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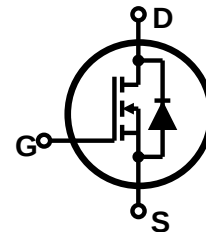
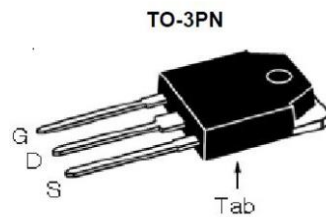
GP1M023A050N

N-channel MOSFET

Features

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

BV_{DSS}	I_D	$R_{DS(on)MAX}$
500V	23A	<0.22Ω



Device	Package	Marking	Remark
GP1M023A050N	TO-3PN	GP1M023A050N	RoHS

Absolute Maximum Ratings

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V _{DS}	500	V
Gate-Source Voltage		V _{GS}	±30	V
Continuous Drain Current	T _C = 25 °C	I _D	23	A
	T _C = 100 °C		14.5	A
Pulsed Drain Current ^(Note 1)		I _{DM}	92	A
Single Pulse Avalanche Energy ^(Note 2)		E _{AS}	970	mJ
Repetitive Avalanche Current ^(Note 1)		I _{AR}	23	A
Repetitive Avalanche Energy ^(Note 1)		E _{AR}	34.7	mJ
Power Dissipation	T _C = 25 °C	P _D	347	W
	Derate above 25 °C		2.77	W/°C
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	°C
Maximum lead temperature for soldering purposes, 1/8" from case for 5 seconds		T _L	300	°C

