TMP10N80/TMPF10N80
TMP10N80G/TMPF10N80G

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 = 9.5A
$R_{DS(ON)}$ = 1.05 Ω(max) @ V_{GS}= 10 V

Absolute Maximum Ratings

Parameter		Symbol	TMP10N80(G)	TMPF10N80(G)	Unit
Drain-Source Voltage		V_{DSS}	800		V
Gate-Source Voltage		V_{GS}	30		V
Continuous Drain Current	T_C = 25	I_D	9.5	9.5 *	A
	T_C = 100		6.4	6.4 *	A
Pulsed Drain Current (Note 1)		I_{DM}	38	38*	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	231		mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	9.5		A
Repetitive Avalanche Energy (Note 1)		E_{AR}	29		mJ
Power Dissipation	T_C = 25	P_D	290	48	W
	Derate above 25		2.32	0.38	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		

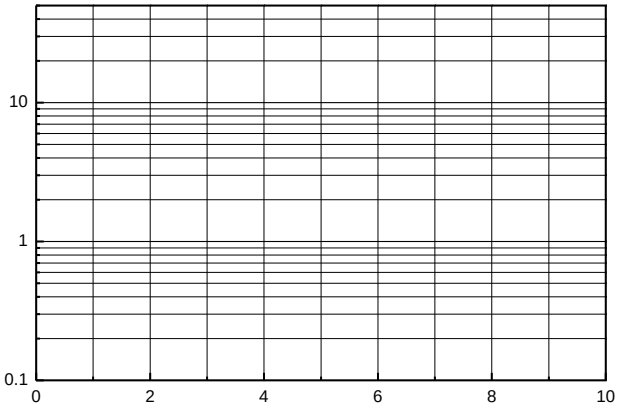
Thermal Characteristics

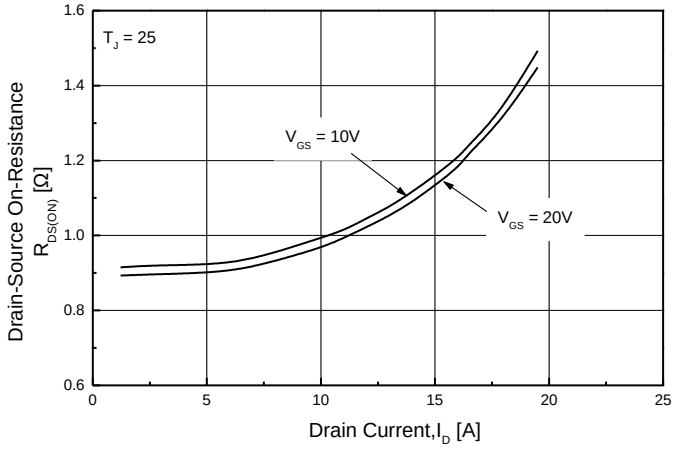
Parameter	Symbol	TMP10N80(G)	TMPF10N80(G)	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	0.43	2.6	/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	62.5	/W

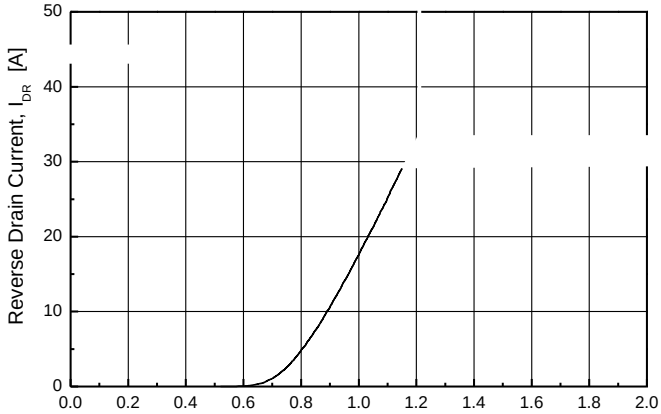
Electrical Characteristics : T_C=25 , unless otherwise noted

Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	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 = 4.75 A	--	0.9	1.05	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 4.75 A	--	6.3	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	2336	--	pF
Output Capacitance	C_{oss}		--	214	--	pF
Reverse Transfer Capacitance	C_{rss}		--	29	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 400 V, I_D = 9.5 A, R_G = 25 Ω	--	63	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	62	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	256	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	72	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 640V, I_D = 9.5 A, V_{GS} = 10 V	--	53	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	10	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	22.3	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	--	--	9.5	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	--	--	38	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 9.5 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 9.5 A, dI_F / dt = 100 A/µs	--	453	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	5.3	--	µC

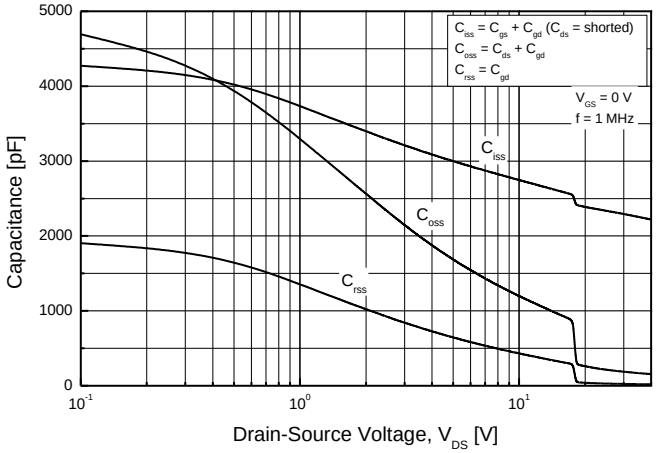
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=4.8mH, I_{AS} = 9.5A, V_{DD} = 50V, R_G = 25Ω, Starting T_J= 25
3 I_{SD} ≤ 9.5A, di/dt ≤ 200A/µs , V_{DD} ≤ BV_{DS}, Starting T_J= 25
4. Pulse Test :Pulse width ≤ 300µs, Duty Cycle ≤ 2%
5. Essentially Independent of Operating Temperature Typical Characteristics

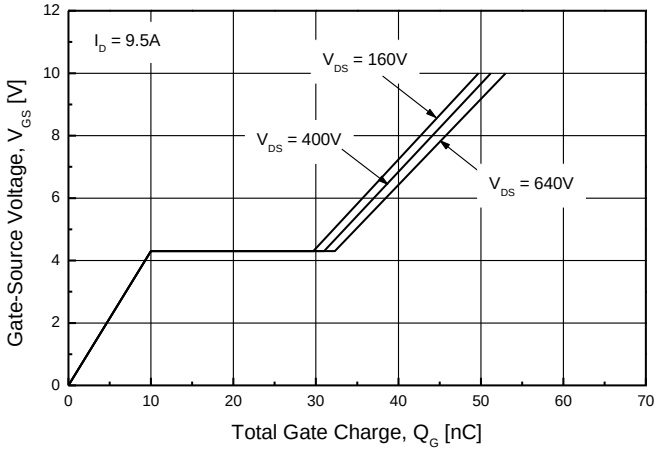

10
1
0.1
0
2
4
6
8
10

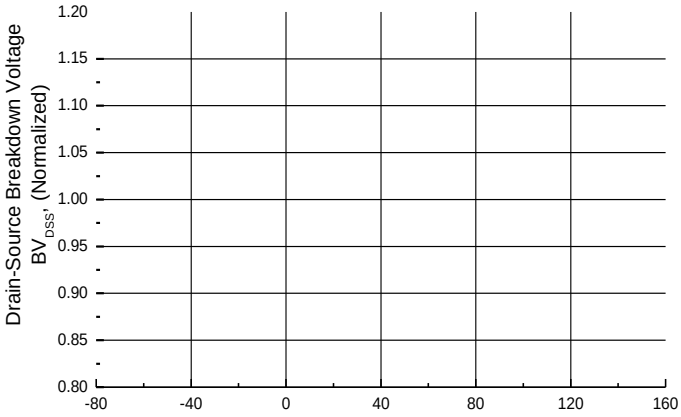

T_J = 25
V_GS = 10V
V_GS = 20V
Drain-Source On-Resistance
R_DS(ON) [Ω]
Drain Current,I_D [A]
1.6
1.4
1.2
1.0
0.8
0.6
0
5
10
15
20
25

