TMP9N90/TMPF9N90
TMP9N90G/TMPF9N90G

Features

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

V_{DSS} = 990 V @T_{jmax}
I_D = 9A
$R_{DS(ON)}$ = 1.4 Ω(max) @ V_{GS}= 10 V

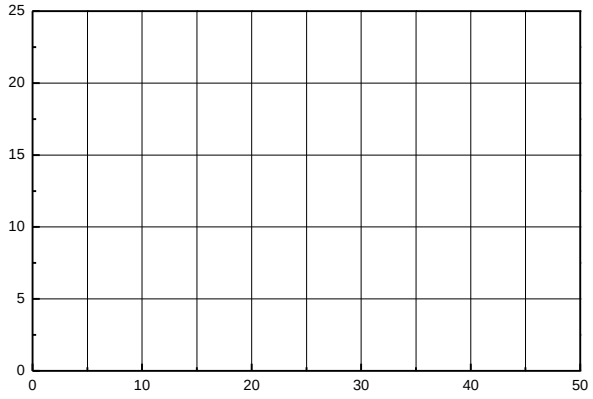
Absolute Maximum Ratings

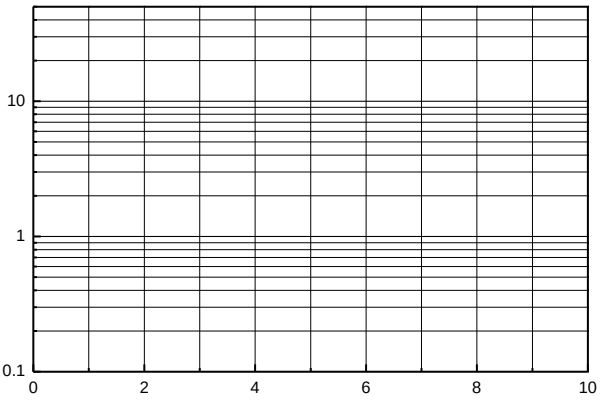
Parameter		Symbol	TMP9N90(G)	TMPF9N90(G)	Unit
Drain-Source Voltage		V_{DSS}	900		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C = 25 ℃	I_D	9	9 *	A
	T_C = 100 ℃		5.7	5.7 *	A
Pulsed Drain Current (Note 1)		I_{DM}	36	36*	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	221		mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	9		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					

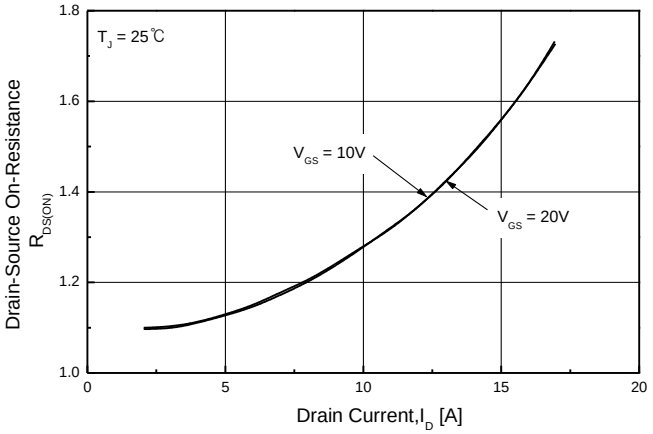
Electrical Characteristics : T_C=25℃, unless otherwise noted

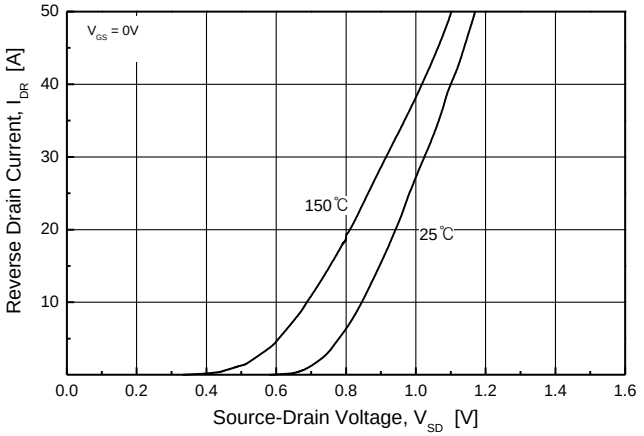
Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	900	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 900 V, V_{GS} = 0 V	--	--	10	µA
		V_{DS} = 720 V, T_C = 125°C	--	--	100	µA
Forward Gate-Source Leakage Current	I_{GSSF}	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 = 4.5 A	--	1.13	1.4	Ω
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 4.5 A	--	10	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V,	--	2324	--	pF
Output Capacitance	C_{oss}	f = 1.0 MHz	--	184	--	pF
Reverse Transfer Capacitance	C_{rss}		--	29	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 450 V, I_D = 9 A,	--	61	--	ns
Turn-On Rise Time (Note 4,5)	t_r	R_G = 25	--	49	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	318	--	ns
Turn-Off Fall Time (Note 4,5)						