* Limited only by maximum junction temperature

Thermal Characteristics

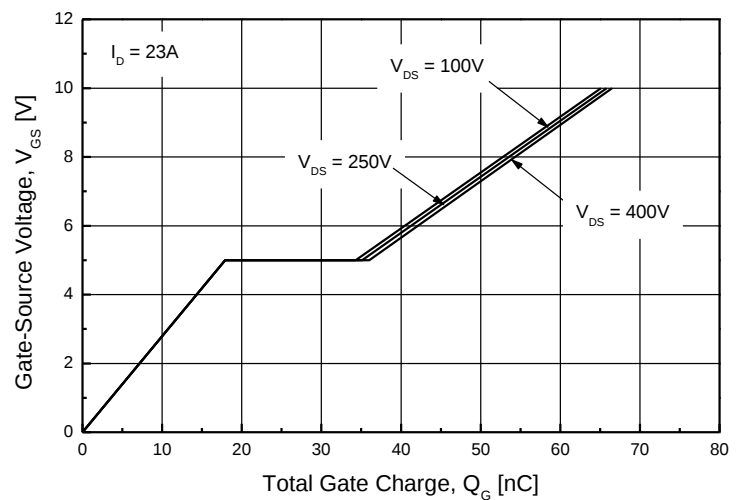
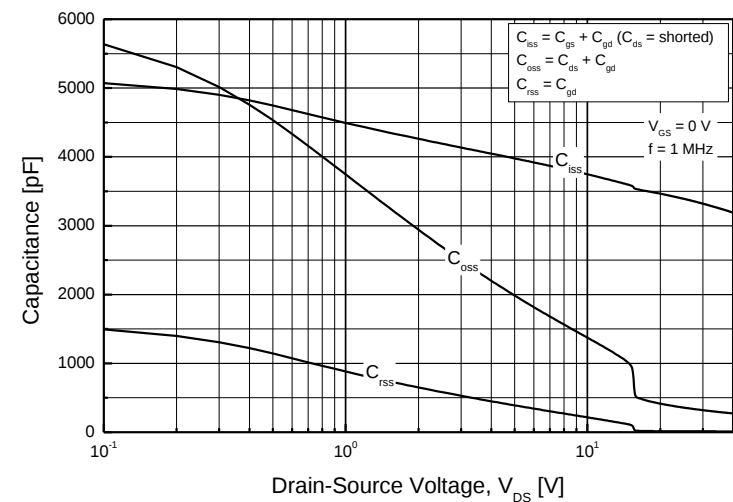
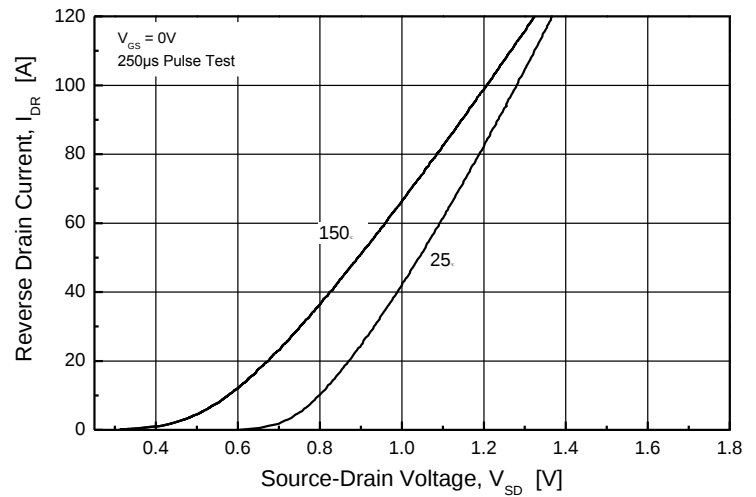
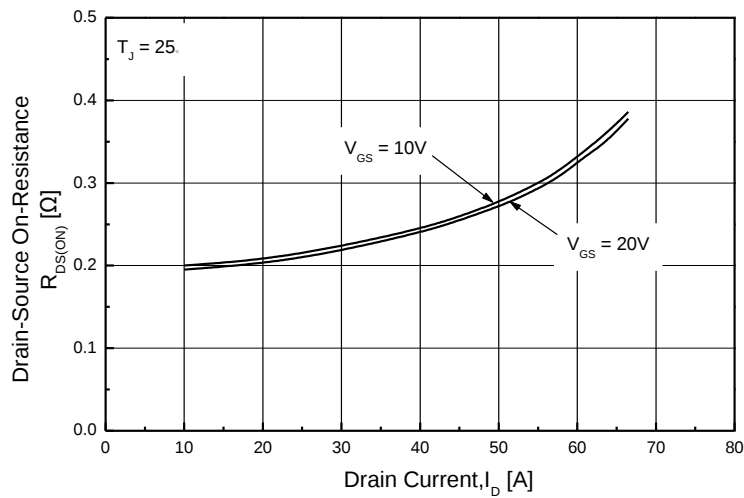
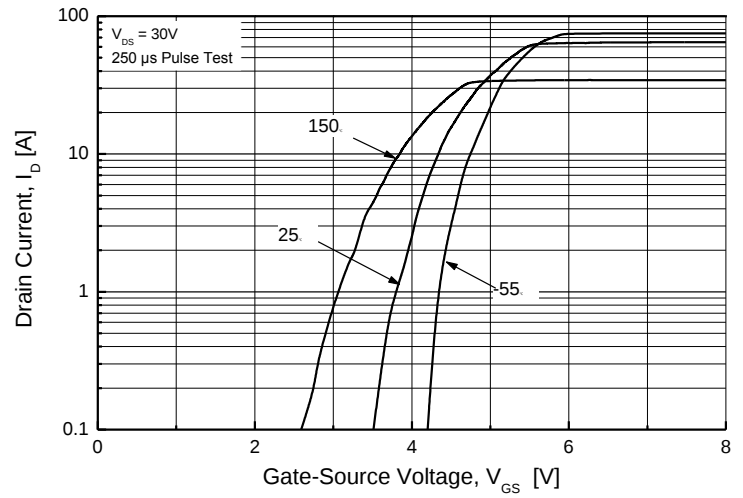
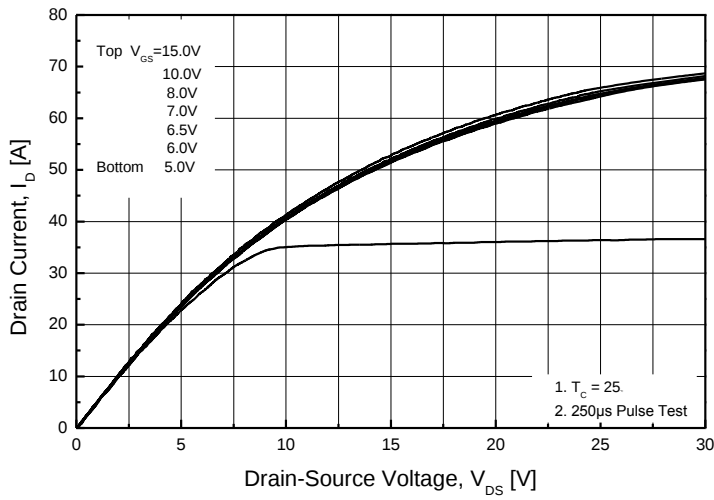
Parameter	Symbol	Value	Unit
Maximum Thermal resistance, Junction-to-Case	$R_{\theta JC}$	0.36	°C/W
Maximum Thermal resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W

