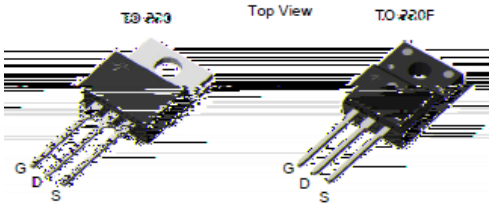
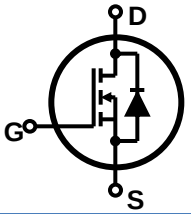
TMP10N60/TMPF10N60
TMP10N60G/TMPF10N60G

Features

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

V_{DSS} = 660 V @T_{jmax}
I_D = 10A
$R_{DS(on)}$ = 0.75 (max) @ V_{GS}= 10 V





Device	Package	Marking	Remark
TMP10N60 / TMPF10N60	TO-220 / TO-220F	TMP10N60 / TMPF10N60	RoHS
TMP10N60G / TMPF10N60G	TO-220 / TO-220F	TMP10N60G / TMPF10N60G	Halogen Free

Absolute Maximum Ratings

Parameter		Symbol	TMP10N60(G)	TMPF10N60(G)	Unit
Drain-Source Voltage		V_{DS}	600		V
Gate-Source Voltage		V_{GS}	±30		V
Continuous Drain Current	T_C = 25 ℃	I_D	10	10*	A
	T_C = 100 ℃		6.5	6.5*	A
Pulsed Drain Current (Note 1)		I_{DM}	40	40*	A
Single Pulse Avalanche Energy (Note 2)		E_{AS}	758		mJ
Repetitive Avalanche Current (Note 1)		I_{AR}	10		A
Repetitive Avalanche Energy (Note 1)		E_{AR}	19.8		mJ
Power Dissipation	T_C = 25 ℃	P_D	198	52	W
	Derate above 25 ℃		1.58	0.41	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		℃

* Limited only by maximum junction temperature

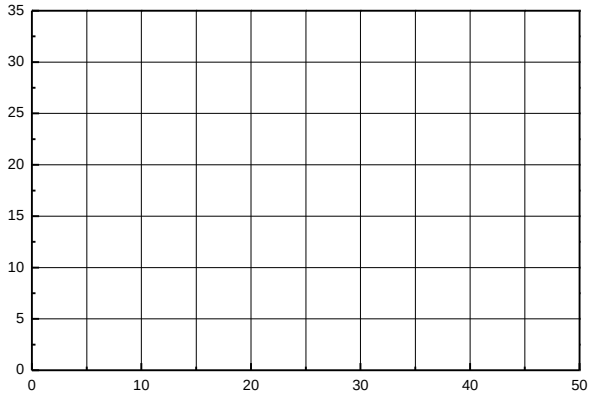
Thermal Characteristics

Parameter	Symbol	TMP10N60(G)	TMPF10N60(G)	Unit
Maximum Thermal resistance, Junction-to-Case	R_{JC}	0.63	2.4	℃/W
Maximum Thermal resistance, Junction-to-Ambient	R_{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	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 = 5 A	--	0.59	0.75	
Forward Transconductance (Note 4)	g_{FS}	V_{DS} = 30 V, I_D = 5 A	--	9	--	S
DYNAMIC						
Input Capacitance	C_{iss}	V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz	--	1891	--	pF
Output Capacitance	C_{oss}		--	160	--	pF
Reverse Transfer Capacitance	C_{rss}		--	5.8	--	pF
SWITCHING						
Turn-On Delay Time (Note 4,5)	$t_{d(on)}$	V_{DD} = 300 V, I_D = 10 A, R_G = 25 Ω	--	55	--	ns
Turn-On Rise Time (Note 4,5)	t_r		--	39	--	ns
Turn-Off Delay Time (Note 4,5)	$t_{d(off)}$		--	156	--	ns
Turn-Off Fall Time (Note 4,5)	t_f		--	53	--	ns
Total Gate Charge (Note 4,5)	Q_g	V_{DS} = 480V, I_D = 10 A, V_{GS} = 10 V	--	36	--	nC
Gate-Source Charge (Note 4,5)	Q_{gs}		--	8.3	--	nC
Gate-Drain Charge (Note 4,5)	Q_{gd}		--	8.3	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I_S	---	--	--	10	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}	---	--	--	40	A
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS} = 0 V, I_S = 10 A	--	--	1.5	V
Reverse Recovery Time (Note 4)	t_{rr}	V_{GS} = 0 V, I_S = 10 A, dI_F / dt = 100 A/µs	--	344	--	ns
Reverse Recovery Charge (Note 4)	Q_{rr}		--	3.6	--	µC

