GPT02N60

POWER FIELD EFFECT TRANSISTOR

GENERAL DESCRIPTION

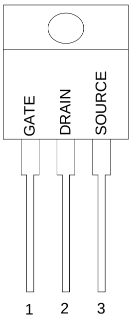
This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters,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

FEATURES

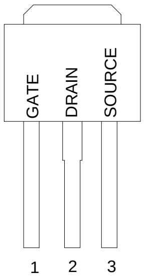
- Higher Current Rating
- Lower Rds(on)
- Lower Capacitances
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

PIN CONFIGURATION

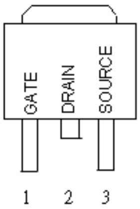
TO-220/TO-220FP
Top View



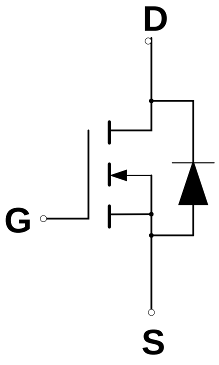
TO-251
Front View



TO-252
Front View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous — Pulsed	I_D I_{DM}	1.8 5.4	A
Gate-to-Source Voltage — Continue	V_{GS}	±30	V
Total Power Dissipation TO-251/TO-252 TO-220 TO-220FP Derate above 25□ TO-251/TO-252 TO-220 TO-220FP	$P_{D\ (TC)}$	42 53 22 0.33 0.42 0.17	W W/℃
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	℃
Single Pulse Drain-to-Source Avalanche Energy — $T_J = 25$℃ ($V_{DD} = 100V$, $V_{GS} = 10V$, $I_L = 1.6A$, $L = 10mH$, $R_G = 25\Omega$)	E_{AS}	12.8	mJ
Thermal Resistance — Junction to Case TO-251/TO-252 TO-220 TO220FP — Junction to Ambient TO-251/TO-252 TO-220, TO-220FP	θ_{JC} θ_{JA}	2.89 2.34 5.7 120 62.5	℃/W
Maximum Lead Temperature for Soldering Purposes, 1/8” from case for 10 seconds	T_L	260	℃

ORDERING INFORMATION

Part Number	Package
GPT02N60GN220*	TO-220
GPT02N60GN220FP*	TO-220 Full Package
GPT02N60GN251*	TO-251
GPT02N60GN252*	TO-252

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

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25℃$.

			GPT02N60			
Characteristic		**Symbol**	**Min**	**Typ**	**Max**	**Units**
Drain-Source Breakdown Voltage (V_{GS} = 0 V, I_D = 250 μA)		$V_{(BR)DSS}$	600			V
Drain-Source Leakage Current (V_{DS} =600 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 = 1.0A) *		$R_{DS(on)}$			4.7	Ω
Forward Transconductance (V_{DS} = 15 V, I_D = 1.0 A) *		g_{FS}		1		S
Input Capacitance	(V_{DS} = 25 V, V_{GS} = 0 V, f = 1.0 MHz)	C_{iss}		254.3		pF
Output Capacitance		C_{oss}		26.9		pF
Reverse Transfer Capacitance		C_{rss}		2.27		pF
Turn-On Delay Time	(V_{DD} = 300 V, I_D = 2.0 A, V_{GS} = 10 V, R_G = 9.1Ω) *	$t_{d(on)}$		11.7		ns
Rise Time		t_r		11		ns
Turn-Off Delay Time		$t_{d(off)}$		30.6		ns
Fall Time		t_f		13		ns
Total Gate Charge	(V_{DS} = 480 V, I_D = 2.0 A, V_{GS} = 10 V)*	Q_g		8.32		nC
Gate-Source Charge		Q_{gs}		1.64		nC
Gate-Drain Charge		Q_{gd}		4.61		nC
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I_S = 2.0 A, d_{IS}/d_t = 100A/μs)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		168		ns