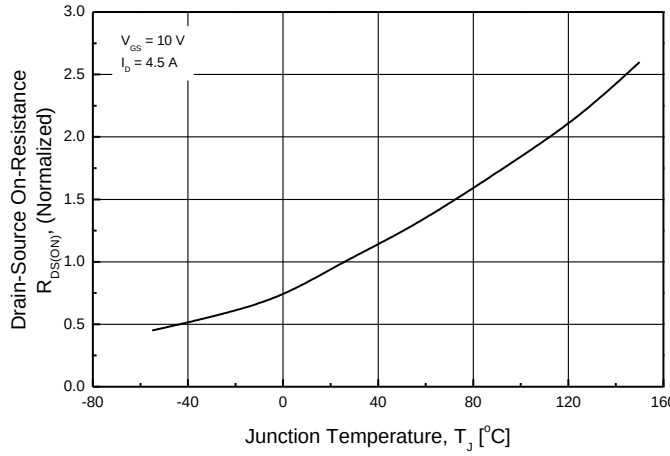

Reverse Drain Current, I_DR [A]
50
40
30
20
10
0
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8
2.0

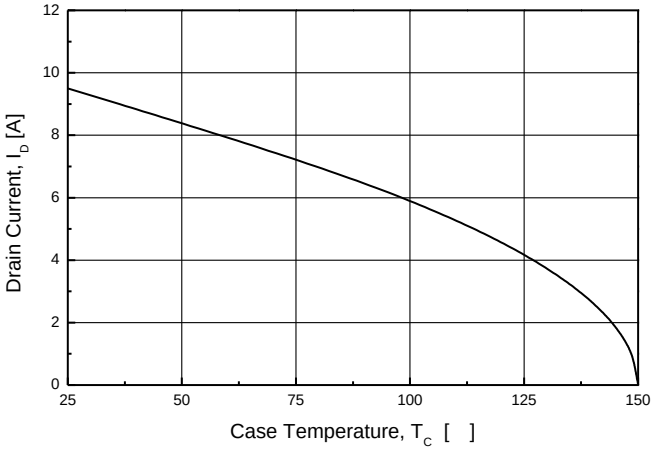
SD

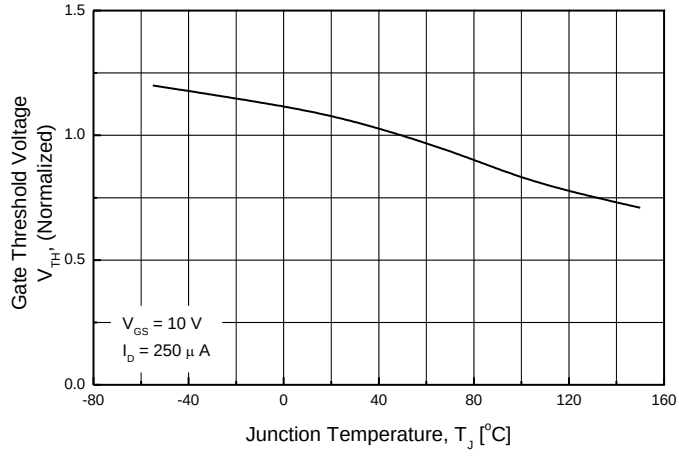

C_iss = C_gs + C_gd (C_ds = shorted)
C_oss = C_ds + C_gd
C_rss = C_gd
V_GS = 0 V
f = 1 MHz
C_ISS
C_OSS
C_RSS
Capacitance [pF]
Drain-Source Voltage, V_DS [V]
5000
4000
3000
2000
1000
0
10^-1
10^0
10^1


I_D = 9.5A
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
10
20
30
40
50
60
70

