Features

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

Absolute Maximum Ratings

Parameter		Symbol	TMAN20N50A	Unit
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	30	V
Continuous Drain Current	T_C = 25	I_D	20	A
	T_C = 100		12.4	A
Pulsed Drain Current (Note 1)		I_{DM}	80	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	770	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	20	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,		T_L	300	

* Limited only by maximum junction temperature

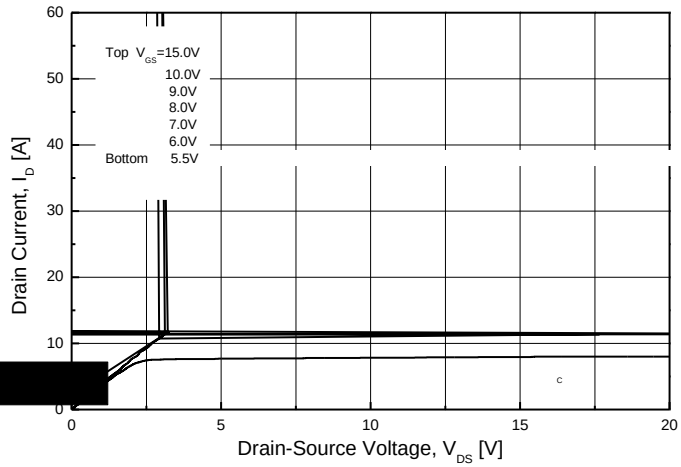
Thermal Characteristics

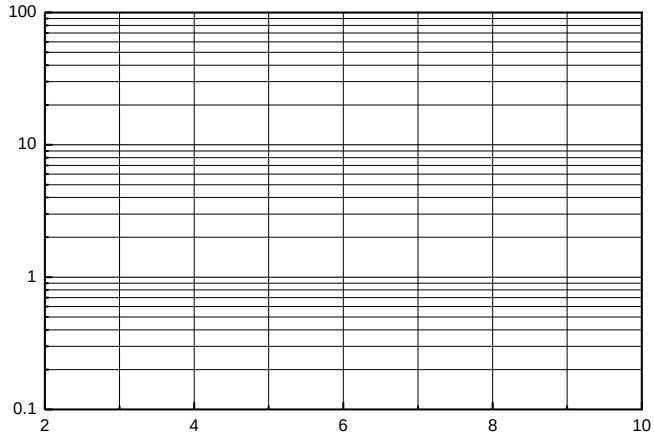
Parameter	Symbol	TMAN20N50A	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	0.4	/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	/W

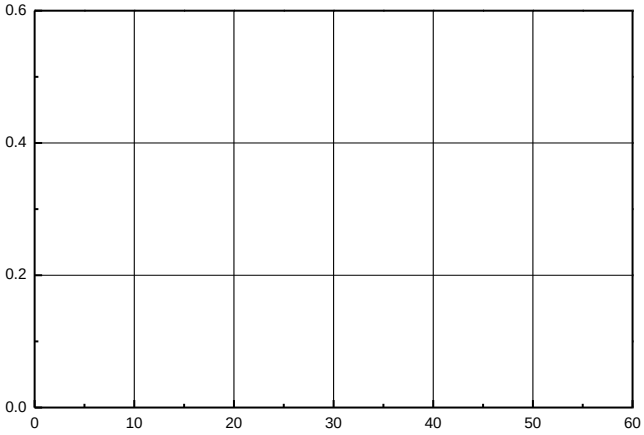
Electrical Characteristics : T_C=25 , unless otherwise noted