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

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

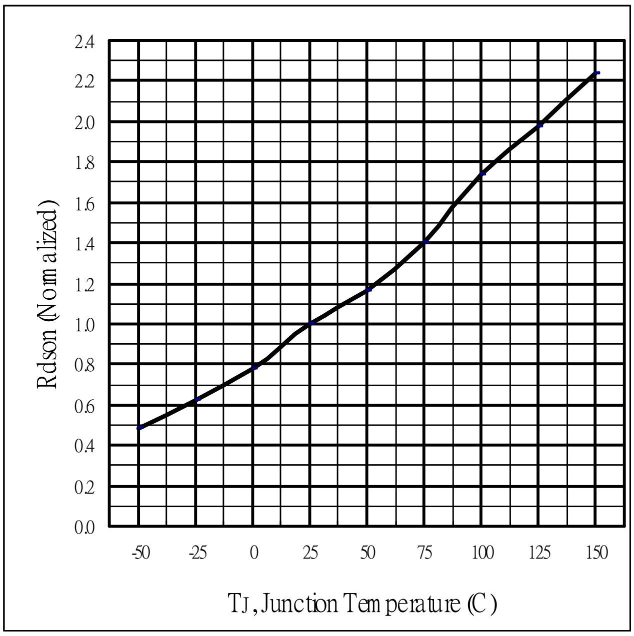


Fig 1. On-Resistance Variation with vs. Temperature

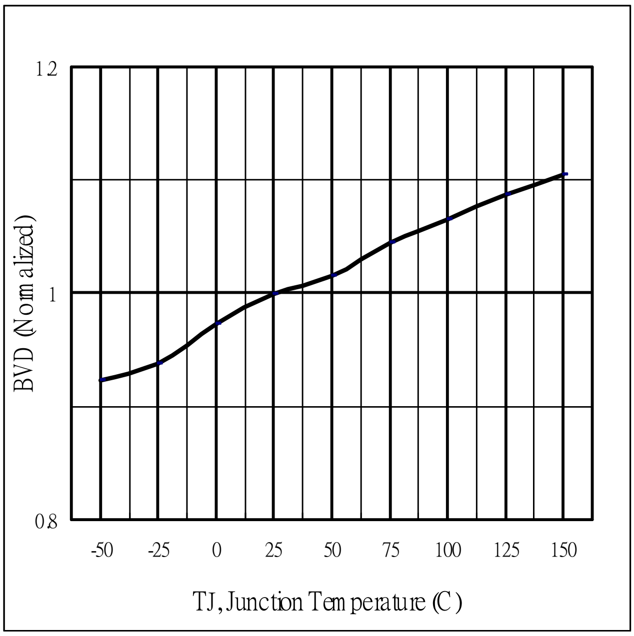


Fig.2 Breakdown Voltage Variation vs. Temperature

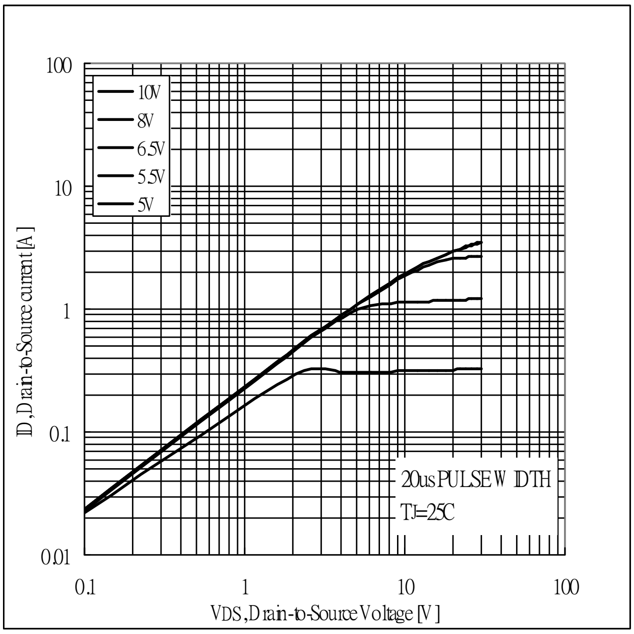