Note :
1. Repeated rating : Pulse width limited by safe operating area
2. L=13.9mH, I_{AS} = 10A, V_{DD} = 50V, R_G = 25Ω, Starting T_J= 25 ℃
3 I_{SD} ≤ 10A, 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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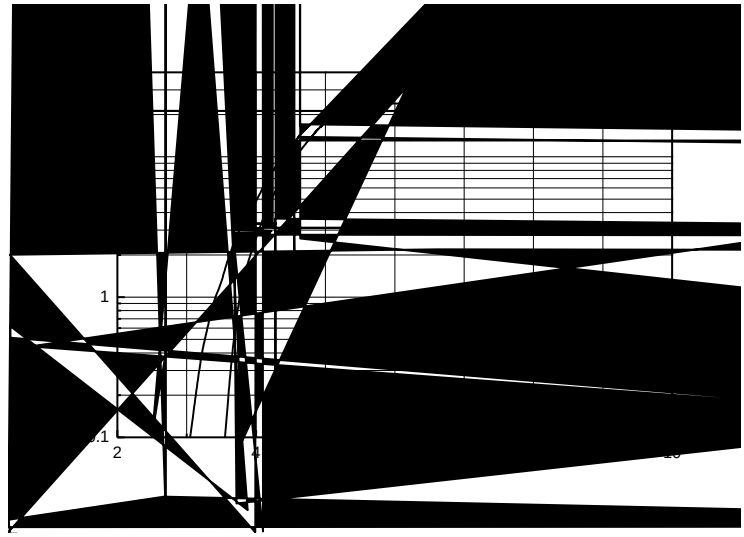
10
20
30
40
50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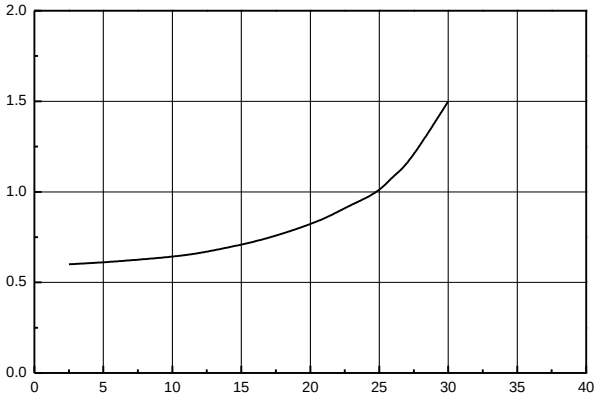
