GENERAL DESCRIPTION

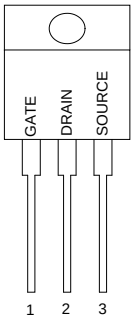
This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters,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

FEATURES

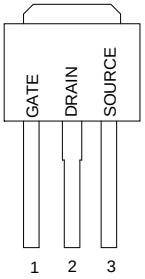
- Higher Current Rating
- Lower Rds(on)
- Lower Capacitances
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

PIN CONFIGURATION

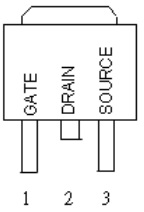
TO-220/TO-220FP
Top View



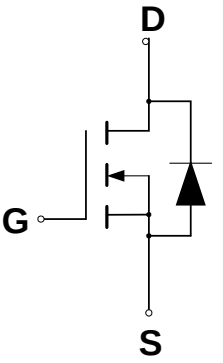
TO-251
Front View



TO-252
Front View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	I_D	4.7	A
— Pulsed	I_{DM}	14.1	
Gate-to-Source Voltage — Continue	V_{GS}	±30	V
Total Power Dissipation TO-251,252	P_D	51	W
TO-220		104	
TO-220FP		32	
Derate above 25℃ TO-251, 252		0.43	W/℃
TO-220		1.18	
TO-220FP		0.28	
Operating 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 = 4A, L = 10mH, R_G = 25Ω)	E_{AS}	80	mJ
Thermal Resistance — Junction to Case TO-251, 252	θ_{JC}	2.2	℃/W
TO-220		1.1	
TO220FP		3.2	
— Junction to Ambient TO-251,252	θ_{JA}	120	
TO-220, TO-220FP		62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	℃
ESD SENSITIVITY — HBM, C=100pF, R=1.5kΩ	Vesd	2000	V

ORDERING INFORMATION

Part Number	Package
GPT05N70GN220*	TO-220
GPT05N70GN220FP*	TO-220 Full Package
GPT05N70GN251*	TO-251
GPT05N70GN252*	TO-252

***Note:** G : Suffix for Pb Free Product

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, T_J = 25℃.

			GPT05N70			
Characteristic		**Symbol**	**Min**	**Typ**	**Max**	**Units**
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	700			V
Drain-Source Leakage Current (V_{DS} =700 V, V_{GS} = 0 V)		I_{DSS}			1	uA
Gate-Source Leakage Current-Forward (V_{gsf} = 30 V, V_{DS} = 0 V)		I_{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V_{gsr} = - 30 V, V_{DS} = 0 V)		I_{GSSR}			100	nA
Gate Threshold Voltage (V_{DS} = V_{GS}, I_D = 250 μA)		$V_{GS(th)}$	2.5	3.5	4.5	V
Static Drain-Source On-Resistance (V_{GS} = 10 V, I_D = 2.5A) *		$R_{DS(on)}$		1.8	2.1	Ω
Forward Transconductance (V_{DS} = 15 V, I_D = 2.5 A) *		g_{FS}		4		S
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		951.7		pF
Output Capacitance		C_{oss}		72.7		pF
Reverse Transfer Capacitance		C_{rss}		3.85		pF
Turn-On Delay Time	(V_{DD} = 350 V, I_D = 5.0 A, V_{GS} = 10 V, R_G = 9.1Ω) *	$t_{d(on)}$		19.1		ns
Rise Time		t_r		17.9		ns
Turn-Off Delay Time		$t_{d(off)}$		32.5		ns
Fall Time		t_f		23.6		ns
Total Gate Charge	(V_{DS} = 560 V, I_D = 5.0 A, V_{GS} = 10 V)*	Q_g		19.9		nC
Gate-Source Charge		Q_{gs}		4.85		nC
Gate-Drain Charge		Q_{gd}		8.32		nC
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I_S = 5.0 A, d_{IS}/d_t = 100A/μs)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		275		ns