Fig 3. Typical Output Characteristics

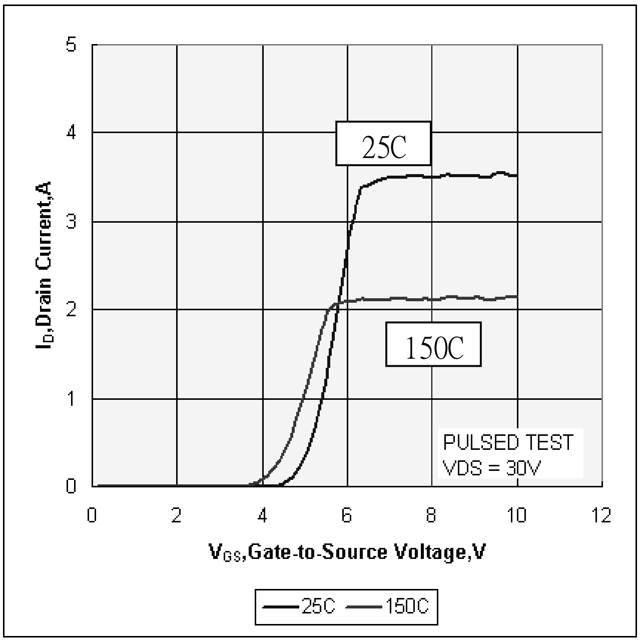


Fig 4. Typical Transfer Characteristics

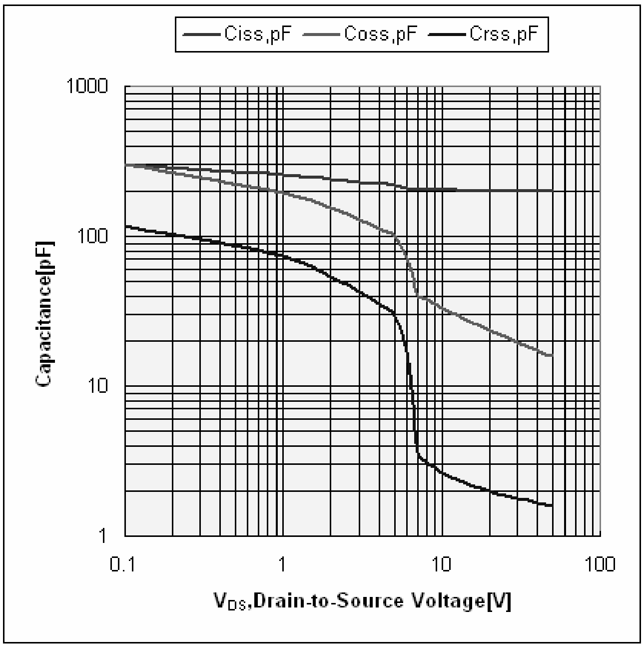


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

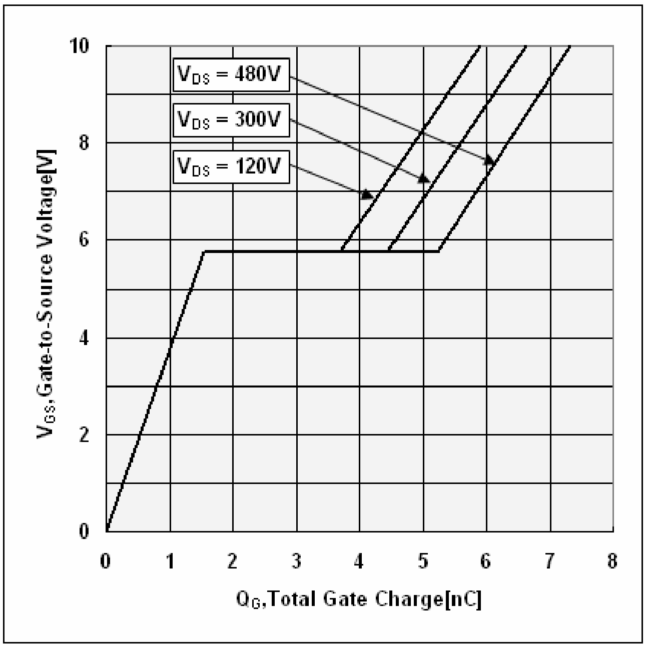
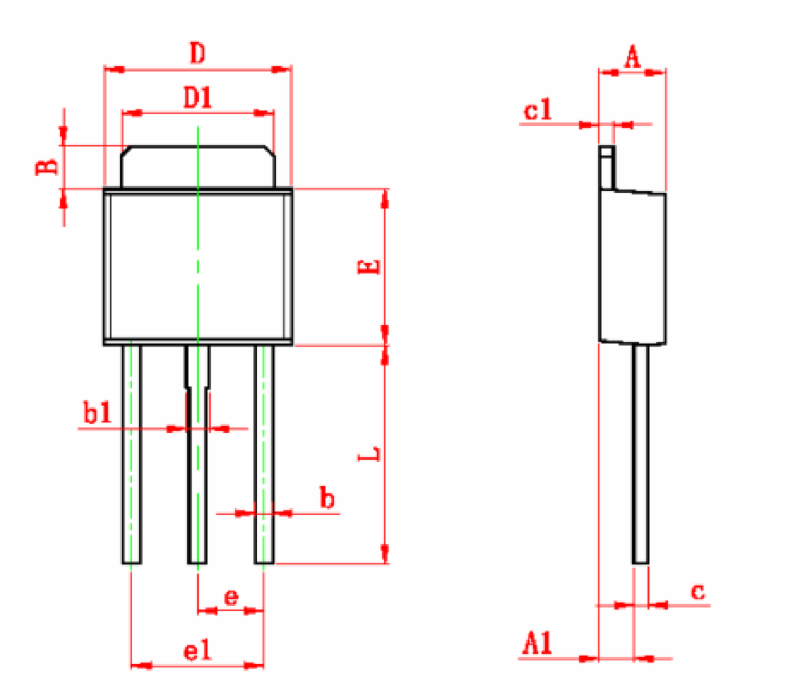