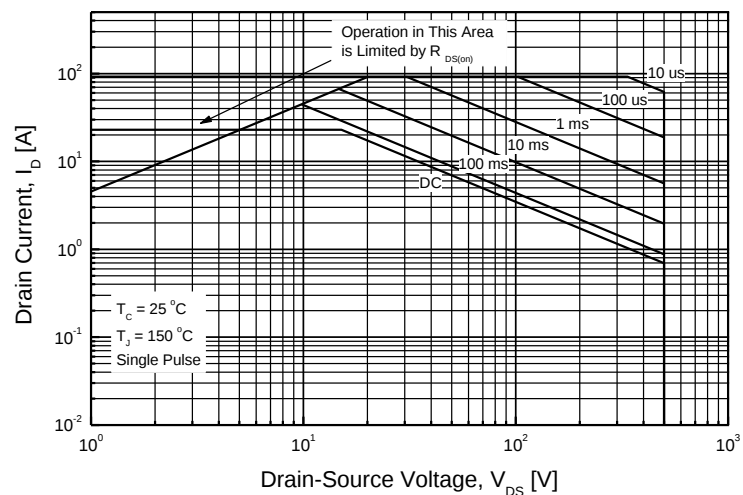
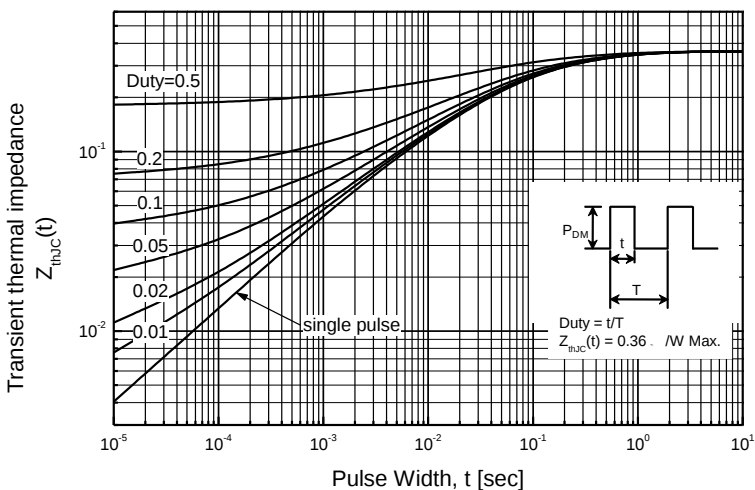
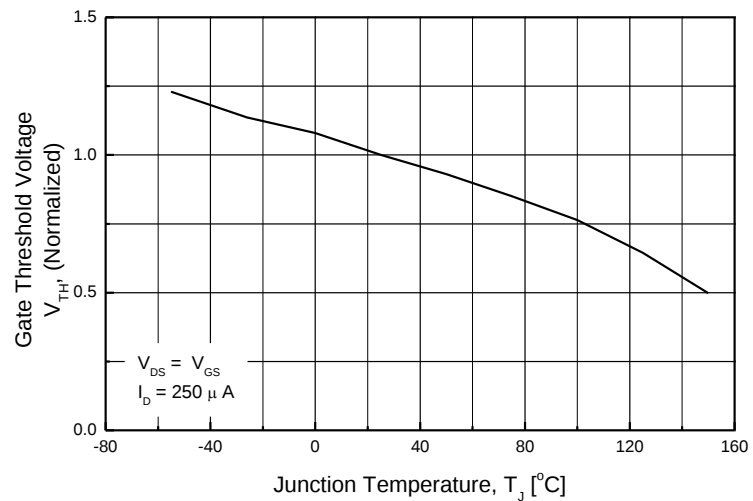
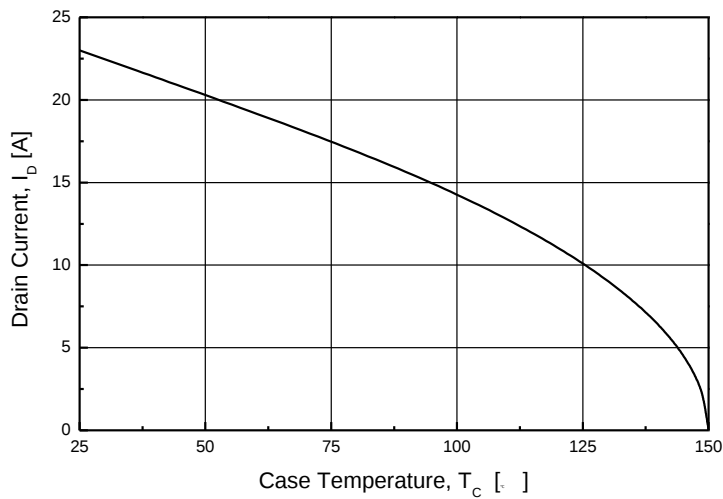
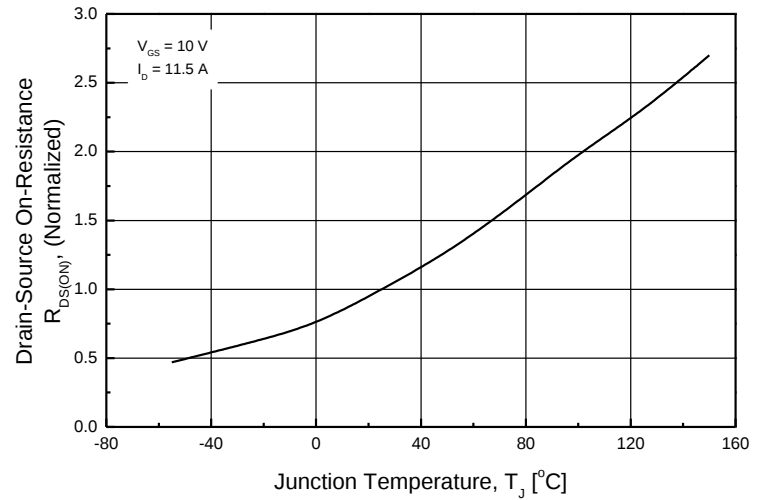
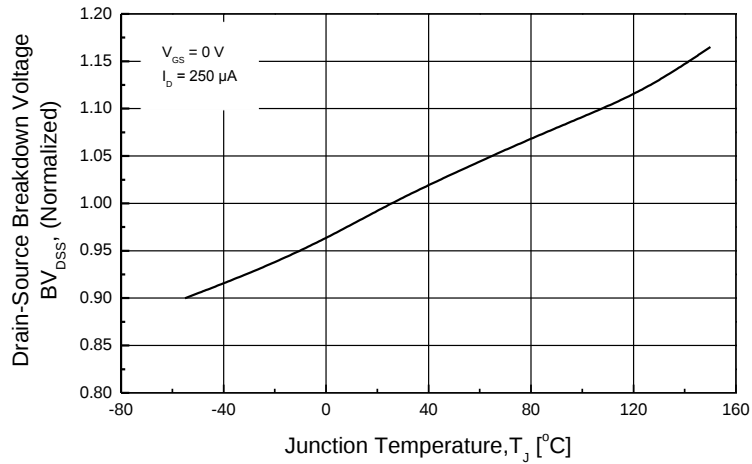
Electrical Characteristics : $T_C=25^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Test condition	Min	Typ	Max	Units
OFF						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0 V, I _D = 250 μA	500	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 500 V, V _{GS} = 0 V	--	--	1	μA
		V _{DS} = 400 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 = 11.5 A	--	0.185	0.22	Ω
Forward Transconductance ^(Note 4)	g _{FS}	V _{DS} = 30 V, I _D = 11.5 A	--	28	--	S
DYNAMIC						
Input Capacitance	C _{iss}	V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz	--	3391	--	pF
Output Capacitance	C _{oss}		--	357	--	pF
Reverse Transfer Capacitance	C _{rss}		--	14	--	pF