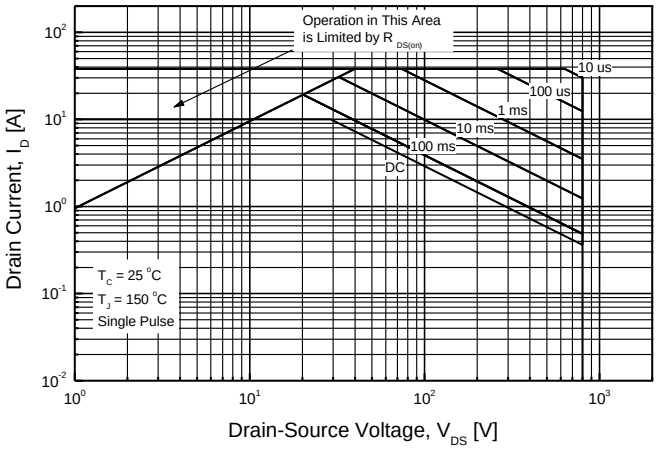








TMP10N80(G)



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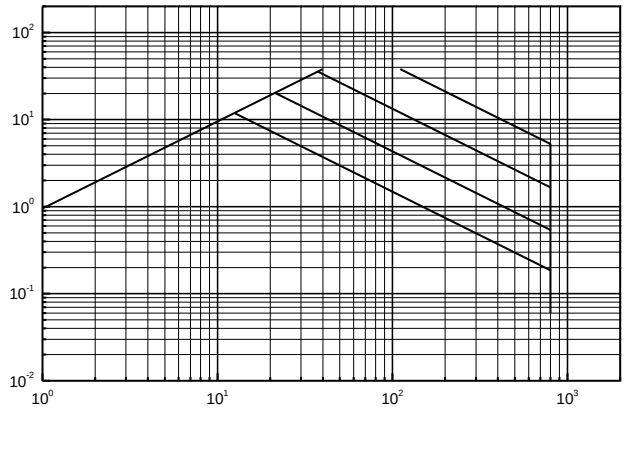

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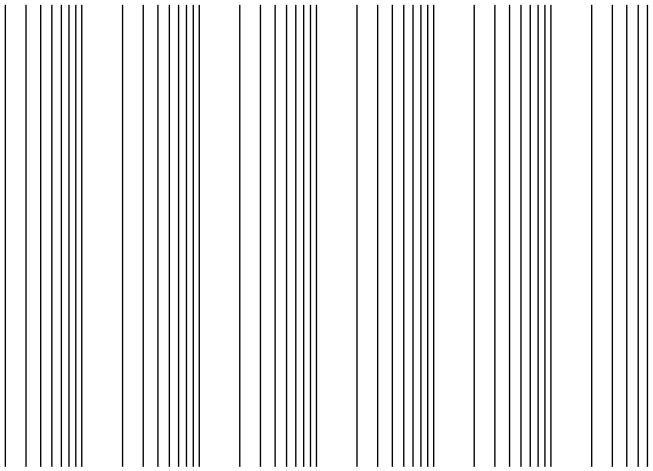