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

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

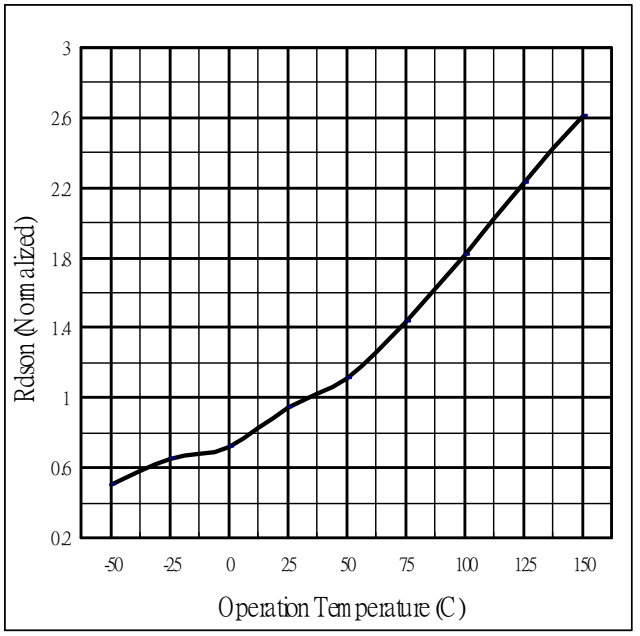


Fig 1. On-Resistance Variation with vs. Temperature

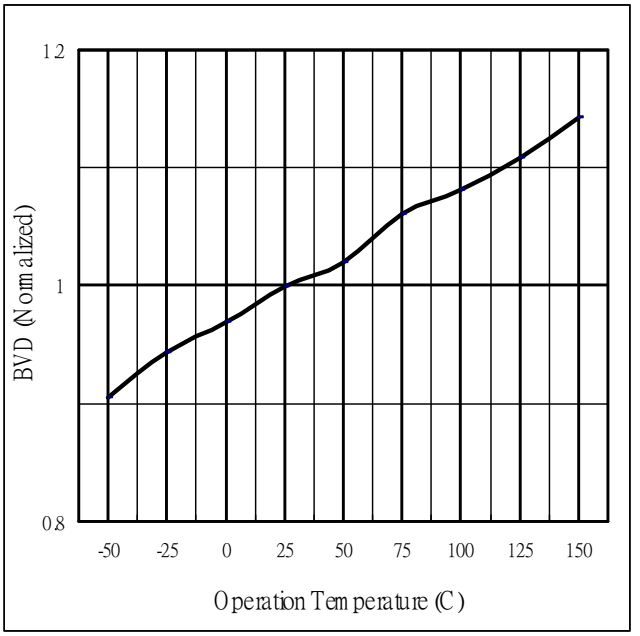


Fig.2 Breakdown Voltage Variation vs. Temperature

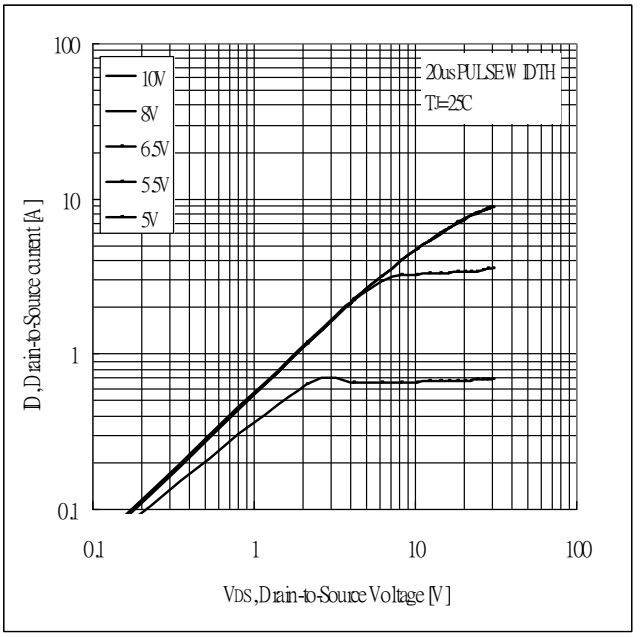