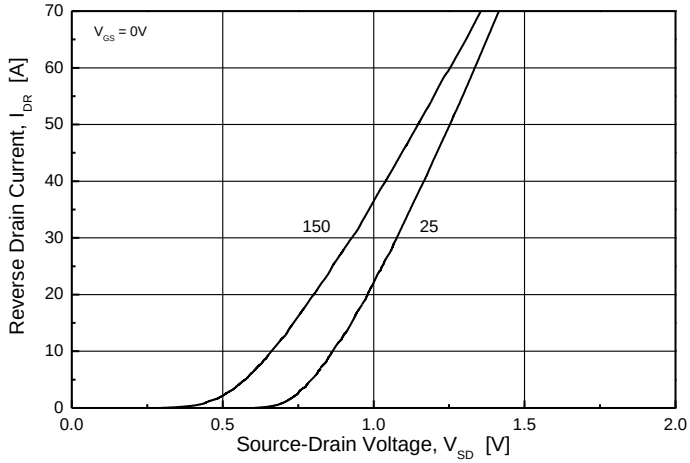
Parameter	Symbol	Test condition	Min		Max	
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	5	--	--	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 500 V, V_{GS} = 0 V		--	1	µ
		V_{DS} = 400 V, T_C = 125°		--	10	µA
Forward Gate-Source Leakage Current	I_{GSSF}	V_{GS} = 30 V, V_{DS} =	--	--	100	nA
Reverse Gate-Source Leakage Current	I_{GSSR}	V_{GS} = -30 V, V	--	--	-100	nA
ON						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V 250 µA	3	--	5	
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} =			0.30	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} =			--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V,	--	2880	--	pF
Output Capacitance	C_{oss}	f = 1.0 MHz	--	283	--	pF
Reverse Transfer Capacitance	C_{rss}		--	10	--	pF
SWITCHING						
Turn-On Delay Time						

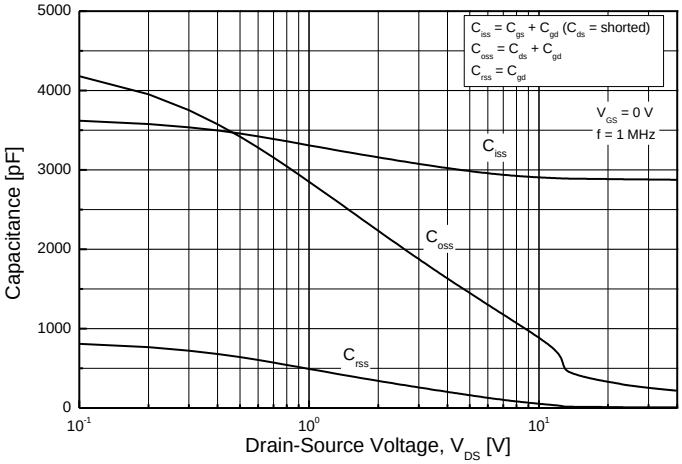
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=4.3mH, I_{AS} = 20A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25
3 I_{SD} 20A, di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

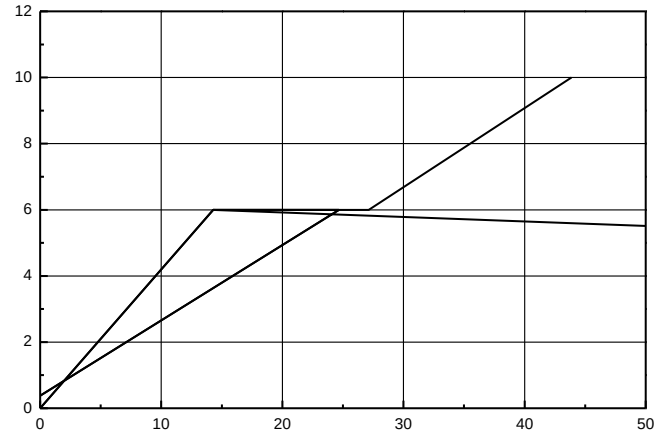

Top V_GS=15.0V
10.0V
9.0V
8.0V
7.0V
6.0V
Bottom 5.5V
Drain Current, I_D [A]
Drain-Source Voltage, V_DS [V]

