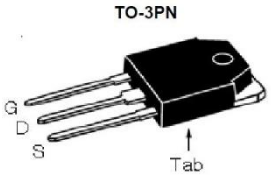
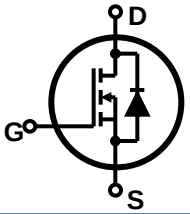
N-channel MOSFET

BV_{DSS}	I_D	$R_{DS(on)MAX}$
600V	20A	<0.33Ω

Features

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





Device	Package	Marking	Remark
TMAN20N60	TO-3PN	TMAN20N60	RoHS

Absolute Maximum Ratings

Parameter		Symbol	TMAN20N60	Unit
Drain-Source Voltage		V_{DS}	600	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}	1330	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	20	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	34.7	mJ
Power Dissipation	T_C = 25	P_D	347	W
	Derate above 25		2.77	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

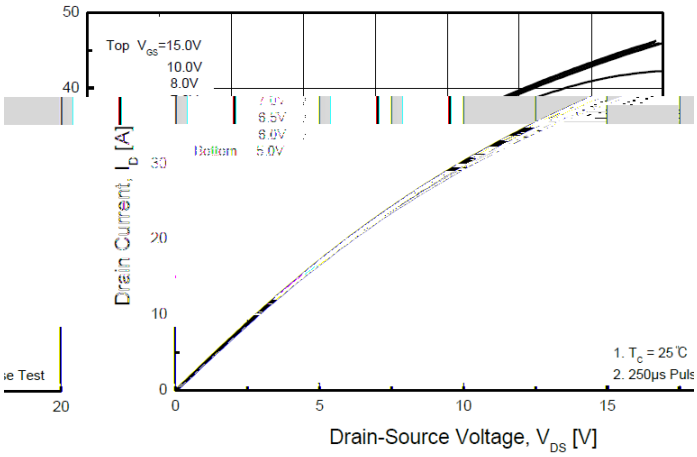
Thermal Characteristics

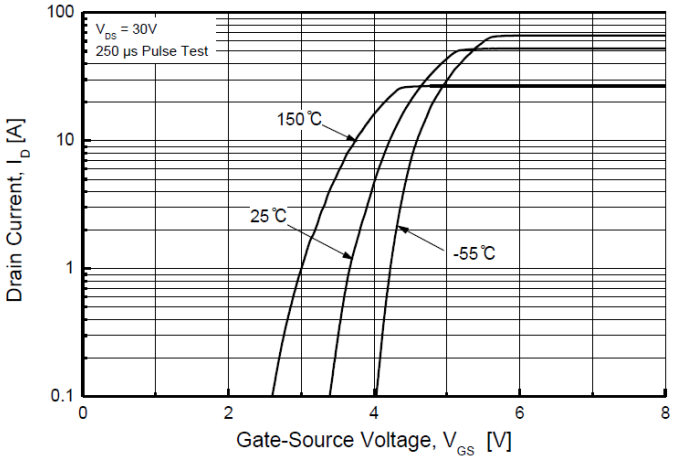
Parameter	Symbol	TMAN20N60	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	0.36	/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	/W

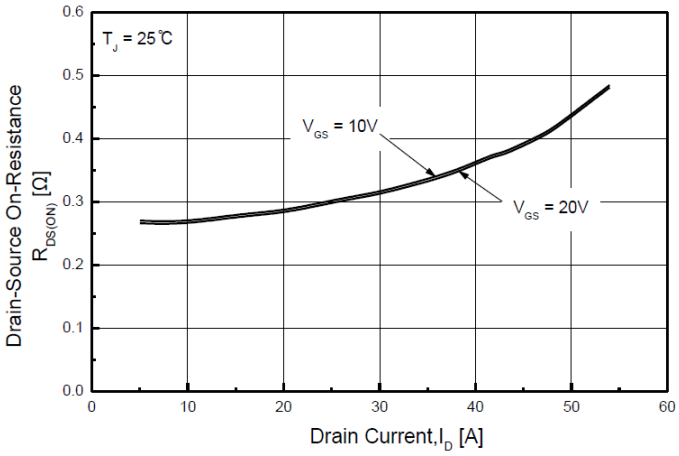
Electrical Characteristics : T_C=25 , unless otherwise noted