Fig 3. Typical Output Characteristics

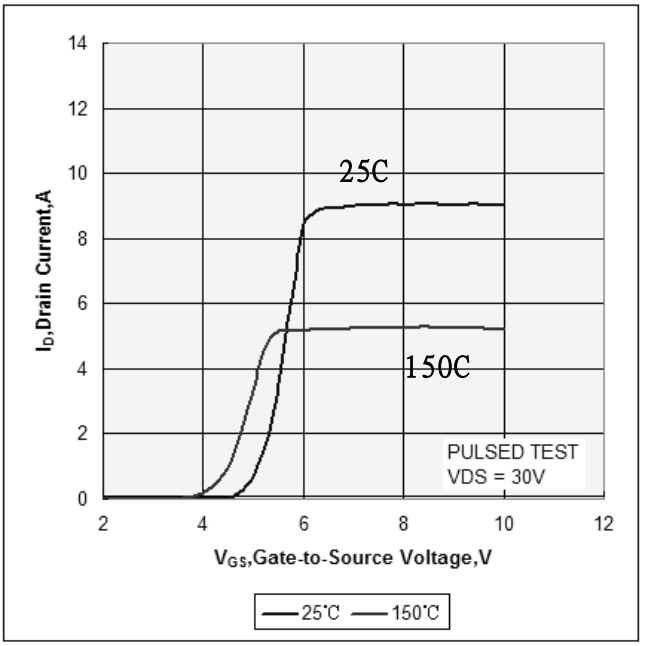


Fig 4. Typical Transfer Characteristics

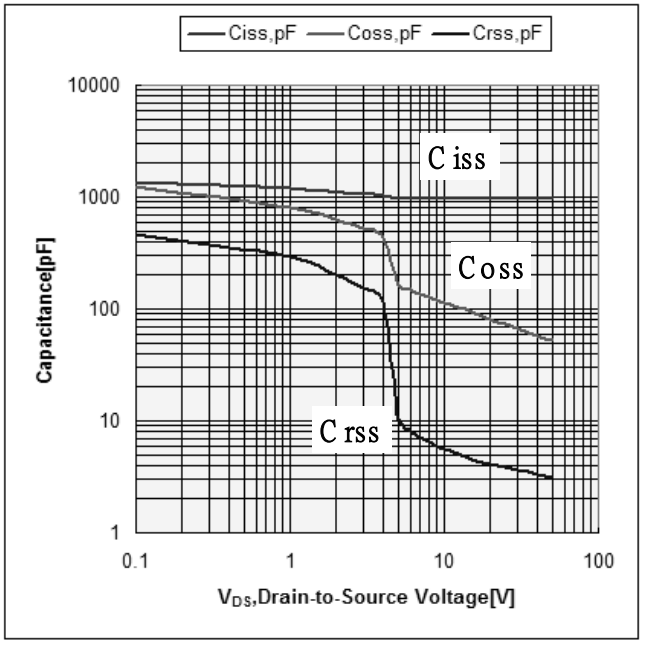


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

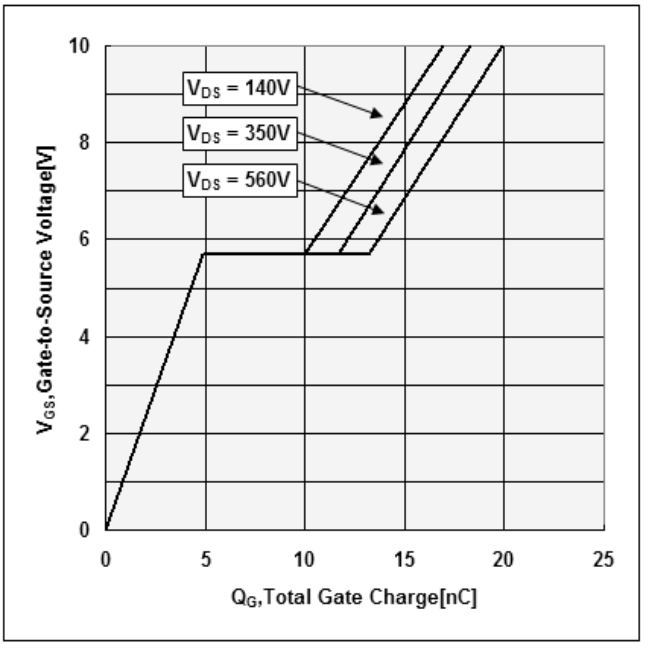
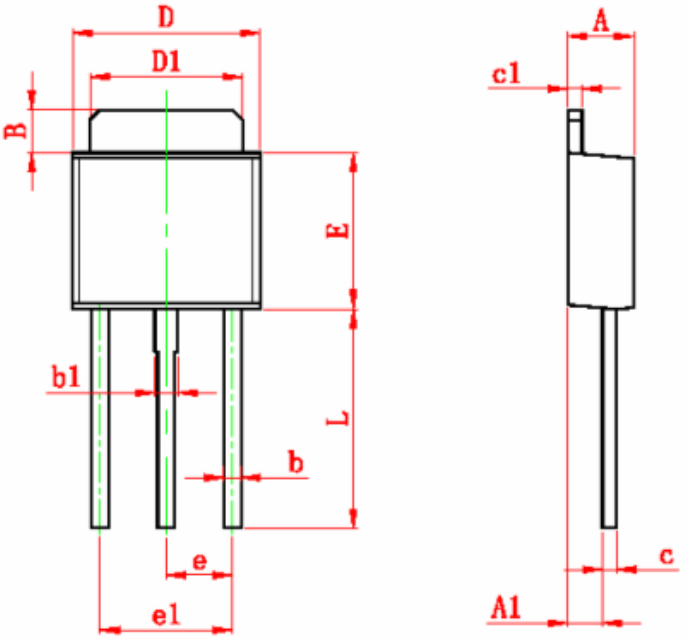