SWITCHING						
Turn-On Delay Time ^(Note 4,5)	t _{d(on)}	V _{DD} = 250 V, I _D = 23 A, R _G = 25 Ω	--	78	--	ns
Turn-On Rise Time ^(Note 4,5)	t _r		--	64	--	ns
Turn-Off Delay Time ^(Note 4,5)	t _{d(off)}		--	335	--	ns
Turn-Off Fall Time ^(Note 4,5)	t _f		--	58	--	ns
Total Gate Charge ^(Note 4,5)	Q _g	V _{DS} = 400V, I _D = 23 A, V _{GS} = 10 V	--	66	--	nC
Gate-Source Charge ^(Note 4,5)	Q _{gs}		--	20	--	nC
Gate-Drain Charge ^(Note 4,5)	Q _{gd}		--	17	--	nC
SOURCE DRAIN DIODE						
Maximum Continuous Drain-Source Diode Forward Current	I _S	---	--	--	23	A
Maximum Pulsed Drain-Source Diode Forward Current	I _{SM}	---	--	--	92	A
Drain-Source Diode Forward Voltage	V _{SD}	V _{GS} = 0 V, I _S = 23 A	--	--	1.5	V
Reverse Recovery Time ^(Note 4)	t _{rr}	V _{GS} = 0 V, I _S = 23 A	--	417	--	ns
Reverse Recovery Charge ^(Note 4)	Q _{rr}	dl _F / dt = 100 A/μs	--	5.5	--	μC