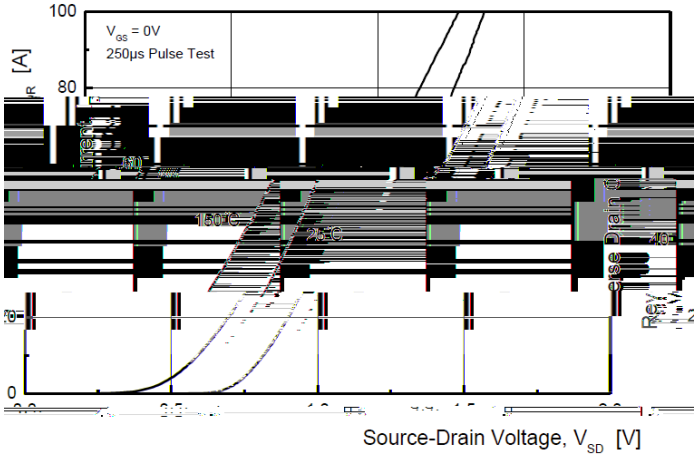
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	600	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 600 V, V_{GS} = 0 V	--	--	1	µA
		V_{DS} = 480 V, T_C = 125°C	--	--	10	µA
Forward Gate-Source Leakage Current	I_{GSSF}	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 = 10 A	--	0.27	0.33	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 10 A	--	30	--	S
DYNAMIC						
InpuT199.7 465.38 Tm[<003A>]TJETBT1 0 0 /P <</MCID 122/Lang (en-US)>>BDC BT1 0 0 1 28.8						

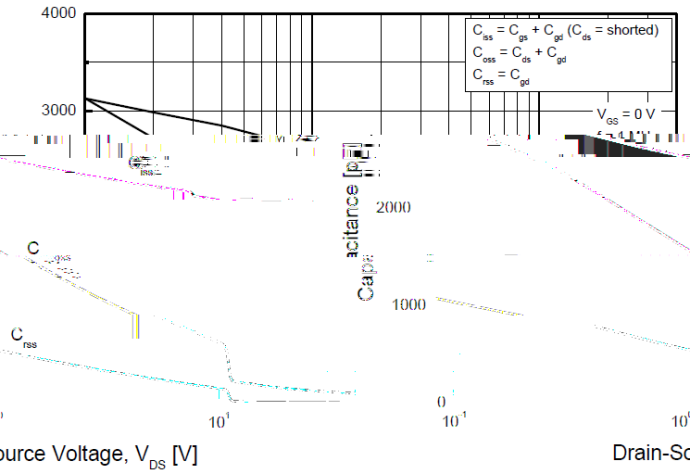
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=6.1mH, I_{AS} = 20A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25
3 I_{SD} 20A, di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

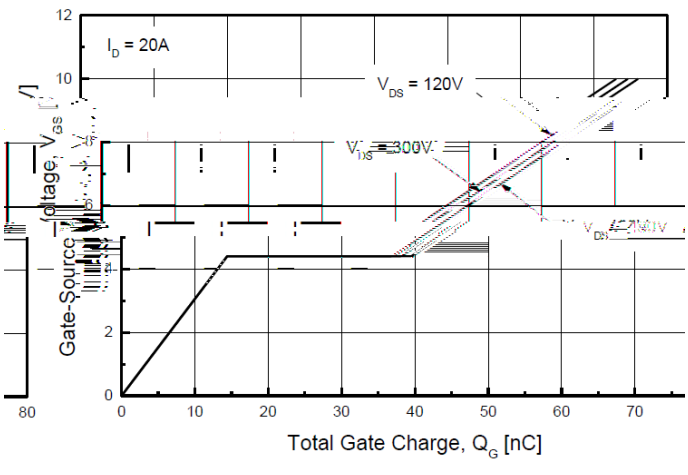

Top V_GS=15.0V
10.0V
8.0V
6.5V
6.0V
Bottom 5.0V
Drain Current, I_D [A]
Drain-Source Voltage, V_DS [V]
1. T_C = 25℃
2. 250μs Puls
e Test

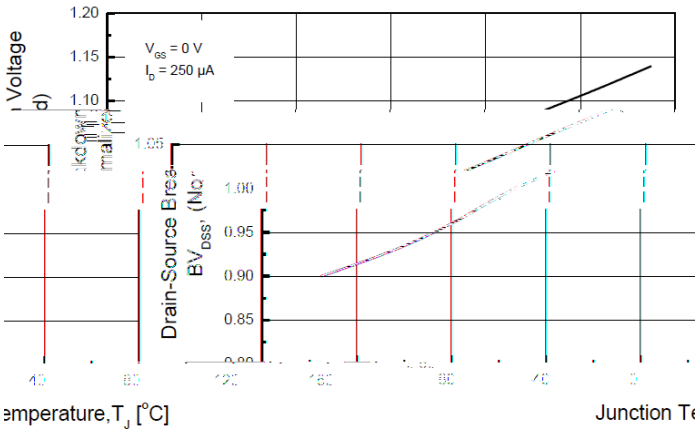

V_DS = 30V
250 μs Pulse Test
150℃
25℃
-55℃
Drain Current, I_D [A]
Gate-Source Voltage, V_GS [V]