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

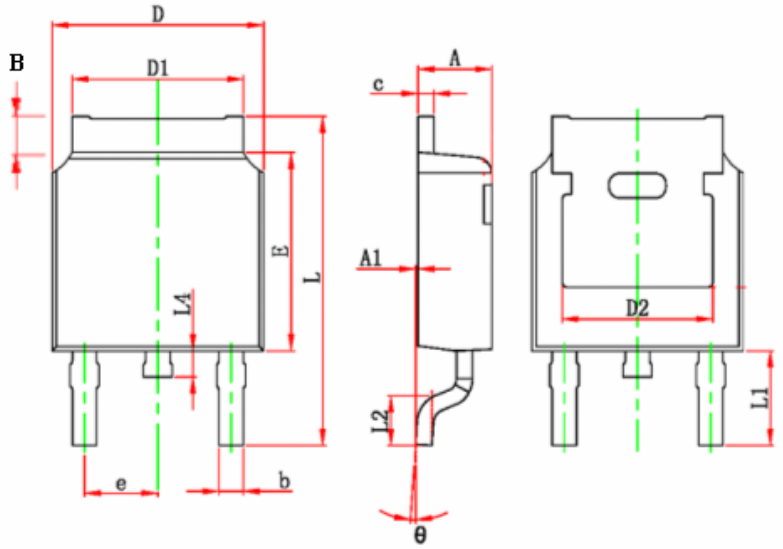
PACKAGE DIMENSION

TO-251



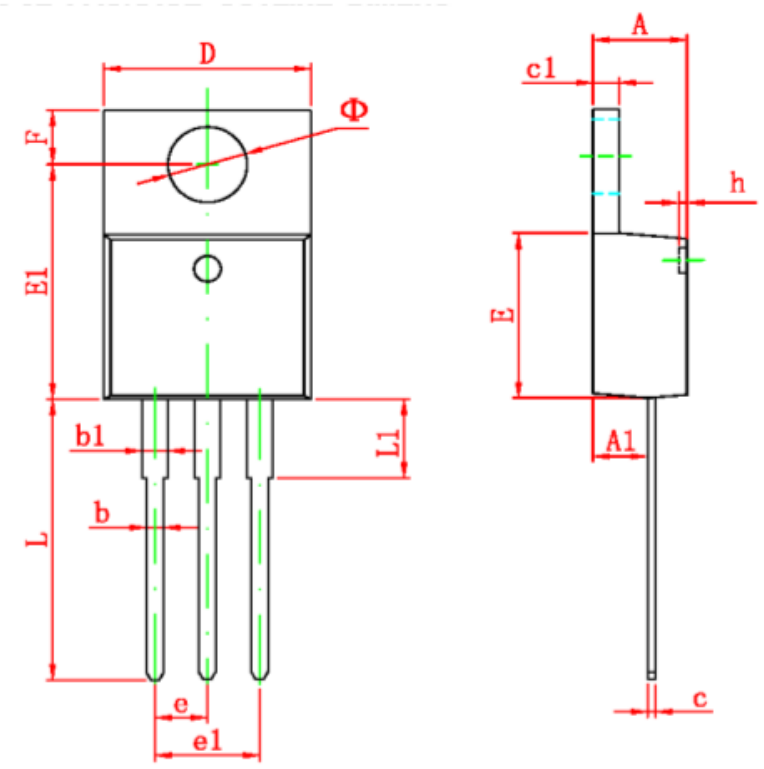
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.75
b1	0.65	0.95
c	0.40	0.60
c1	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
E	5.40	6.30
e	2.3 TYP.	
e1	4.40	4.80
L	7.40	8.00

TO-252



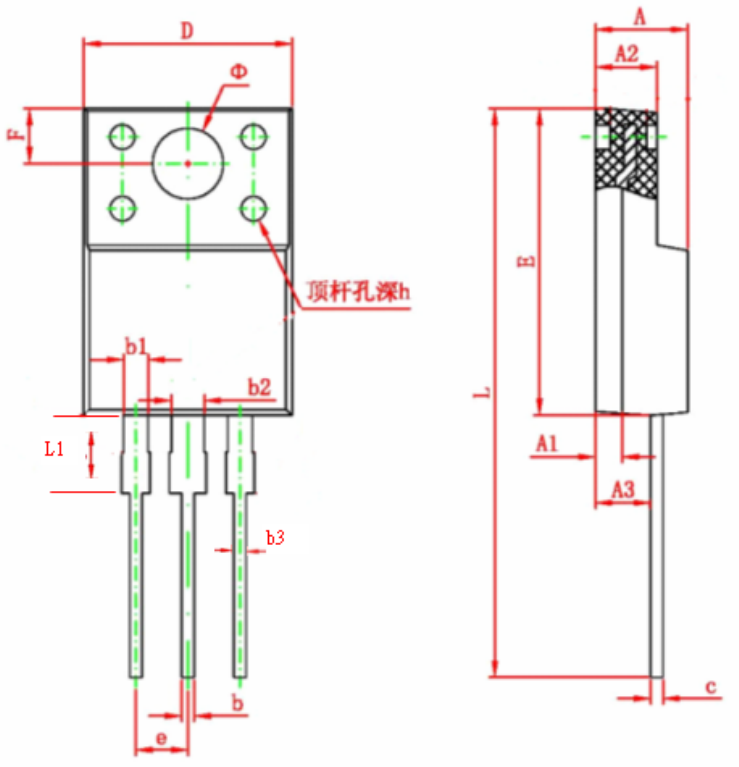
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.90
c	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
D2	4.83 TYP.	
E	5.90	6.30
e	2.3 TYP.	
L	9.30	10.50
L2	1.20	1.80
L4	0.60	1.00
θ	0.00	10.00

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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深圳市冠顺微电子股份有限公司
Shenzhen Great Power Co.,Ltd
Web:http:// www.grtpower.com

台湾	深圳
台北县汐止市新台五路一段 96 号 21F 21F., No. 96, Sec. 1, Sintai 5th Rd., Sijhih City, Taipei County 22102, Taiwan, R.O.C.	深圳市福田区深南大道 7002 号财富广场 A 座 4V, 518040 4V, Tower A, Fortune Plaza, No. 7002, Shennan Road, Futian District, Shenzhen City, China PC : 518040
TEL: +886-2-2696 3558	TEL: +86-755-83709176
FAX: +886-2-2696 3559	FAX: +86-755-83709276