GP18S50

POWER FIELD EFFECT TRANSISTOR

GENERAL DESCRIPTION

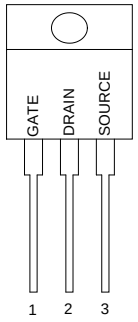
This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters, power motor controls and bridge circuits.

FEATURES

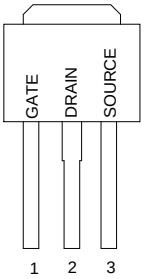
- SJ MOS
- Higher Current Rating
- Lower Rds(on)
- Lower Capacitances
- Lower Total Gate Charge

PIN CONFIGURATION

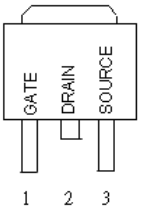
TO-220/TO-220FP
Top View



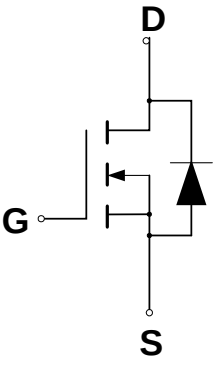
TO-251
Front View



TO-252
Front View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	I_D	18	A
— Pulsed	I_{DM}	54	
Gate-to-Source Voltage — Continue	V_{GS}	±20	V
Total Power Dissipation TO251/TO252	P_D	27	W
TO-220		125	
TO-220FP		31	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Single Pulse Drain-to-Source Avalanche Energy — T_J = 25℃ (V_{DD} = 100V, V_{GS} = 10V, I_L = 5A, L = 10mH, R_G = 25Ω)	E_{AS}	125	mJ
Thermal Resistance — Junction to Case TO251/TO252	θ_{JC}	4.6	℃/W
TO-220		1	
TO220FP		4	
— Junction to Ambient TO251/TO252	θ_{JA}	85	
TO-220		62.5	
TO-220FP		40	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	℃

ORDERING INFORMATION

Part Number	TOP MARK	Part Number	Packing Mthod	Note
GP18S50XN251 (Note1)	GP18S50X	TO-251	Tube	
GP18S50XN252 (Note1)	GP18S50X	TO-252	Tube	
GP18S50XN252TR (Note1)	GP18S50X	TO-252	Tape and Reel	
GP18S50XN220 (Note1)	GP18S50X	TO-220	Tube	
GP18S50XN220FP (Notte1)	GP18S50X	TO-220FP	Tube	
GP18S50GN251 (Note2)	GP18S50G	TO-251	Tube	
GP18S50GN252 (Note2)	GP18S50G	TO-252	Tube	
GP18S50GN252TR (Note2)	GP18S50X	TO-252	Tape and Reel	
GP18S50GN220 (Note2)	GP18S50G	TO-220	Tube	
GP18S50GN220FP (Notte2)	GP18S50G	TO-220FP	Tube	

Note1: X : Suffix for Halogen Free and PB Free Product

Note2: G : Suffix for PB Free Product

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

			GP18S50			
Characteristic		**Symbol**	**Min**	**Typ**	**Max**	**Units**
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	500			V
Drain-Source Leakage Current (V_{DS} =500 V, V_{GS} = 0 V)		I_{DSS}			1	uA
Gate-Source Leakage Current-Forward (V_{gsf} = 20 V, V_{DS} = 0 V)		I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V_{gsr} = - 20 V, V_{DS} = 0 V)		I_{GSSR}			100	nA
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2	3	4	V
Static Drain-Source On-Resistance (V_{GS} = 10 V, I_D = 6.2A) *		$R_{DS(on)}$			0.19	Ω
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		1035		pF
Output Capacitance		C_{oss}		1283		pF
Reverse Transfer Capacitance		C_{rss}		12		pF
Turn-On Delay Time	(V_{DD} = 250 V, I_D = 6.2 A, V_{GS} = 10 V, R_G = 9.1Ω) *	$t_{d(on)}$		14.6		ns
Rise Time		t_r		43.2		ns
Turn-Off Delay Time		$t_{d(off)}$		64.6		ns
Fall Time		t_f		24		ns
Total Gate Charge	(V_{DS} = 400 V, I_D = 6.2 A, V_{GS} = 10 V)*	Q_g		25.75		nC
Gate-Source Charge		Q_{gs}		6.76		nC
Gate-Drain Charge		Q_{gd}		9.38		nC
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I_S = 6.2 A, dI_S/dt = 100A/μs)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		261.533		ns