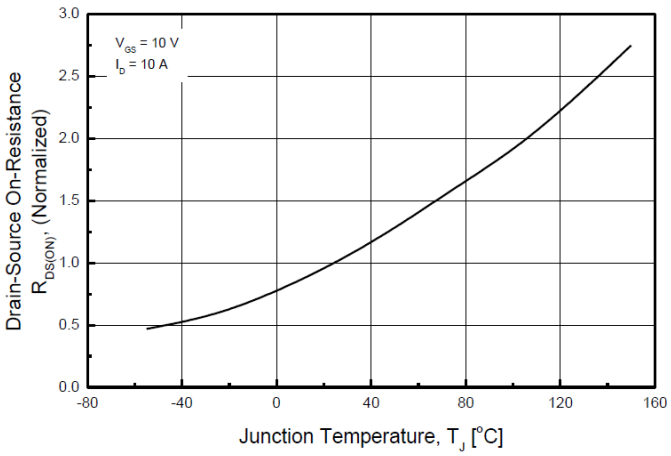

T_J = 25℃
V_GS = 10V
V_GS = 20V
Drain-Source On-Resistance
R_DS(ON) [Ω]
Drain Current,I_D [A]

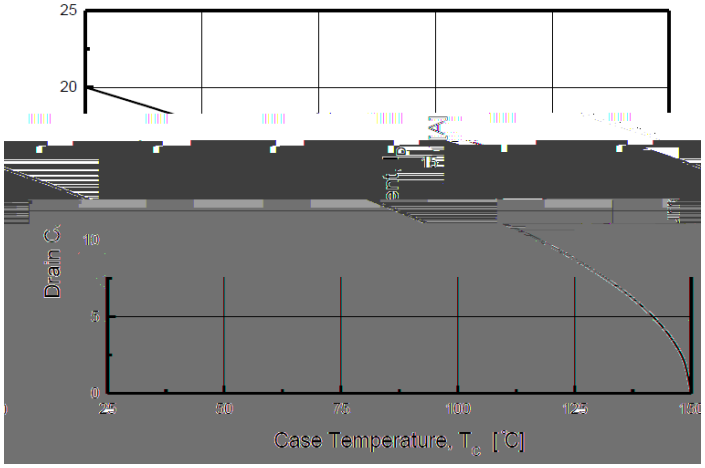

V_GS = 0V
250μs Pulse Test
150℃
25℃
Source-Drain Voltage, V_SD [V]

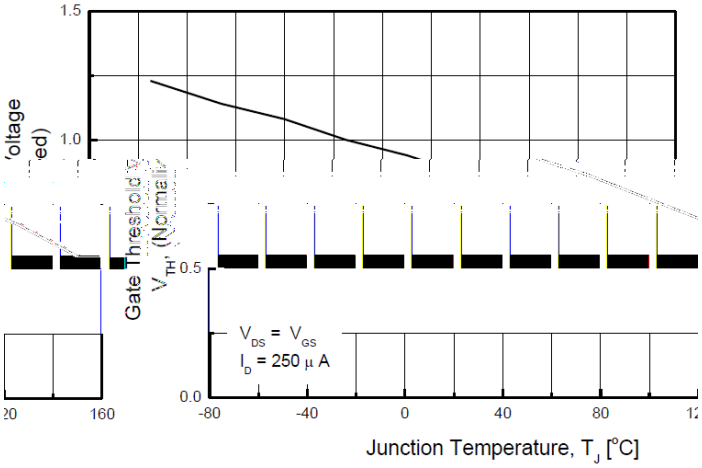

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
Drain-Sc

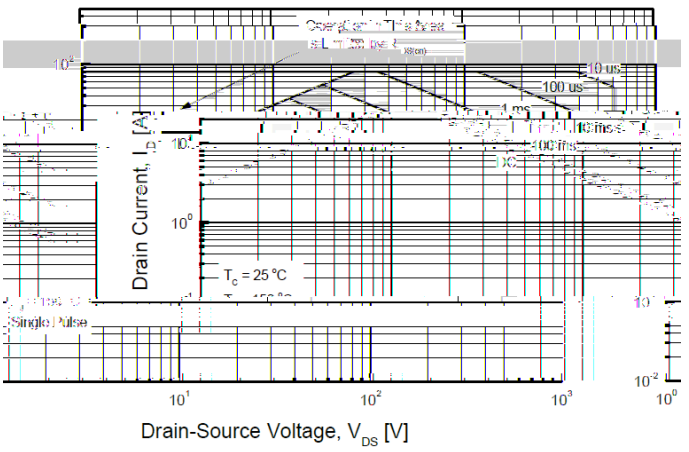

I_D = 20A
V_DS = 120V
V_DS = 300V
Total Gate Charge, Q_G [nC]

