## Features

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

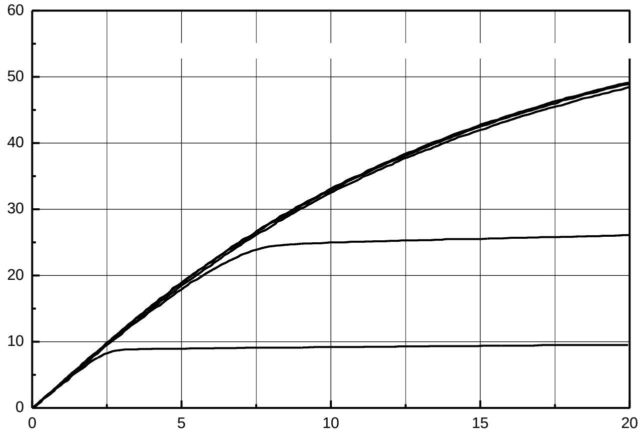
## Absolute Maximum Ratings

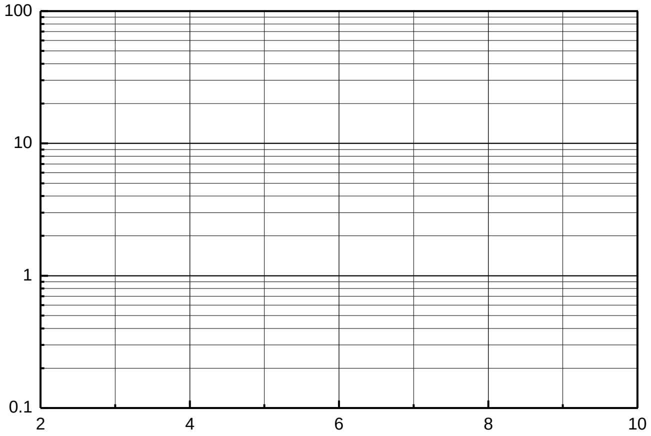
| Parameter | | Symbol | TMAN20N60A | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 600 | V |
| Gate-Source Voltage | | $V_{GS}$ | 30 | V |
| Continuous Drain Current | $T_C$ = 25 | $I_D$ | 20 | A |
| | $T_C$ = 100 | | 12.8 | A |
| Pulsed Drain Current (Note 1) | | $I_{DM}$ | 80 | A |
| Single Pulse Avalanche Energy (Note 2) | | $E_{AS}$ | 826 | 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 | | |
| | | | | |

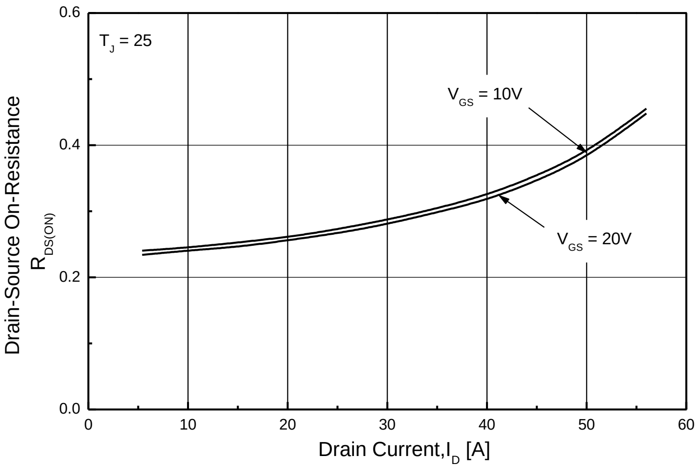
## Electrical Characteristics : $T_C$=25 , unless otherwise noted

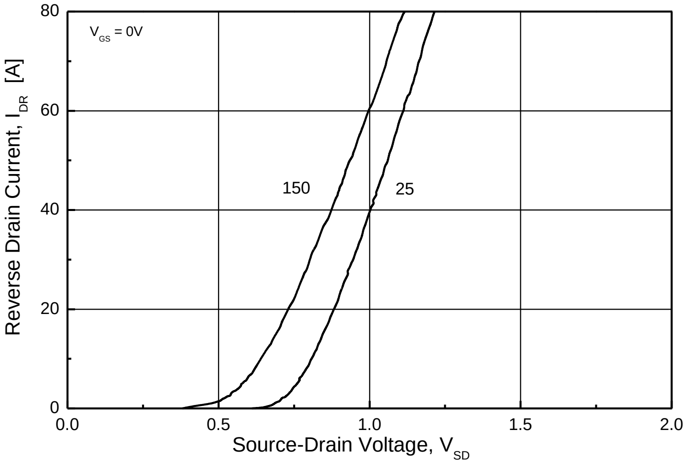
Note :

