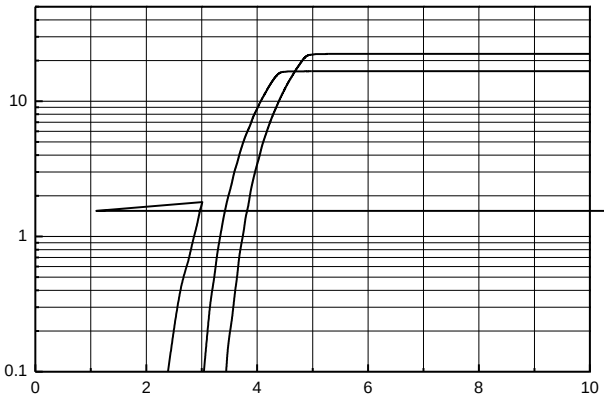
Electrical Characteristics : T_C=25 , unless otherwise noted

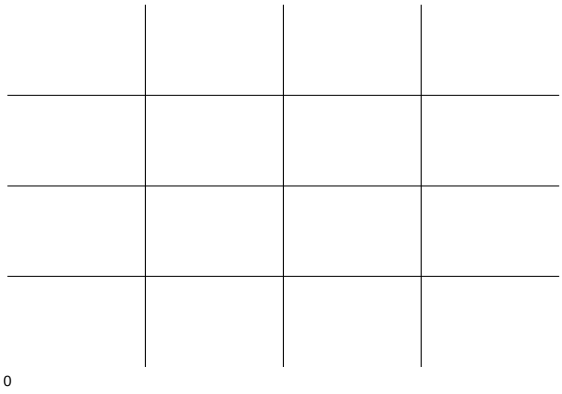
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	900	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 900 V, V_{GS} = 0 V	--	--	10	µA
		V_{DS} = 720 V, T_C = 125 C	--	--	100	µA
Forward Gate-Source Leakage Current	I_{GSSF}	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 = 4.75 A	-- --			

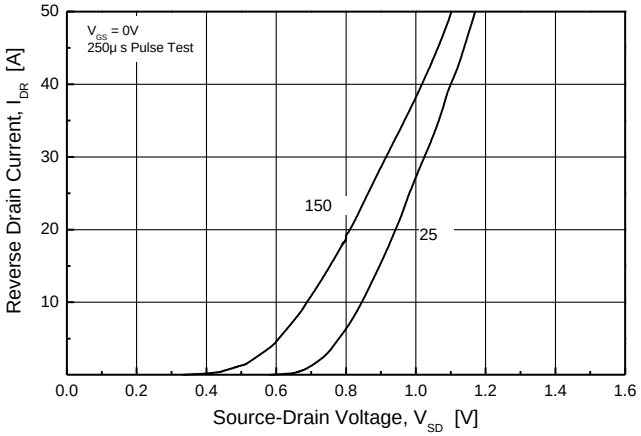
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L= 4.4mH, I_{AS} = 9.5A, V_{DD} = 50V, R_G = 25Ω, Starting T_J= 25 , not subject to production test – verified by design/characterization
3 I_{SD} ≤ 9.5A, di/dt ≤ 200A/µs , V_{DD} ≤ BV_{DS}, Starting T_J= 25
4. Pulse Test :Pulse width ≤ 300µs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature Typical Characteristics