* Pulse Test: Pulse Width ≦300μs, Duty Cycle ≦2%

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

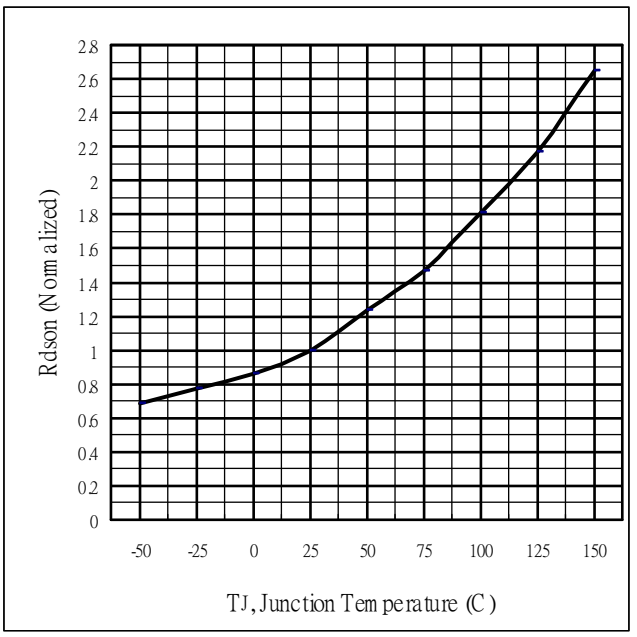


Fig 1. On-Resistance Variation with vs. Temperature

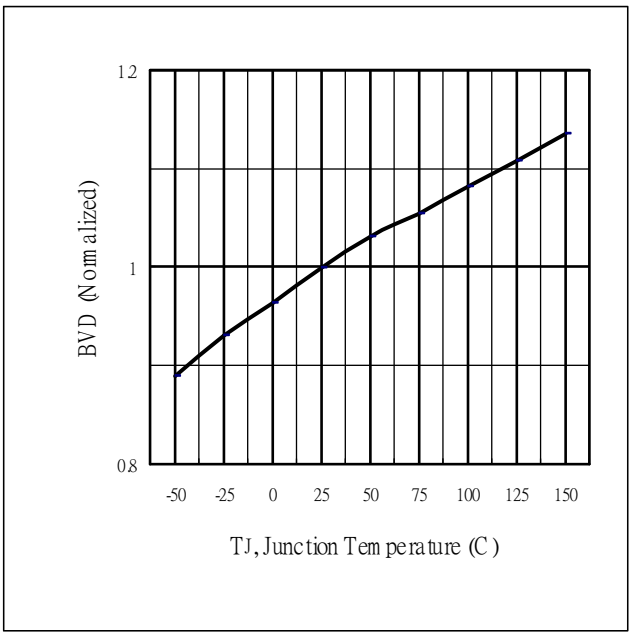


Fig.2 Breakdown Voltage Variation vs. Temperature

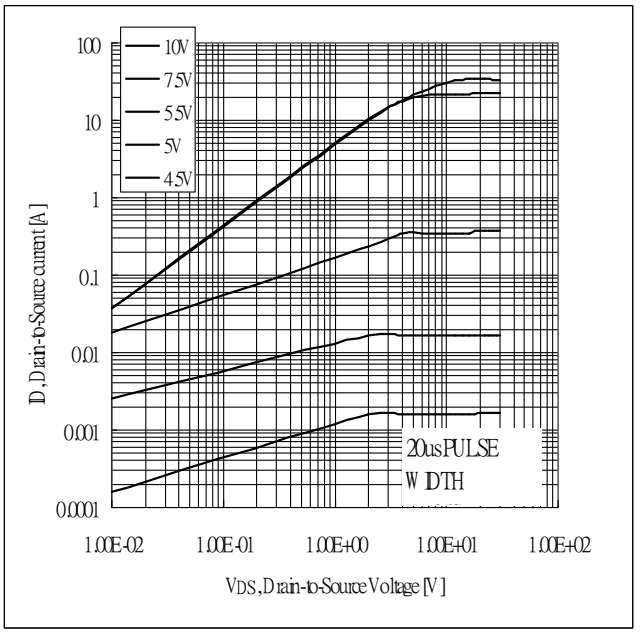