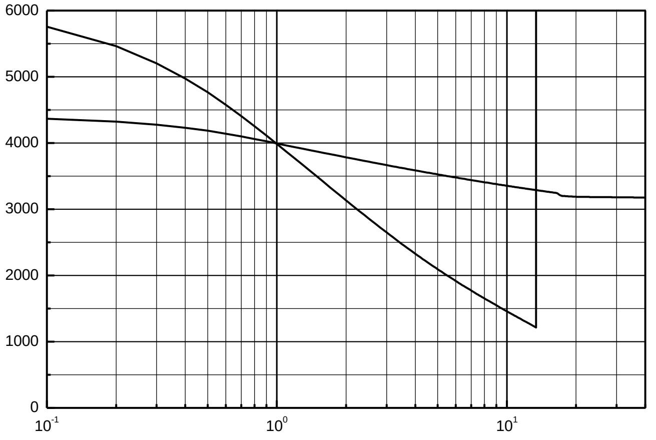
1. Repeated rating : Pulse width limited by safe operating area
2. L=3.79mH, $I_{AS}$ = 20A, $V_{DD}$ = 50V, $R_G$ = 25 , Starting $T_J$= 25

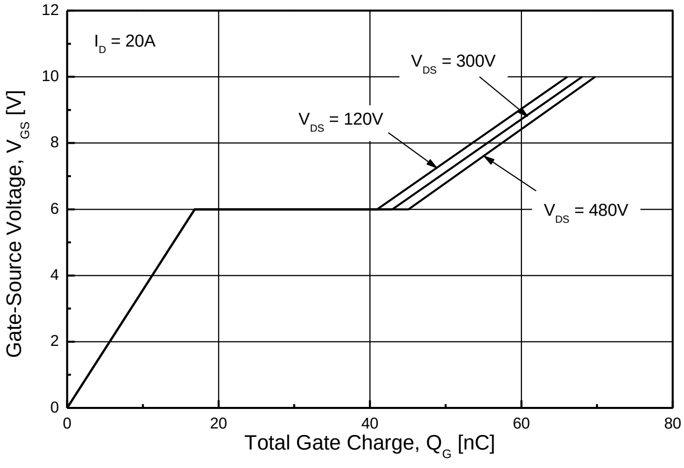

60
50
40
30
20
10
0
0
5
10
15
20

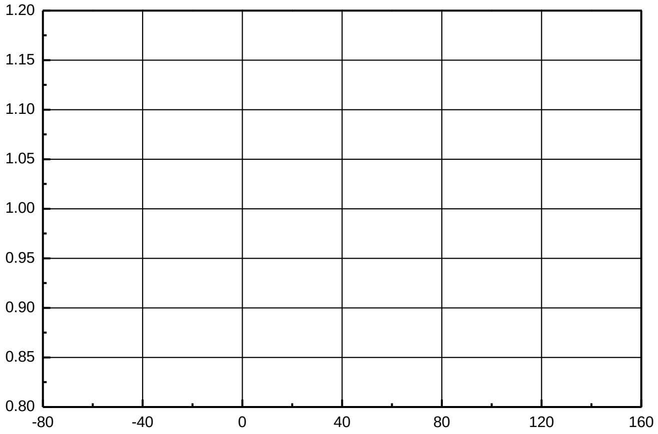

100
10
1
0.1
2
4
6
8
10

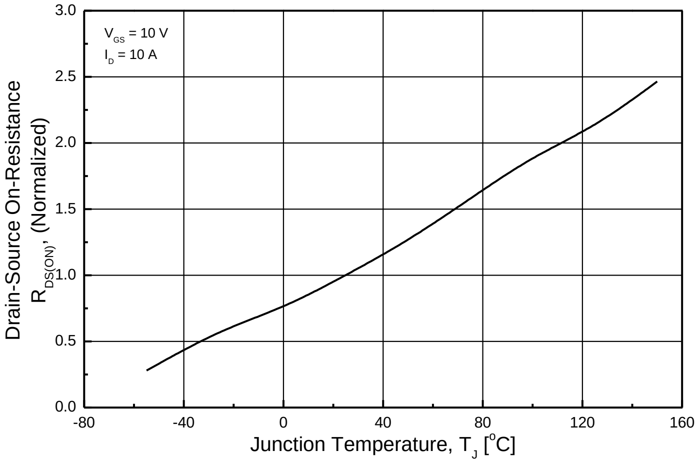

T$_J$ = 25
V$_{GS}$ = 10V
V$_{GS}$ = 20V
Drain-Source On-Resistance
R$_{DS(ON)}$
Drain Current,I$_D$ [A]
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60

