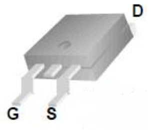
Features

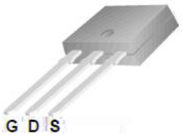
- Low gate charge
- 100% avalanche tested
- Improved dv/dt capability
- RoHS compliant
- Halogen free package
- JEDEC Qualification

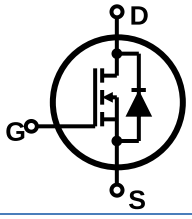
V_{DSS} = 880 V @T_{jmax}
I_D = 3A
$R_{DS(on)}$ = 4.2 (max) @ V_{GS}= 10 V

D-PAK



I-PAK





Device	Package	Marking	Remark
TMD3N80G/TMU3N80G	D-PAK/I-PAK	TMD3N80G/TMU3N80G	Halogen Free

Absolute Maximum Ratings

Parameter		Symbol	TMD3N80G/TMU3N80G	Unit
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GS}	±30	V
Continuous Drain Current	T_C = 25 ℃	I_D	3	A
	T_C = 100 ℃		1.83	A
Pulsed Drain Current (Note 1)		I_{DM}	12	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	283	mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	3	A
Repetitive Avalanche Energy (Note 1)		E_{AR}	9.4	mJ
Power Dissipation	T_C = 25 ℃	P_D	94	W
	Derate above 25 ℃		0.75	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

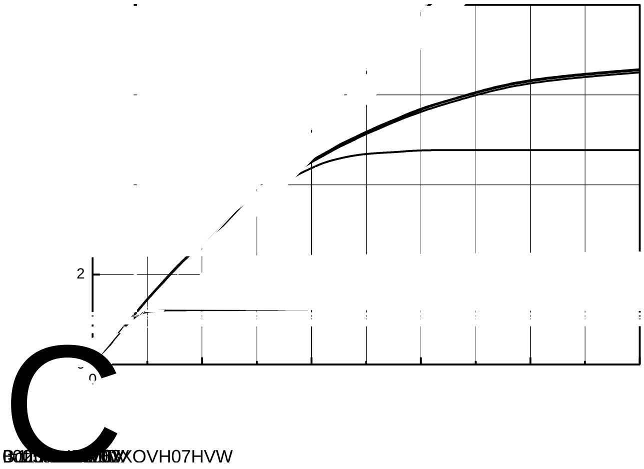
Parameter	Symbol	TMD3N80G/TMU3N80G	Unit
Maximum Thermal resistance, Junction-to-Case	R_{JC}	1.33	℃/W
Maximum Thermal resistance, Junction-to-Ambient	R_{JA}	110	℃/W

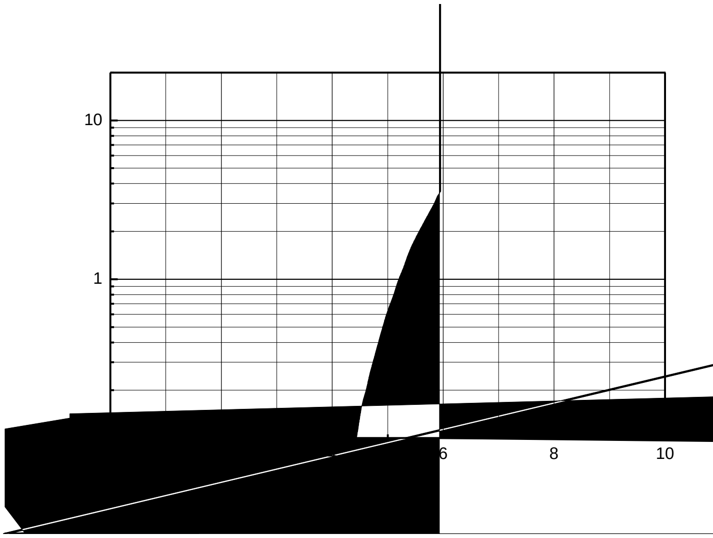
Electrical Characteristics : T_C=25℃, unless otherwise noted