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

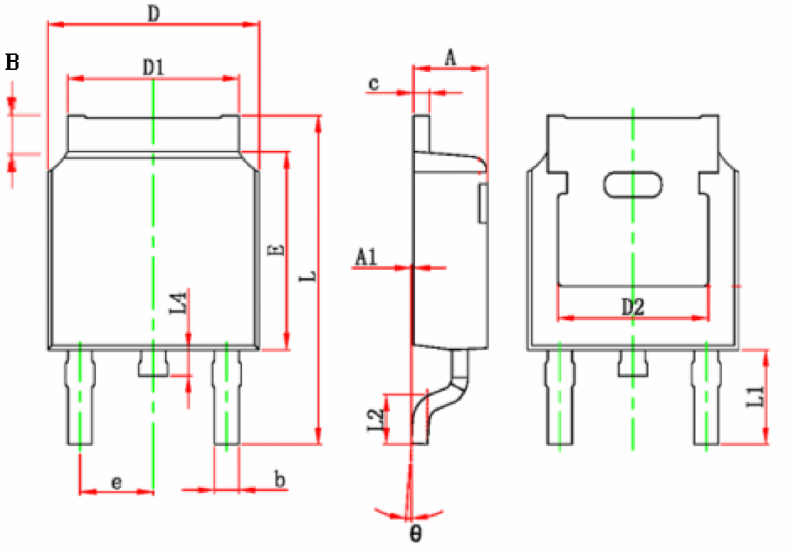
PACKAGE DIMENSION

TO-251



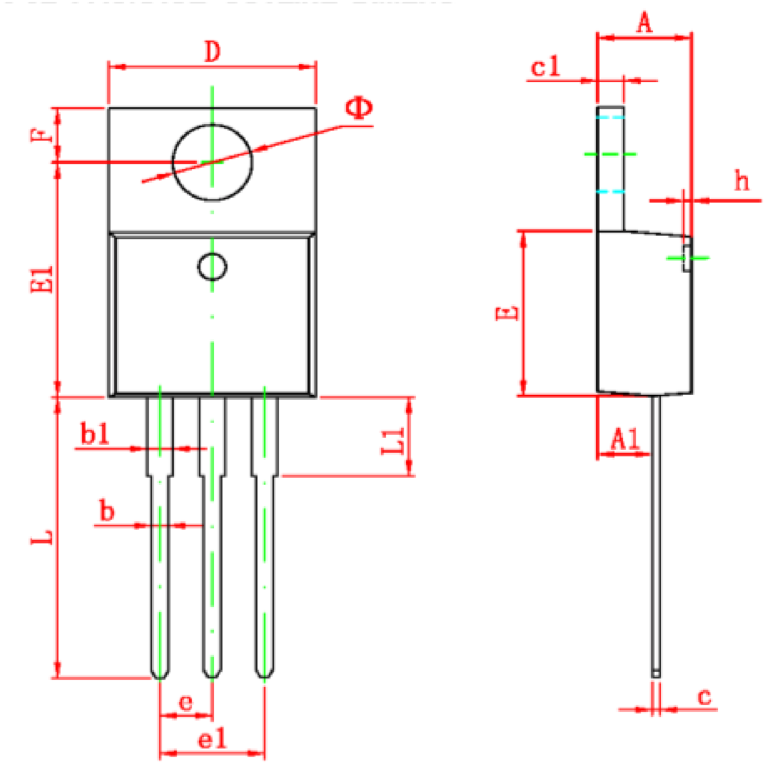
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.75
b1	0.65	0.95
c	0.40	0.60
c1	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
E	5.40	6.30
e	2.3 TYP.	
e1	4.40	4.80
L	7.40	8.00

TO-252



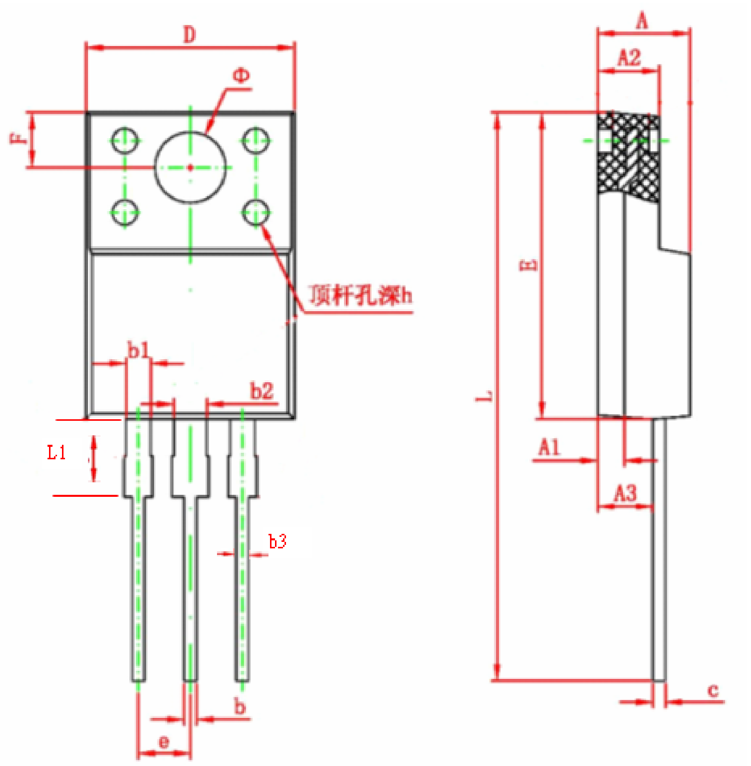
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.90
c	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
D2	4.83 TYP.	
E	5.90	6.30
e	2.3 TYP.	
L	9.30	10.50
L2	1.20	1.80
L4	0.60	1.00
θ	0.00	10.00

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

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虹冠電子工業股份有限公司
Champion Microelectronic Corporation
Web:http://www.champion-micro.com/

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

臺灣
新北市汐止區新台五路一段 96 號 21F
21F., No. 96, Sec. 1, Sintai 5th Rd.,
Sijhih City, Taipei County 22102,
Taiwan, R.O.C.
TEL:+886-2-2696 3558
FAX:+886-2-2696 3559

深圳
深圳市福田区深南大道 7002 号财富广场 A 座 4V,
4V, Tower A, Fortune Plaza, No. 7002, Shennan
Road, Futian District, Shenzhen City, China
PC : 518040
TEL:+86-755-83709176
FAX:+86-755-83709276