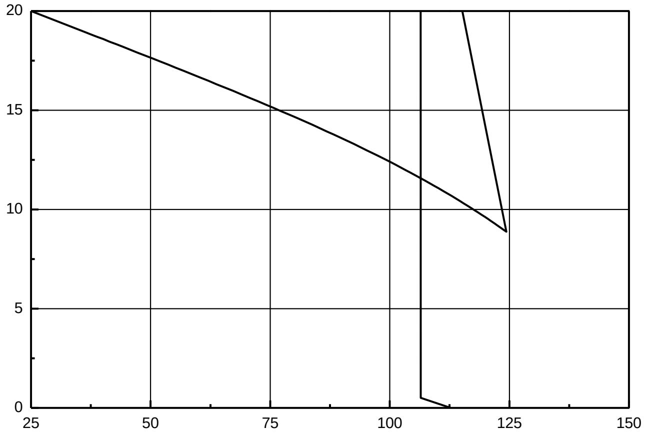

V$_{GS}$ = 0V
150
25
Reverse Drain Current, I$_{DR}$ [A]
Source-Drain Voltage, V$_{SD}$
80
60
40
20
0
0.0
0.5
1.0
1.5
2.0

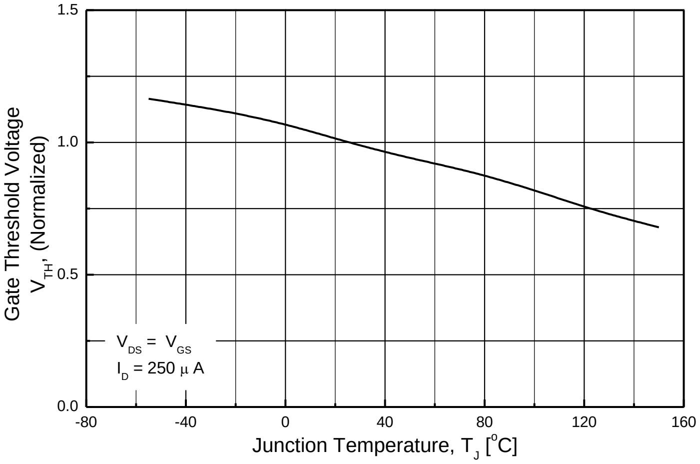

6000
5000
4000
3000
2000
1000
0
10$^{-1}$
10$^0$
10$^1$

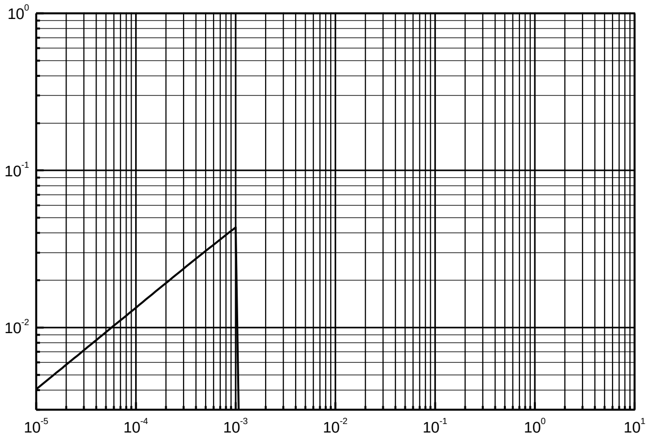

I$_D$ = 20A
V$_{DS}$ = 300V
V$_{DS}$ = 120V
V$_{DS}$ = 480V
Gate-Source Voltage, V$_{GS}$ [V]
Total Gate Charge, Q$_G$ [nC]
12
10
8
6
4
2
0
0
20
40
60
80

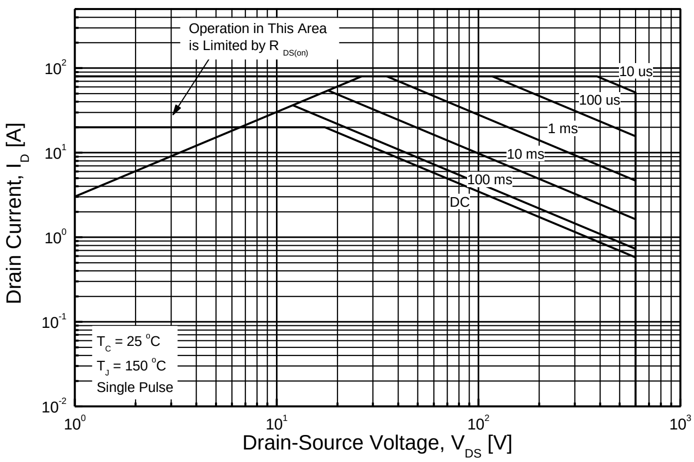

1.20
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
-80
-40
0
40
80
120
160