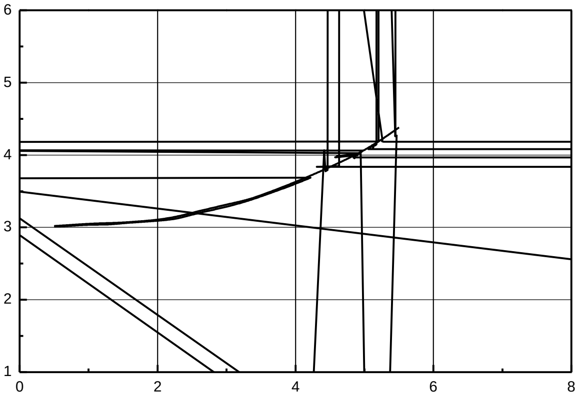
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	800	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 800 V, V_{GS} = 0 V	--	--	10	μA
		V_{DS} = 640 V, T_C = 125°C	--	--	100	μA
Forward Gate-Source Leakage Current	I_{GSSF}	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 = 1.5 A	--	3.36	4.2	
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 1.5 A	--	3.7	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	696	--	pF
Output Capacitance	C_{oss}		--	65	--	pF
Reverse Transfer Capacitance	C_{rss}		--	10.2	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 400 V, I_D = 3 A, R_G = 25	--	48	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	36	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	106	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	41	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 640V, I_D = 3 A, V_{GS} = 10 V	--	19	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	4	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	7.6	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	----	--	--	3	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	----	--	--	12	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 3 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 3 A dI_F / dt = 100 A/μs	--	372	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	1.8	--	μC

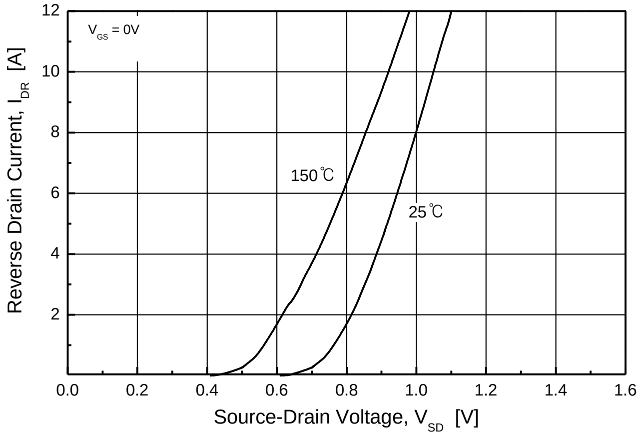
Note :

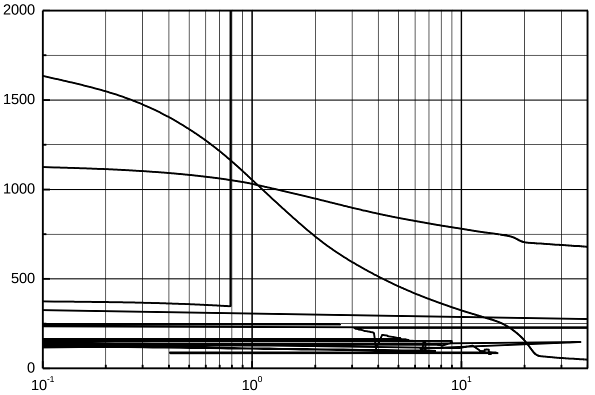
1. Repeated rating : Pulse width limited by safe operating area
2. L= 59mH, I_{AS} = 3A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25 ℃
3 I_{SD} μs , V_{DD} $_{DS}$, Starting T_J= 25 ℃
μ
5. Essentially Independent of Operating Temperature Typical Characteristics