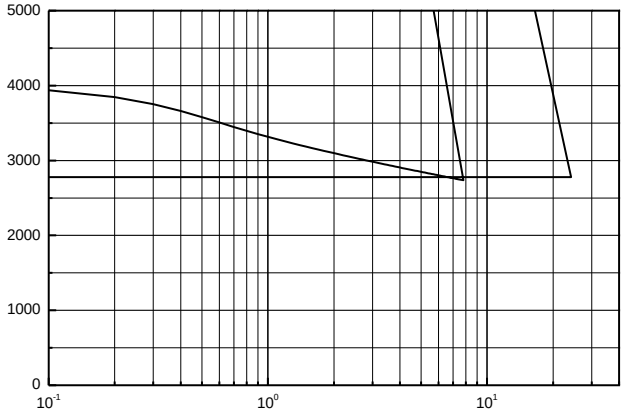
Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=5.16mH, I_{AS} = 9A, V_{DD} = 50V, R_G = 25 , Starting T_J= 25 ℃
3 I_{SD} di/dt µs , V_{DD} $_{DS}$, Starting T_J= 25 ℃
µ
5. Essentially Independent of Operating Temperature Typical Characteristics

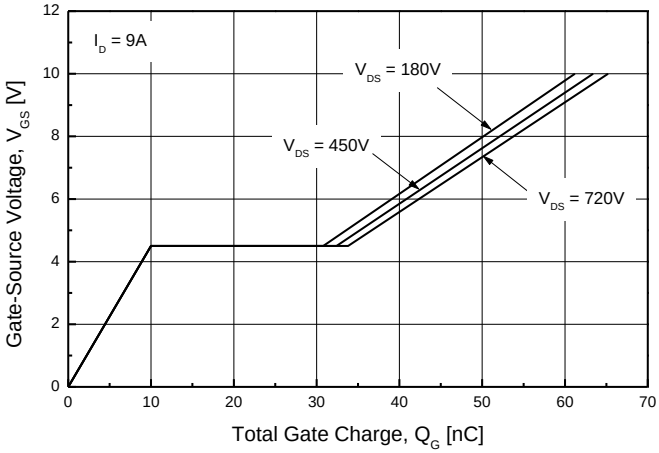

25
20
15
10
5
0
0
10
20
30
40
50

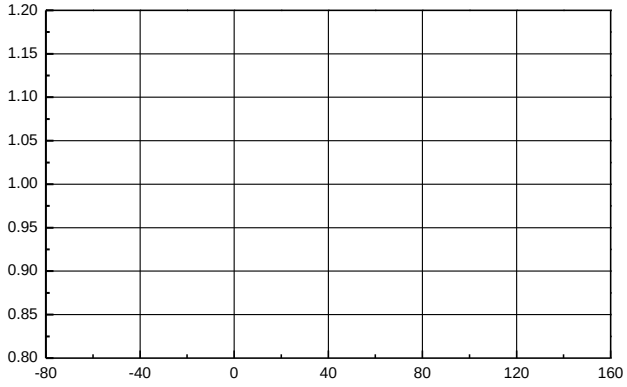

10
1
0.1
0
2
4
6
8
10

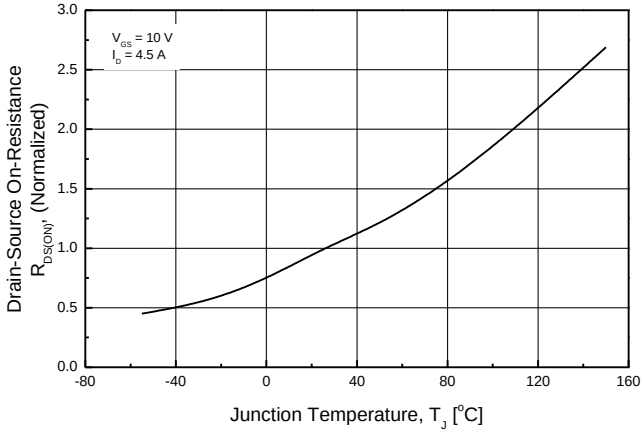

T_J = 25℃
V_GS = 10V
V_GS = 20V
Drain-Source On-Resistance
R_DS(ON)
Drain Current,I_D [A]
1.8
1.6
1.4
1.2
1.0
0
5
10
15
20

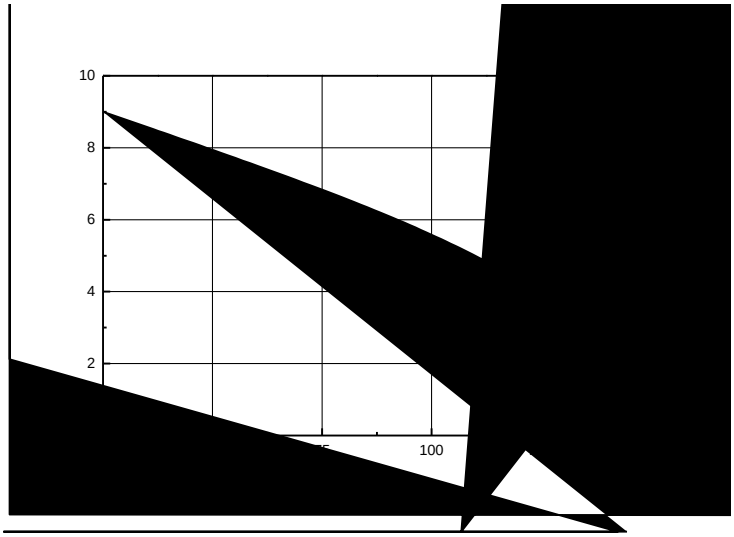

V_GS = 0V
150℃
25℃
Reverse Drain Current, I_DR [A]
Source-Drain Voltage, V_SD [V]
50
40
30
20
10
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6