Fig 3. Typical Output Characteristics

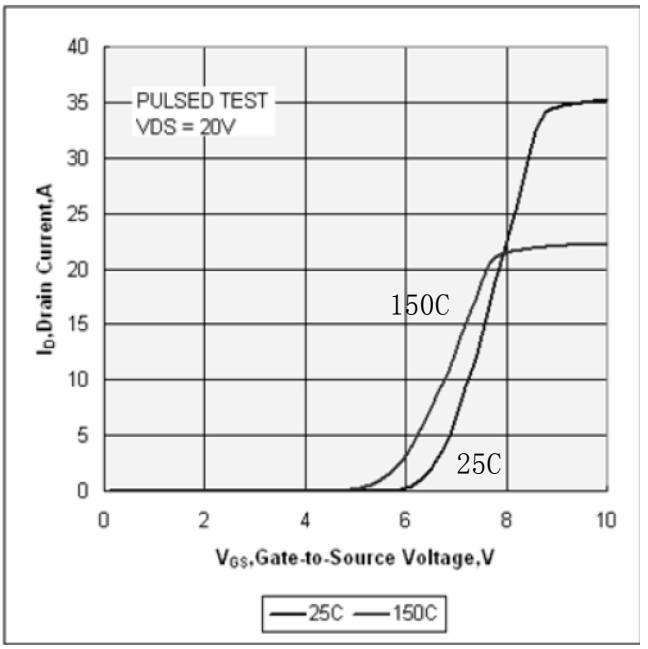


Fig 4. Typical Transfer Characteristics

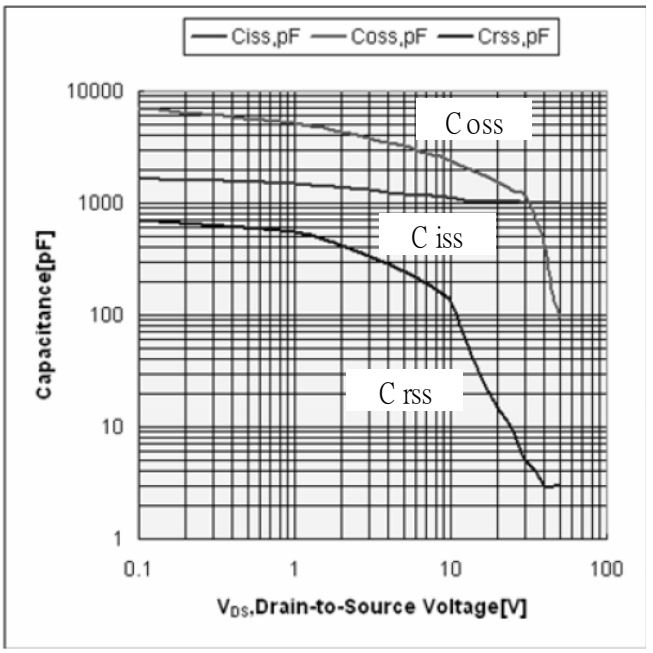


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

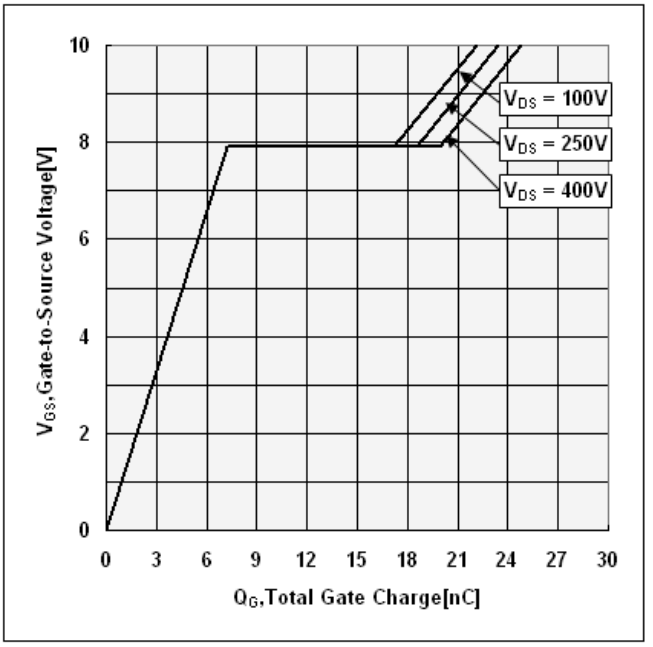
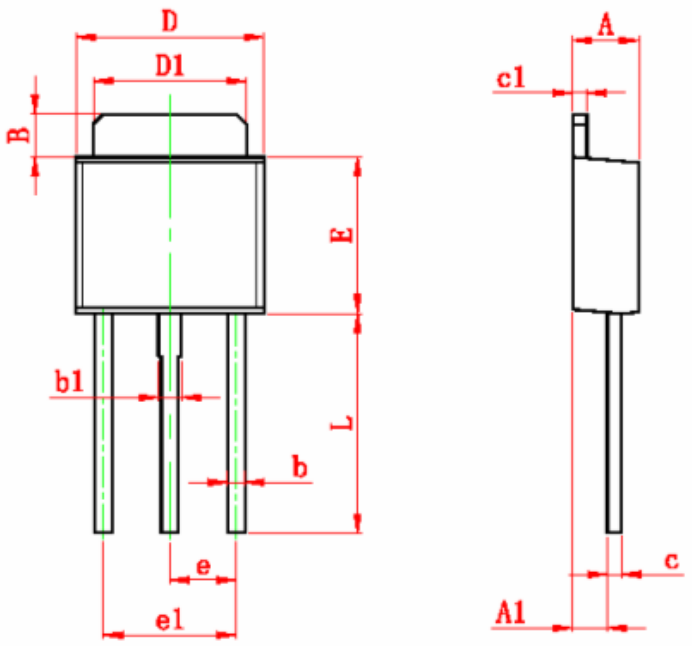