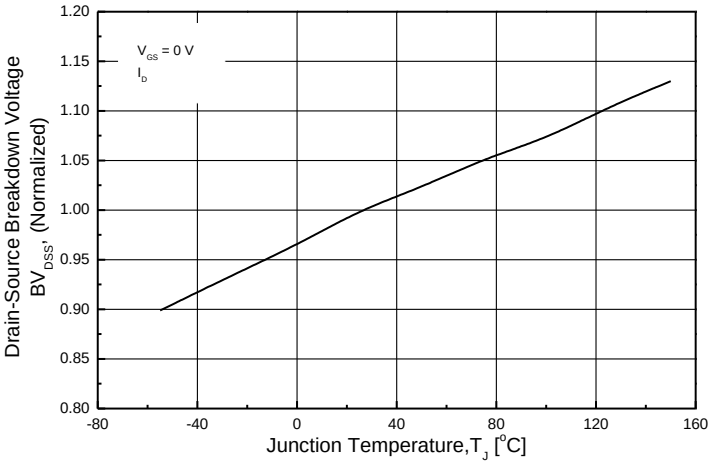


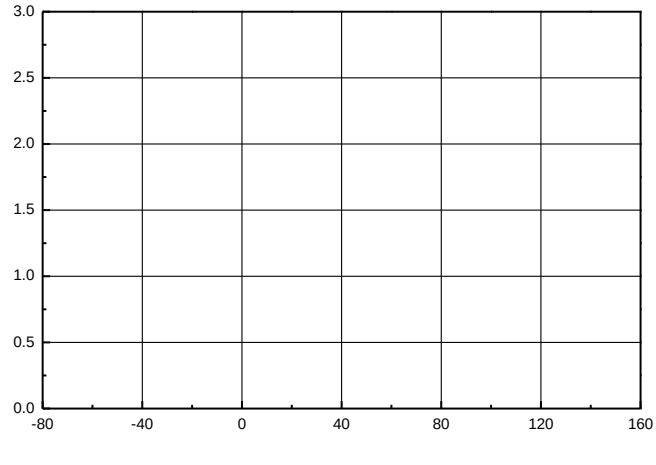


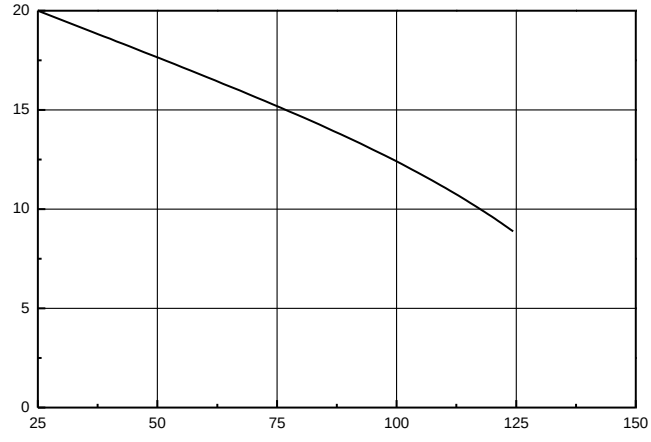

V_GS = 0V
150
25
Reverse Drain Current, I_DR [A]
Source-Drain Voltage, V_SD [V]

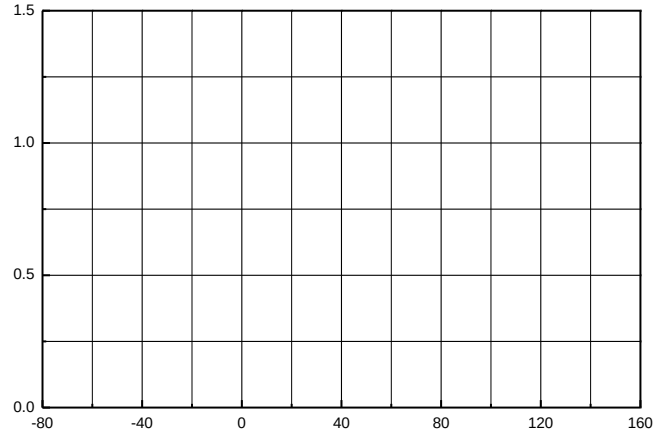

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
f = 1 MHz
C_iss
C_oss
C_rss
Capacitance [pF]
Drain-Source Voltage, V_DS [V]