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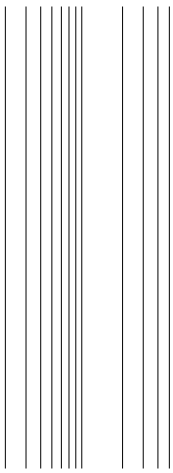
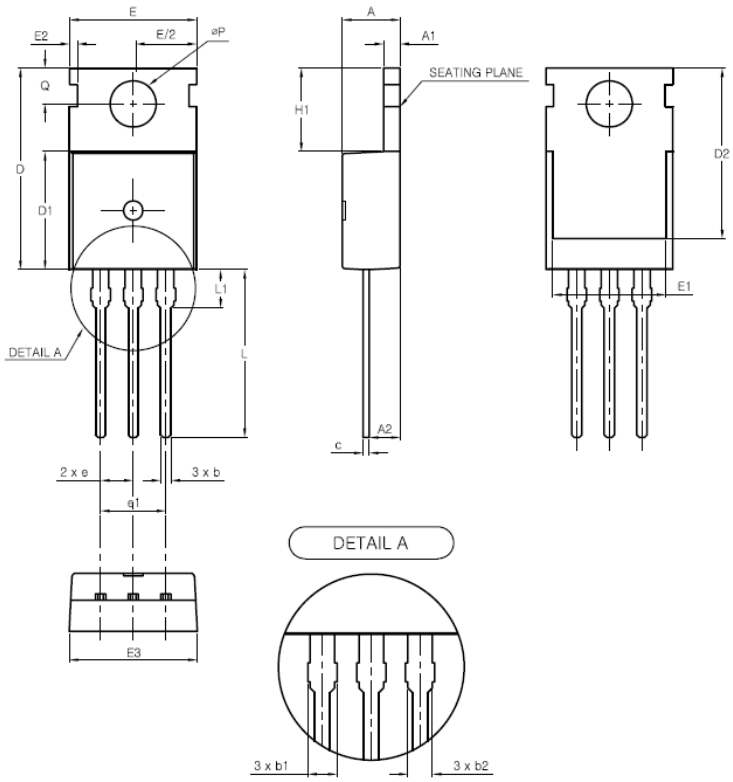
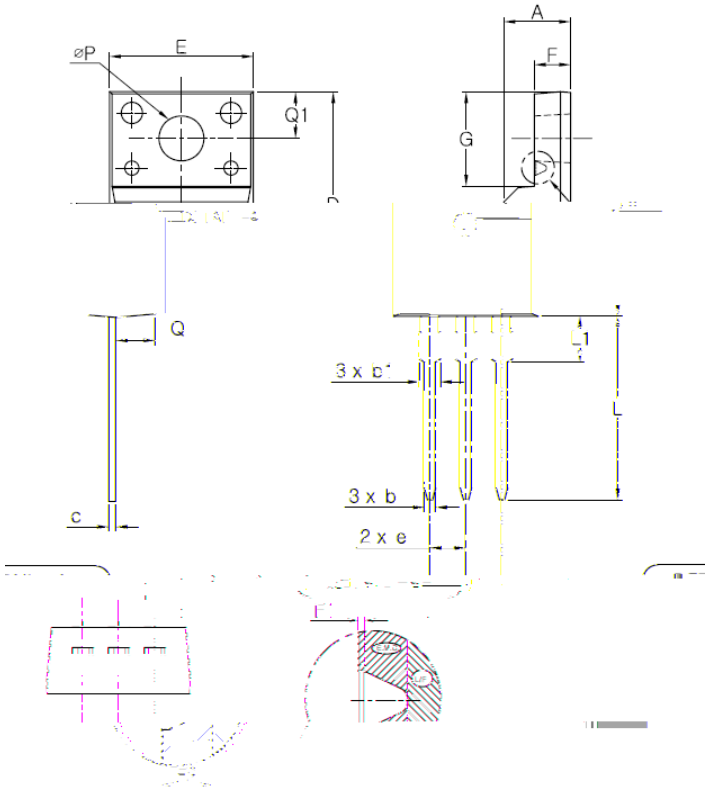


TO-220AB-3L MECHANICAL DATA



SYMBOL	MIN	NOM	MAX
A	4.30	4.50	4.70
A1	1.25	1.30	1.40
A2	2.20	2.40	2.60
b	0.70	0.80	0.90
b1	1.42	1.52	1.62
b2	1.17	1.27	1.37
c	0.45	0.50	0.60
D	15.50	15.70	15.90
D1	9.00	9.20	9.40
D2	13.10	13.30	13.50
E	9.70	9.90	10.10
E1	-	-	8.90
E2		(0.60)	
E3	9.80	10.00	10.20
e		2.54 BSC	
e1		5.08 BSC	
H1	6.30	6.50	6.70
L	12.88	13.08	13.28
L1		(3.00)	
	3.40	3.60	3.80
Q	2.70	2.80	2.90

TO-220F-3L MECHANICAL DATA



SYMBOL	MIN	NOM	MAX
A	4.50	4.70	4.90
b	0.70	0.80	0.90
b1	1.33	1.40	1.47
c	0.45	0.50	0.60
D	15.67	15.87	16.07
E	9.96	10.16	10.36
e		2.54 BSC	
F	2.34	2.54	2.74
F1		(0.10)	
F2		(0.84)	
G	6.48	6.68	6.88
L	12.78	12.98	13.18
L1	3.03	3.23	3.43
Q	2.56	2.76	2.96
Q1	3.10	3.30	3.50
	3.08	3.18	3.28