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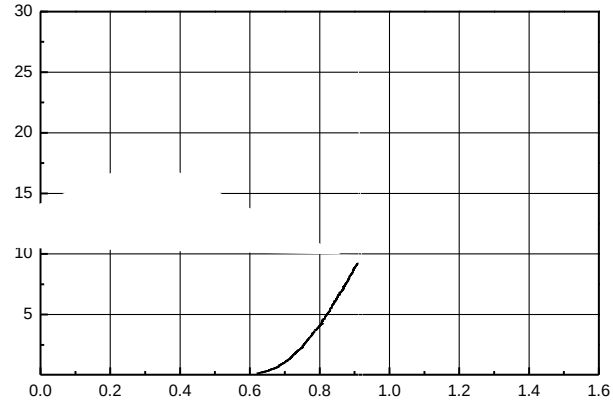
5
10
15
20
25
30
35
40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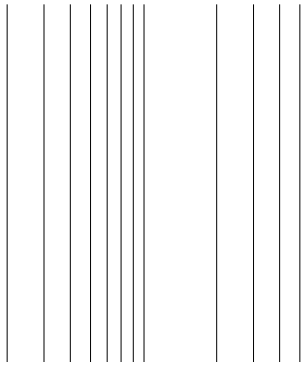
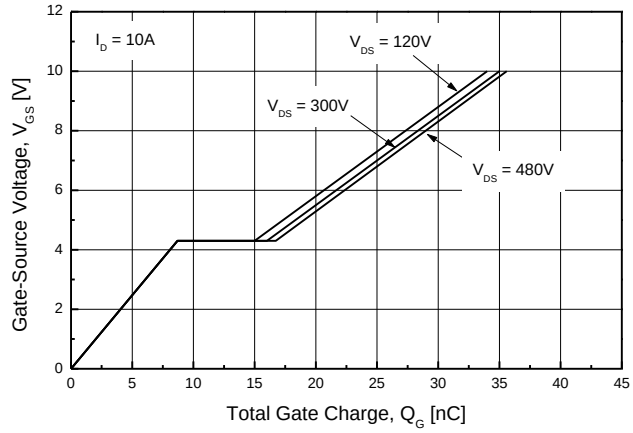
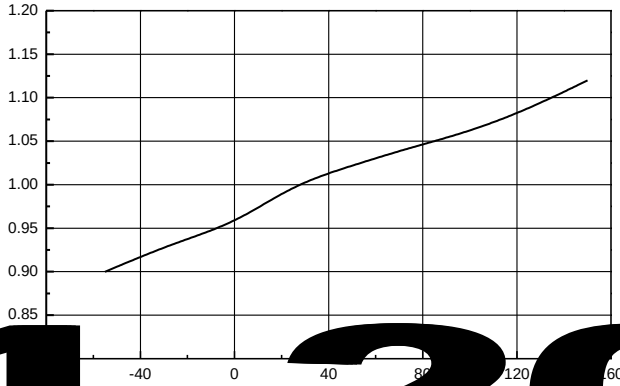
0.4
0.6
0.8
1.0
1.2
1.4
1.6