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

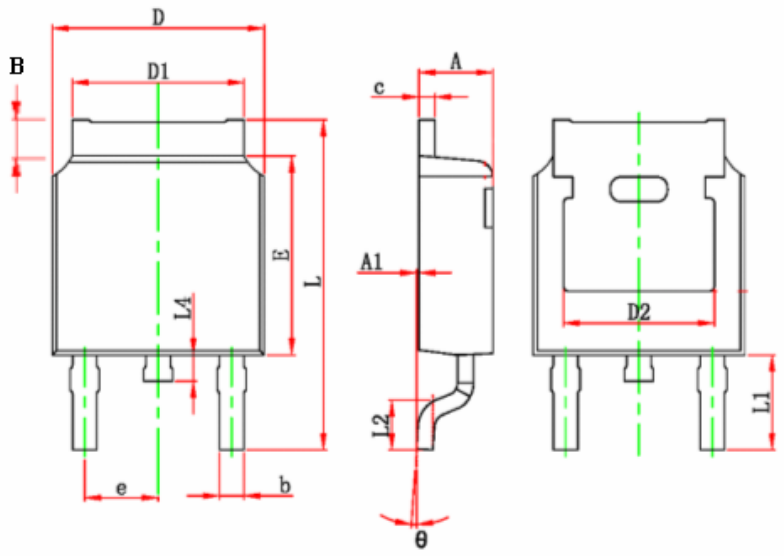
PACKAGE DIMENSION

TO-251



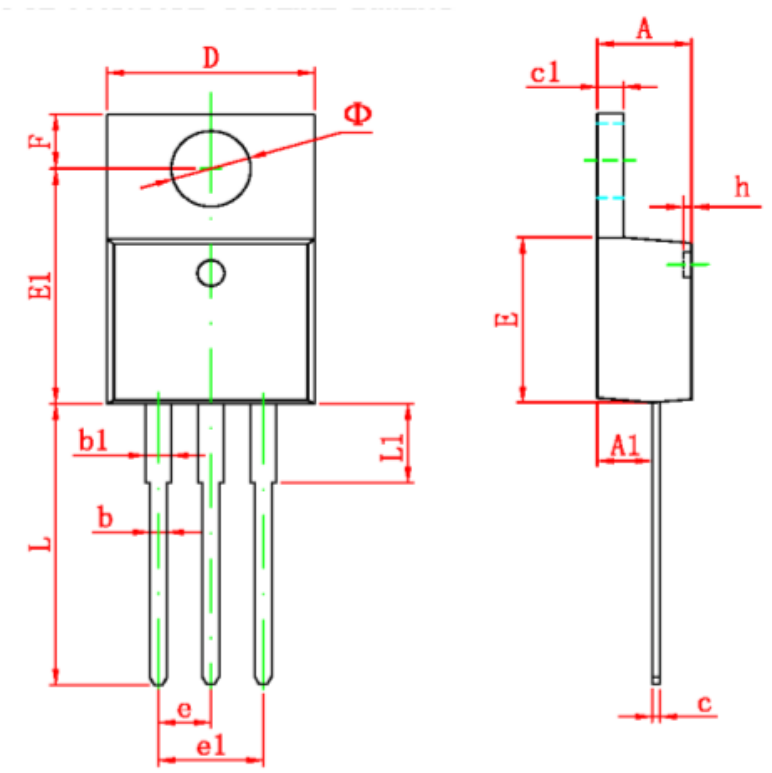
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.75
b1	0.65	0.95
c	0.40	0.60
c1	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
E	5.40	6.30
e	2.3 TYP.	
e1	4.40	4.80
L	7.40	8.00