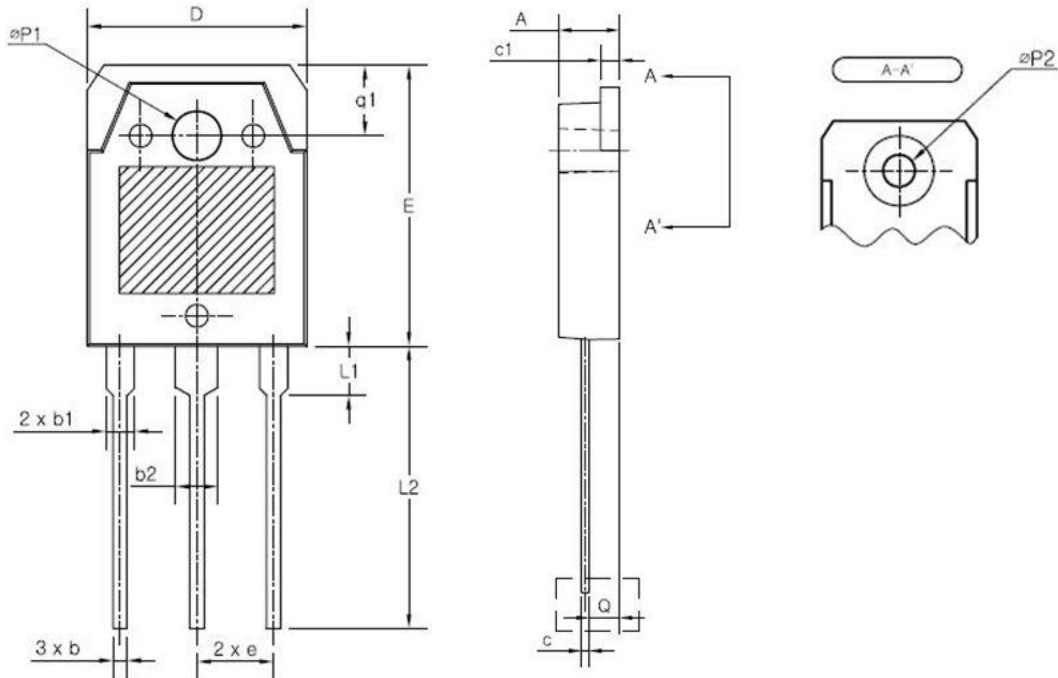
Note :

1. Repeated rating : Pulse width limited by safe operating area
2. $L=3.3\text{ mH}, I_{AS} = 23\text{ A}, V_{DD} = 50\text{ V}, R_G = 25\text{ }\Omega$, Starting $T_J = 25^{\circ}\text{C}$, , not subject to production test – verified by design/characterization
3. $I_{SD} \leq 23\text{ A}, di/dt \leq 200\text{ A}/\mu\text{s}, V_{DD} \leq BV_{DS}$, Starting $T_J = 25^{\circ}\text{C}$
4. Pulse Test :Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
5. Essentially Independent of Operating Temperature Typical Characteristics





TO-3PN MECHANICAL DATA



SYMBOL	MIN	NOM	MAX
A	4.60	4.80	5.00
b	0.80	1.00	1.20
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.55	0.60	0.75
c1	1.45	1.50	1.65
D	15.40	15.60	15.80
E	19.70	19.90	20.10
e	5.15	5.45	5.75
L1	3.30	3.50	3.70
L2	19.80	20.00	20.20
P1	3.30	3.40	3.50
P2	(3.20)		
Q	2.20	2.40	2.60
q1	4.80	5.00	5.20

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