I_D = 10A
V_DS = 120V
V_DS = 300V
V_DS = 480V
Gate-Source Voltage, V_GS [V]
Total Gate Charge, Q_G [nC]
12
10
8
6
4
2
0
0
5
10
15
20
25
30
35
40
45



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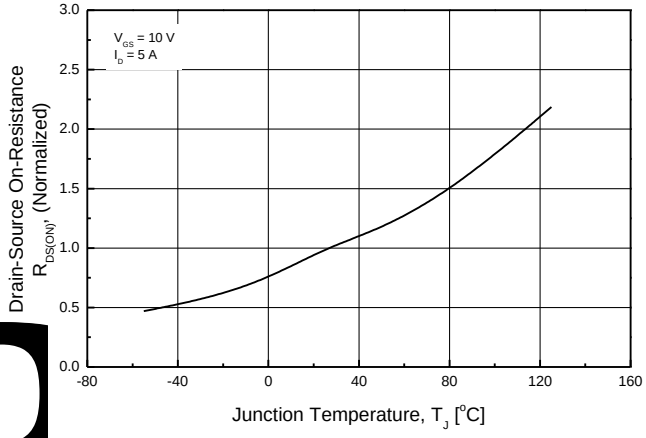
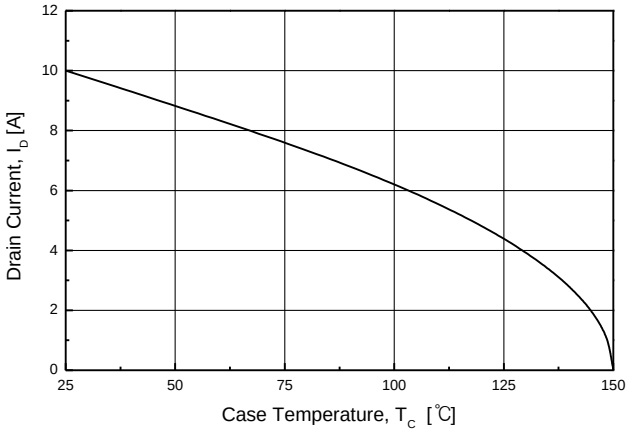
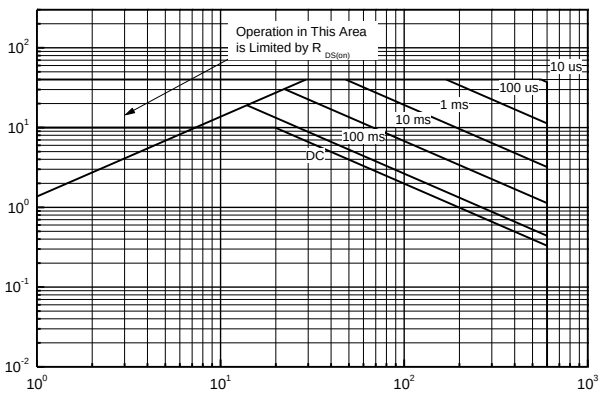




TMP10N60(G)



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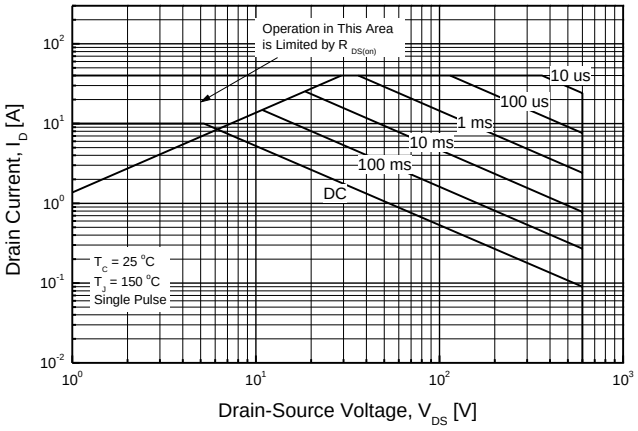

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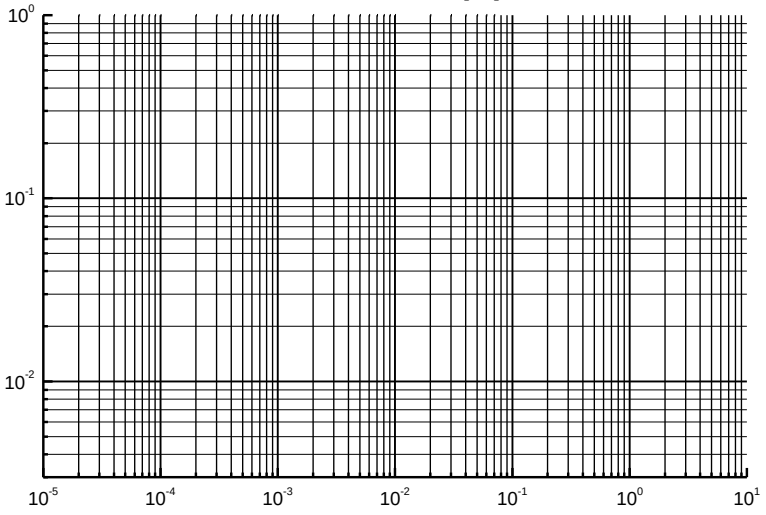

TMPF10N60(G)