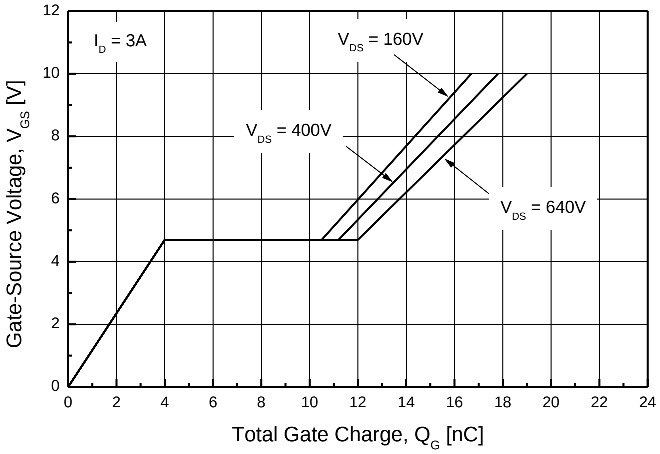

2
0

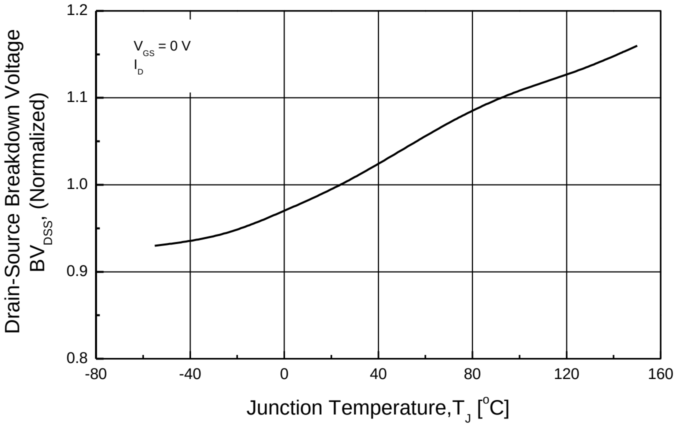

10
1
6
8
10


6
5
4
3
2
1
0
2
4
6
8

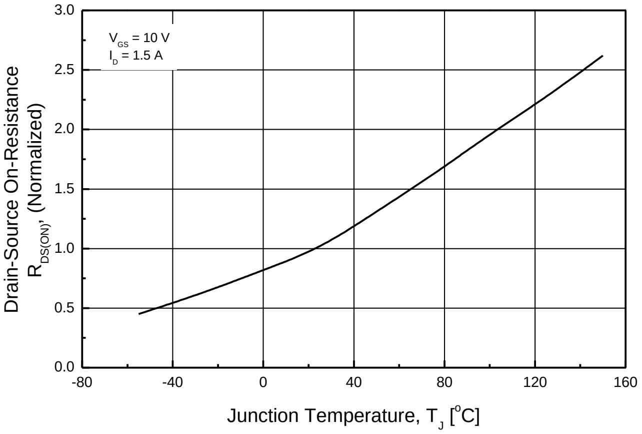

V_{GS} = 0V
150℃
25℃
Reverse Drain Current, I_{DR} [A]
Source-Drain Voltage, V_{SD} [V]
12
10
8
6
4
2
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6


2000
1500
1000
500
0
10^{-1}
10^{0}
10^{1}

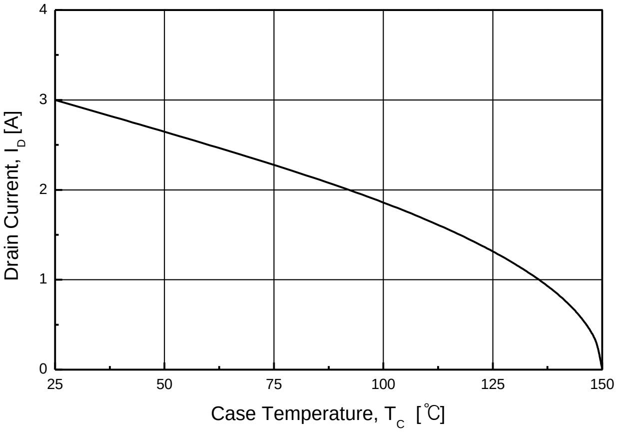

I_D = 3A
V_{DS} = 160V
V_{DS} = 400V
V_{DS} = 640V
Gate-Source Voltage, V_{GS} [V]
Total Gate Charge, Q_G [nC]
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
16
18
20
22
24



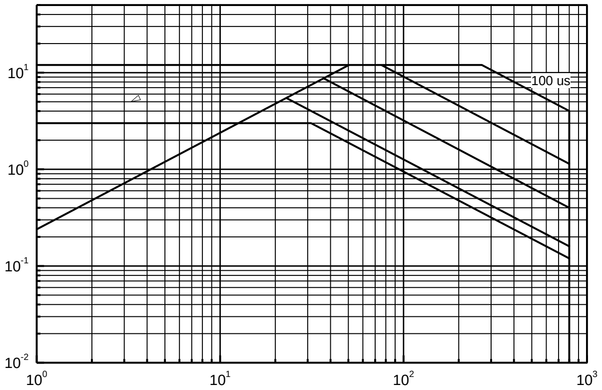
V_{GS} = 0 V
I_D
Drain-Source Breakdown Voltage
BV_{DSS}, (Normalized)
1.2
1.1
1.0
0.9
0.8
-80
-40
0
40
80
120
160
Junction Temperature,T_J [^oC]



V_{GS} = 10 V
I_D = 1.5 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 [^oC]



Drain Current, I_D [A]
4
3
2
1
0
25
50
75
100
125
150
Case Temperature, T_C [℃]



100 us
10^1
10^0
10^{-1}
10^{-2}
10^0
10^1
10^2
10^3