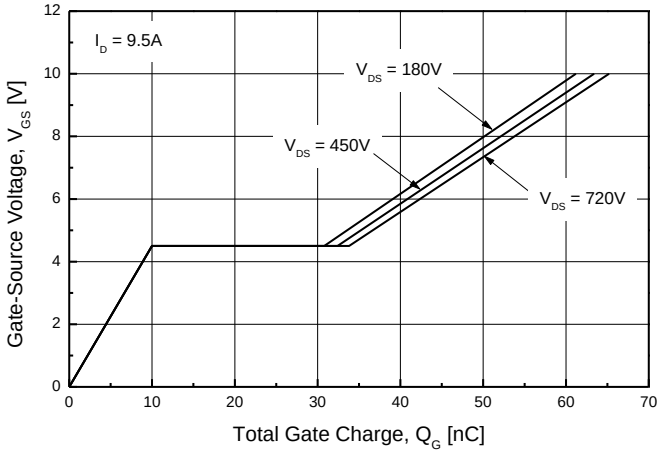
Drain

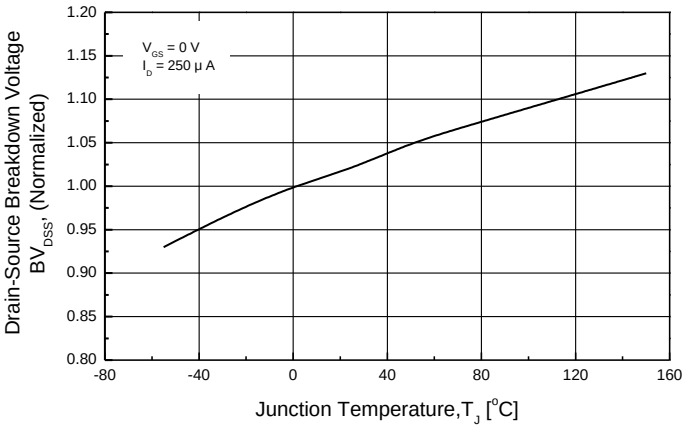

25
20
15
10
5
0
0
10
20
30
40
50

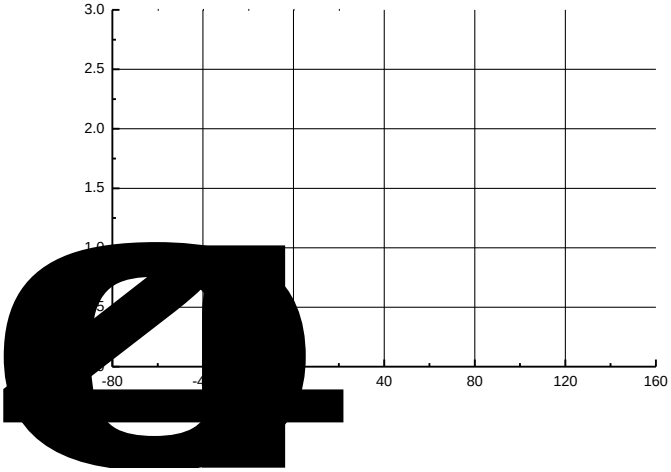

10
1
0.1
0
2
4
6
8
10

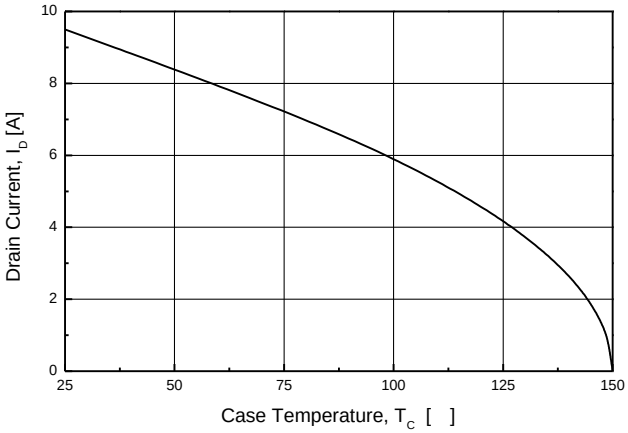

0

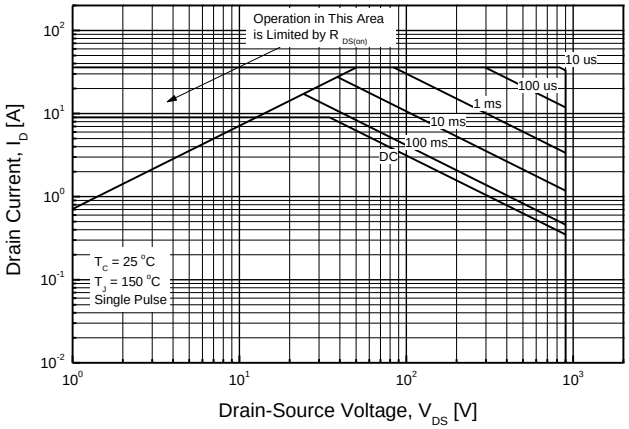

V_{GS} = 0V
250μ s Pulse Test
150
25
Reverse Drain Current, I_{DR} [A]
Source-Drain Voltage, V_{SD} [V]
50
40
30
20
10
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6