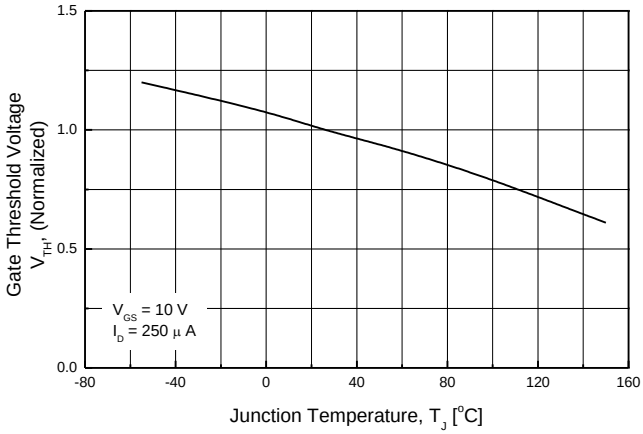

5000
4000
3000
2000
1000
0
10^-1
10^0
10^1


I_D = 9A
V_DS = 180V
V_DS = 450V
V_DS = 720V
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

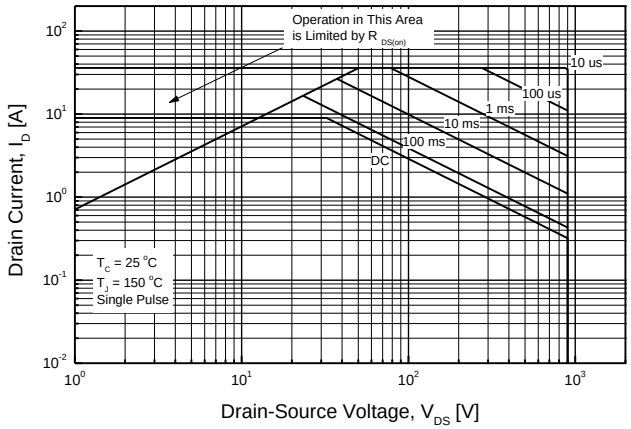








TMP9N90(G)



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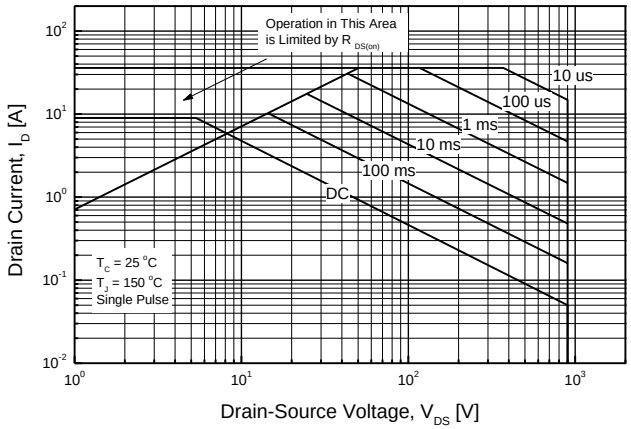

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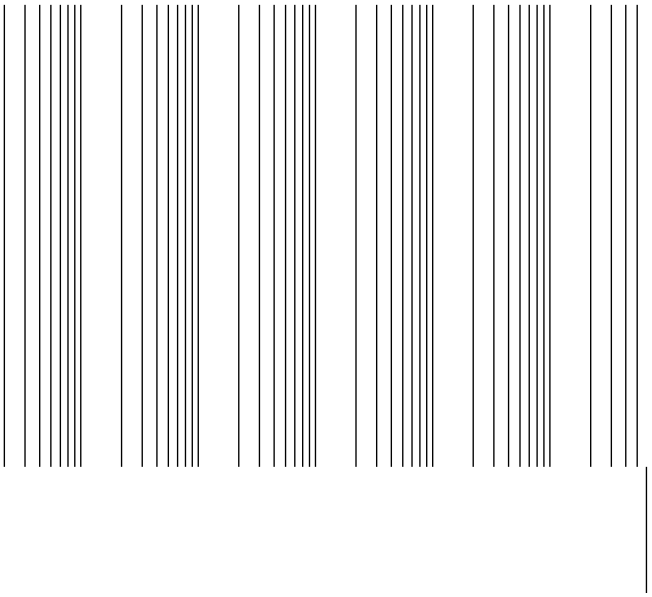

TMPF9N90(G)