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

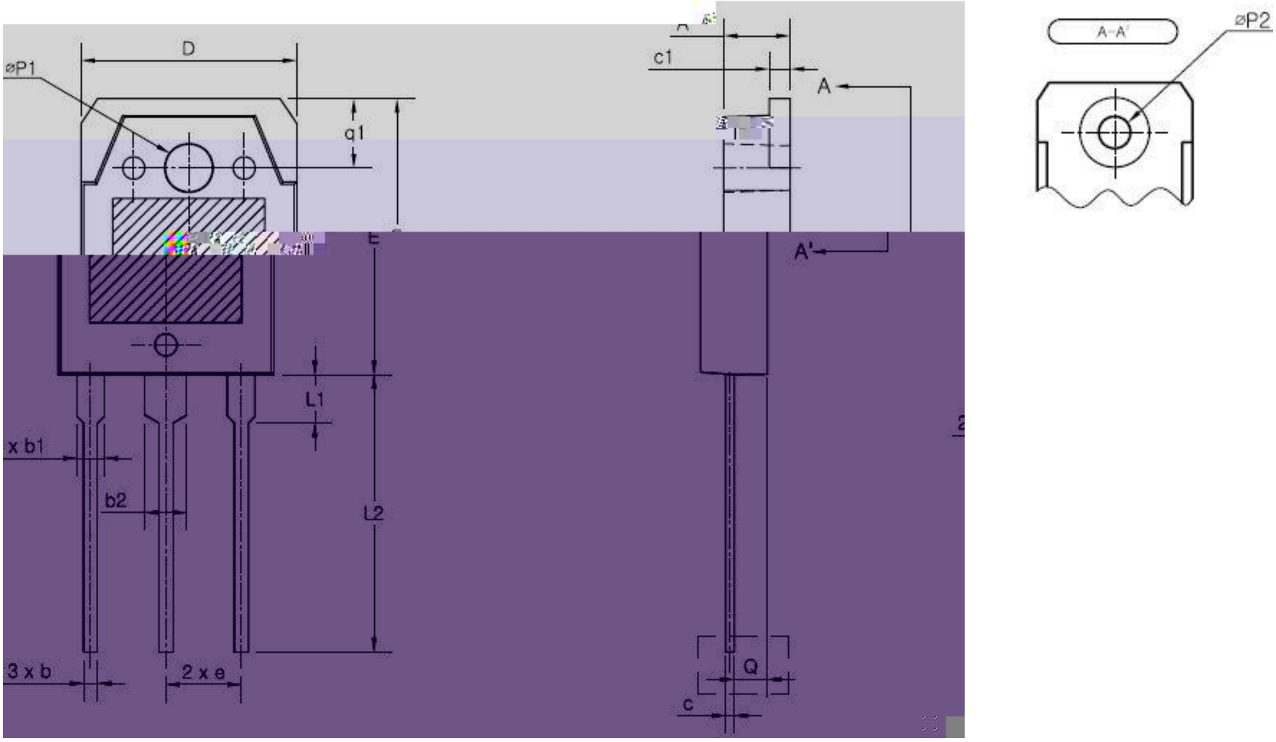

20
15
10
5
0
25
50
75
100
125
150


Gate Threshold Voltage
$V_{TH}$, (Normalized)
$V_{DS}$ = $V_{GS}$
$I_D$ = 250 μ A
1.5
1.0
0.5
0.0
-80
-40
0
40
80
120
160
Junction Temperature, $T_J$ [°C]


$10^0$
$10^{-1}$
$10^{-2}$
$10^{-5}$
$10^{-4}$
$10^{-3}$
$10^{-2}$
$10^{-1}$
$10^0$
$10^1$


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]

## TO-3PN MECHANICAL DATA



| SYMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A | 4.60 | 4.80 | 5.00 |
| [illegible] | [illegible] | [illegible] | [illegible] |
| [illegible] | [illegible] | 20.00 | 20.20 |
| øP1 | 3.30 | 3.40 | 3.50 |
| øP2 | | (3.20) | |
| Q | 2.20 | 2.40 | 2.60 |
| q1 | 4.80 | 5.00 | 5.20 |