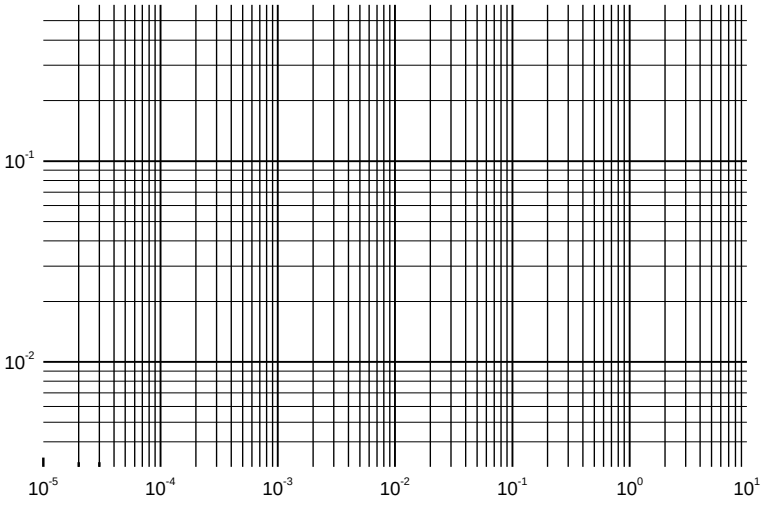

I_D = 9.5A
V_{DS} = 180V
V_{DS} = 450V
V_{DS} = 720V
Gate-Source Voltage, V_{GS} [V]
Total Gate Charge, Q_G [nC]
12
10
8
6
4
2
0
0
10
20
30
40
50
60
70


Drain-Source Breakdown Voltage
BV_DSS, (Normalized)
V_GS = 0 V
I_D = 250 μ A
1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
-80
-40
0
40
80
120
160
Junction Temperature,T_J [°C]

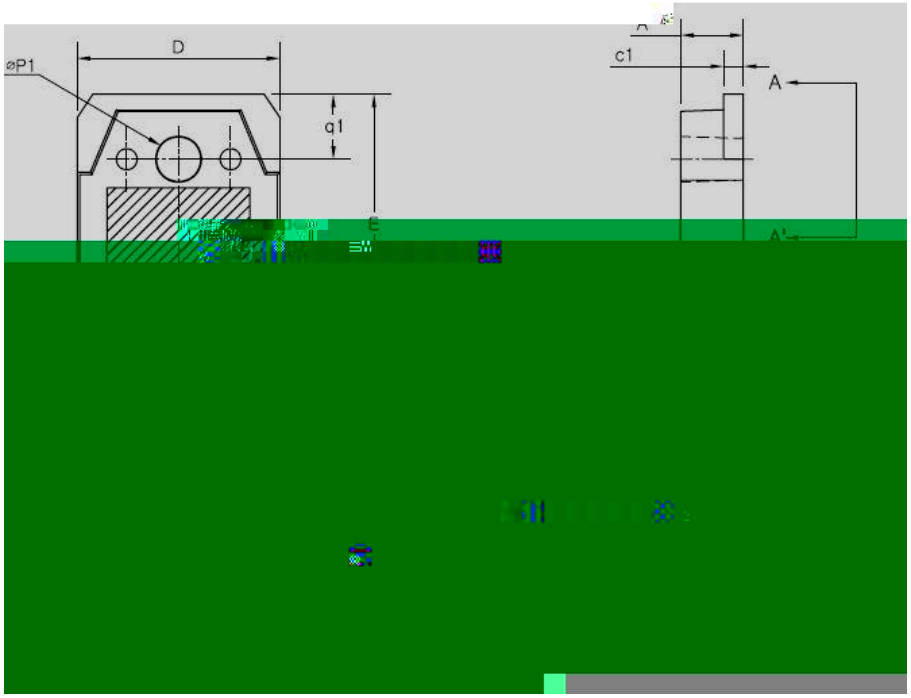

3.0
2.5
2.0
1.5
40
80
120
160

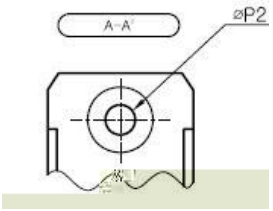

Drain Current, I_D [A]
10
8
6
4
2
0
25
50
75
100
125
150
Case Temperature, T_C [ ]


Operation in This Area
is Limited by R DS(on)
10 us
100 us
1 ms
10 ms
100 ms
DC
T_C = 25 °C
T_J = 150 °C
Single Pulse
Drain Current, I_D [A]
10^2
10^1
10^0
10^-1
10^-2
10^0
10^1
10^2
10^3
Drain-Source Voltage, V_DS [V]


10^-1
10^-2
10^-5
10^-4
10^-3
10^-2
10^-1
10^0
10^1

TO-3PN MECHANICAL DATA





SYMBOL	MIN	NOM	MAX
A	4.60	4.80	5.00
b	0.80	1.00	1.20
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.55	0.60	0.75
c1	1.45	1.50	1.65
D	15.40	15.60	15.80
E	19.70	19.90	20.10
e	5.15	5.45	5.75
L1	3.30	3.50	3.70
L2	19.80	20.00	20.20
øP1	3.30	3.40	3.50
		(3.20)	
Q		2.40	2.60
q1	4.80	5.00	5.20

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