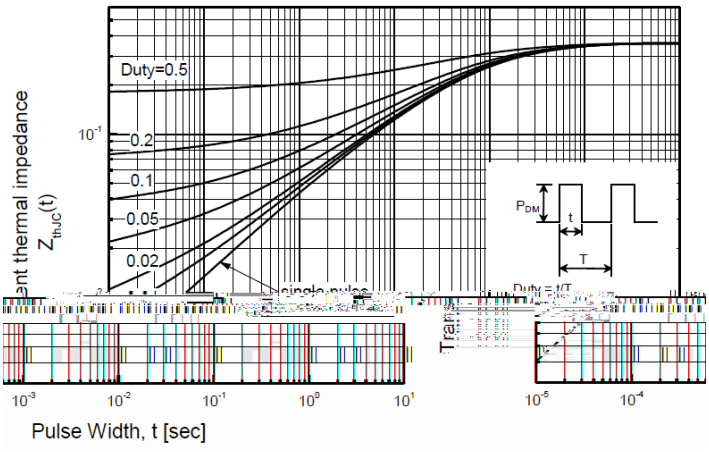

1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
V_{GS} = 0 V
I_D = 250 μA
Drain-Source Breakdown Voltage
BV_{DSS}, (Normalized)
Junction Temperature, T_J [°C]


3.0
2.5
2.0
1.5
1.0
0.5
0.0
-80
-40
0
40
80
120
160
V_{GS} = 10 V
I_D = 10 A
Drain-Source On-Resistance
$R_{DS(ON)}$, (Normalized)
Junction Temperature, T_J [°C]

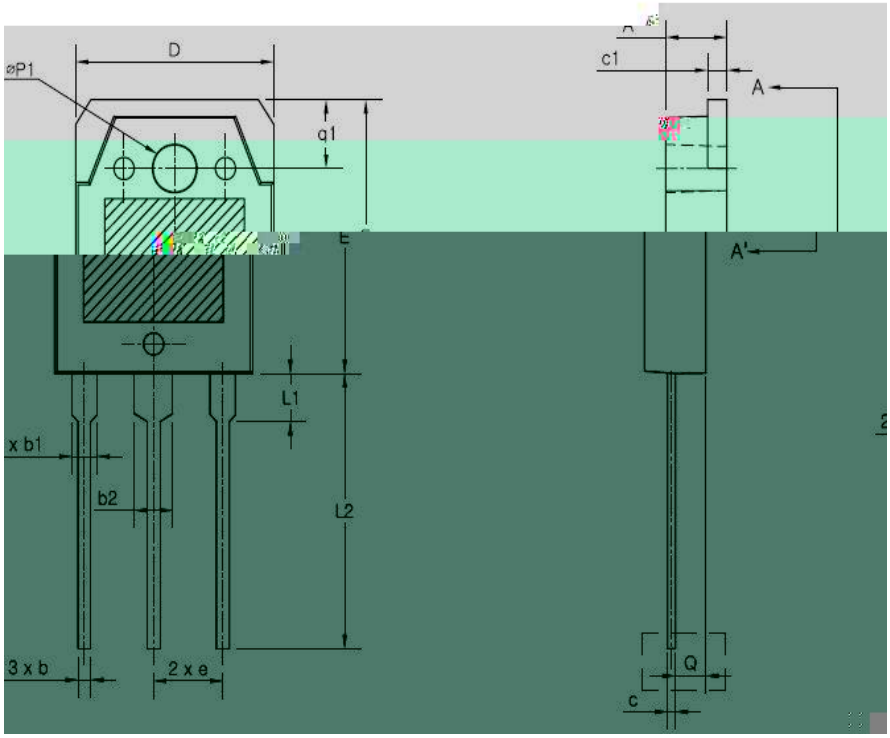

25
20
10
0
25
50
75
100
125
Drain Current, I_D [A]
Case Temperature, T_C [°C]

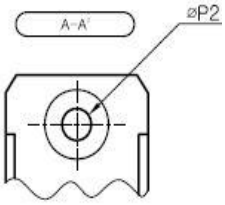

1.5
1.0
0.5
0.0
-80
-40
0
40
80
160
V_{DS} = V_{GS}
I_D = 250 μA
Gate Threshold Voltage
V_{TH}, (Normalized)
Junction Temperature, T_J [°C]


10 us
100 us
1 ms
10 ms
100 ms
DC
T_C = 25 °C
Single Pulse
Drain Current, I_D [A]
Drain-Source Voltage, V_{DS} [V]


Duty=0.5
0.2
0.1
0.05
0.02
single pulse
P_{DM}
t
T
Transient thermal impedance
Z_{thJC}(t)
Pulse Width, t [sec]

TO-3PN MECHANICAL DATA





SYMBOL	MIN	NOM	MAX
A	4.60	4.80	5.00
øP1	3.30	3.40	3.50
øP2		(3.20)	
Q	2.20	2.40	2.60
q1	4.80	5.00	5.20