TO-252



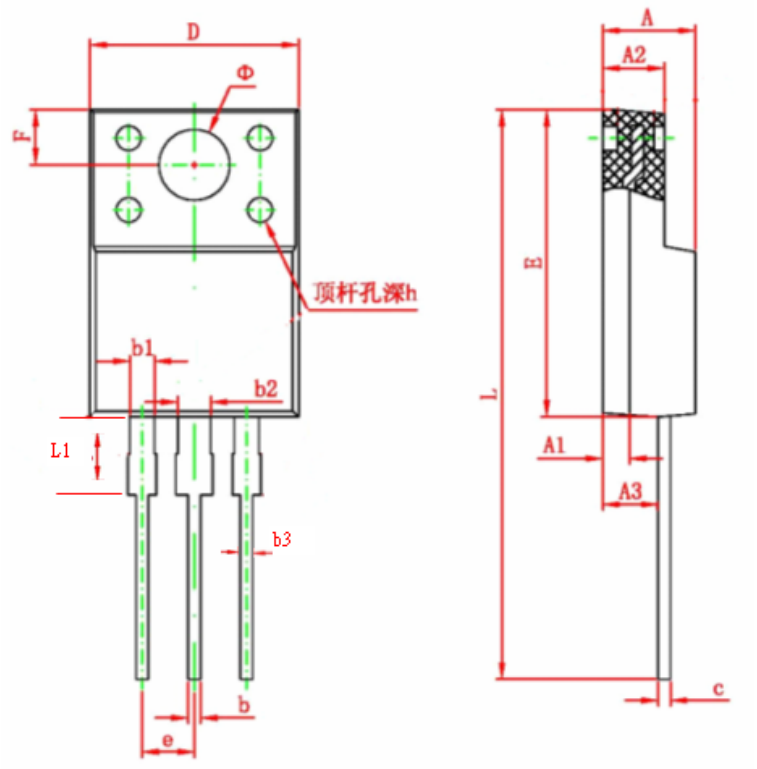
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.90
c	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
D2	4.83 TYP.	
E	5.90	6.30
e	2.3 TYP.	
L	9.30	10.50
L2	1.20	1.80
L4	0.60	1.00
θ	0.00	10.00

TO-220



Symbol	Dimensions In Millimeters	
	Min.	Max
A	4.40	4.80
A1	2.10	2.84
b	0.71	0.91
b1	1.17	1.37
c	0.30	0.60
c1	1.17	1.47
D	9.40	10.60
E	8.40	9.60
e	2.54 TYP.	
e1	4.90	5.60
F	3.00 REF.	
Φ	3.50 REF.	
h	0.00	0.30
L	12.50	14.00
L1	3.50	4.00

TO-220FP



Symbol	Dimensions In Millimeters	
	Min.	Max
A	3.80	4.70
A1	1.3 REF.	
A2	2.20	3.20
A3	2.10	3.20
b	0.30	0.95
b1	1.00	1.75
b2	1.00	1.75
b3	0.50	0.80
c	0.30	0.90
D	9.90	10.40
E	14.60	16.20
e	2.54 TYP.	
F	3.00 REF.	
Φ	3.50 REF.	
h	0.00	0.30
L	28.00	30.00
L1	3.20	3.55

IMPORTANT NOTICE

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