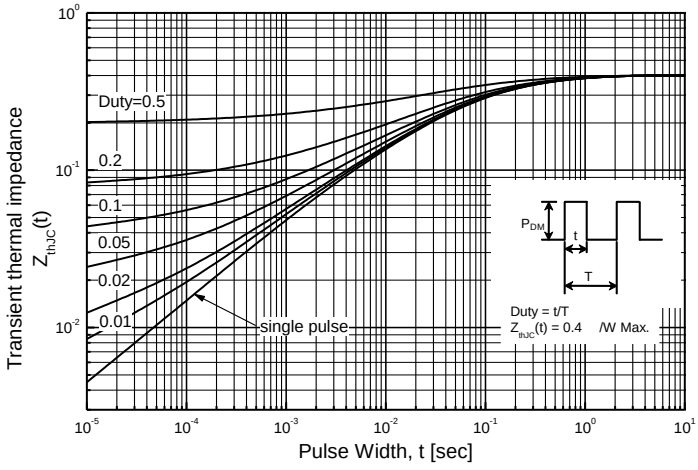


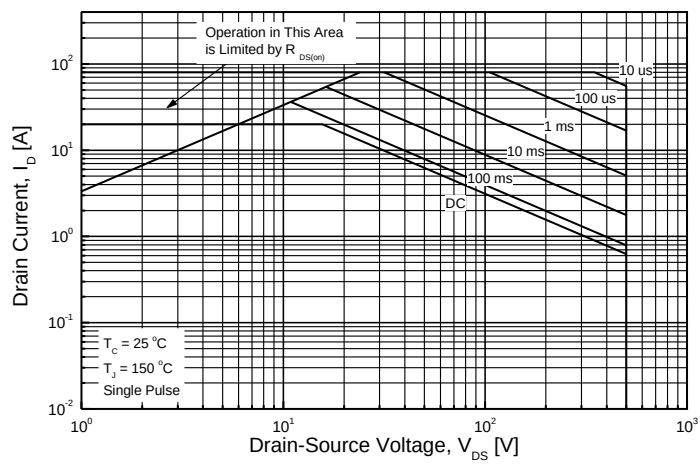

Drain-Source Breakdown Voltage
BV_DSS, (Normalized)
V_GS = 0 V
I_D
Junction Temperature,T_J [°C]



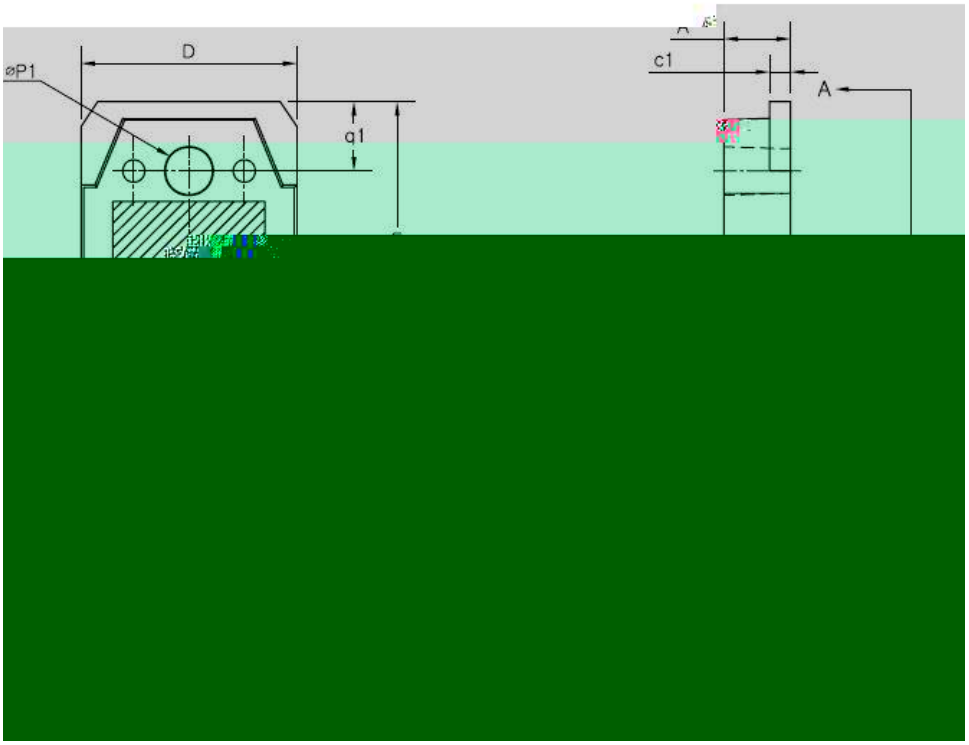


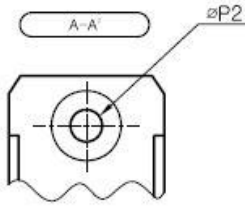



Transient thermal impedance
Z_thJC(t)
Duty=0.5
0.2
0.1
0.05
0.02
0.01
single pulse
P_DM
t
T
Duty = t/T
Z_thJC(t) = 0.4 /W Max.
Pulse Width, t [sec]


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]
Drain-Source Voltage, V_DS [V]

TO-3PN MECHANICAL DATA





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