

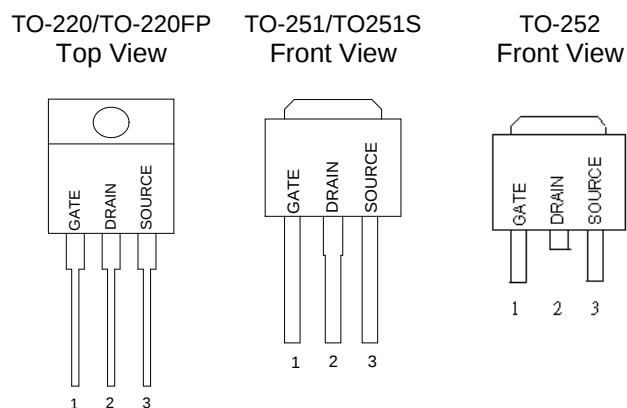
GENERAL DESCRIPTION

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.

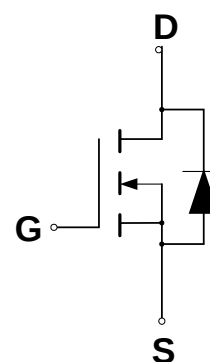
FEATURES

- ◆ Higher Current Rating
- ◆ Lower $R_{DS(on)}$
- ◆ Lower Capacitances
- ◆ Lower Total Gate Charge
- ◆ Tighter VSD Specifications
- ◆ Avalanche Energy Specified

PIN CONFIGURATION



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	I_D	2.8	A
— Pulsed	I_{DM}	8.4	
Gate-to-Source Voltage — Continue	V_{GS}	± 30	V
Total Power Dissipation TO-251/TO-252	P_D	55	W
TO-220		93	
TO-220FP		36	W/°C
Derate above 25°C TO-251/TO-252		0.45	
TO-220		0.8	
TO-220FP		0.31	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy — $T_J = 25^\circ\text{C}$ ($V_{DD} = 100\text{V}$, $V_{GS} = 10\text{V}$, $I_L = 2.5\text{A}$, $L = 10\text{mH}$, $R_G = 25\Omega$)	E_{AS}	31.25	mJ
Thermal Resistance — Junction to Case TO-251/TO-252	θ_{JC}	2.43	°C/W
TO-220		1.28	
TO220FP	θ_{JA}	4.2	
— Junction to Ambient TO-251/TO-252		120	
TO-220, TO-220FP		62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	°C

ORDERING INFORMATION

Part Number	Package
GPT03N80GN220*	TO-220
GPT03N80GN220FP*	TO-220 Full Package
GPT03N80GN251*	TO-251
GPT03N80GN251S*	TO-251S
GPT03N80GN252*	TO-252

*Note: G : Suffix for Pb Free Product

X : Suffix for Halogen and Pb Free Product

ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25^{\circ}\text{C}$.

		GPT03N80			
Characteristic	Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage (V _{GS} = 0 V, I _D = 250 μA)	V _{(BR)DSS}	800			V
Drain-Source Leakage Current (V _{DS} =650 V, V _{GS} = 0 V)	I _{DSS}			10	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)}	3		5	V
Static Drain-Source On-Resistance (V _{GS} = 10 V, I _D = 1.5A) *	R _{DS(on)}			5.2	Ω
Forward Transconductance (V _{DS} = 15 V, I _D = 1.5 A) *	g _{FS}		2		S
Input Capacitance	(V _{DS} = 25 V, V _{GS} = 0 V, f = 1.0 MHz)	C _{iss}	535.2		pF
Output Capacitance		C _{oss}	40.6		pF
Reverse Transfer Capacitance		C _{rss}	3.56		pF
Turn-On Delay Time	(V _{DD} = 400 V, I _D = 3.0 A, V _{GS} = 10 V, R _G = 9.1Ω) *	t _{d(on)}	15.1		ns
Rise Time		t _r	14.3		ns
Turn-Off Delay Time		t _{d(off)}	30.7		ns
Fall Time		t _f	20.5		ns
Total Gate Charge	(V _{DS} = 640 V, I _D = 3.0 A, V _{GS} = 10 V)*	Q _g	15		nC
Gate-Source Charge		Q _{gs}	2.83		nC
Gate-Drain Charge		Q _{gd}	7.63		nC
SOURCE-DRAIN DIODE CHARACTERISTICS					
Forward On-Voltage(1)	(I _S = 3.0 A, dI _S /dI _t = 100A/μs)	V _{SD}		1.5	V
Forward Turn-On Time		t _{on}	**		ns
Reverse Recovery Time		t _{rr}	184		ns

* Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

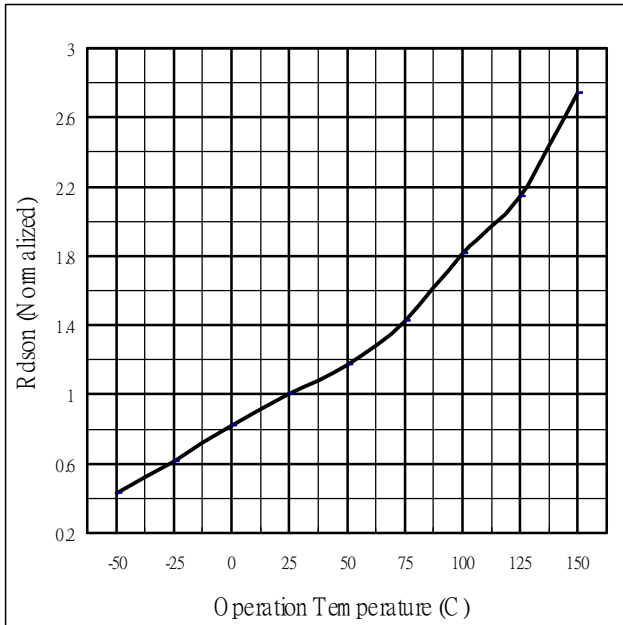


Fig 1. On-Resistance Variation with vs. Temperature

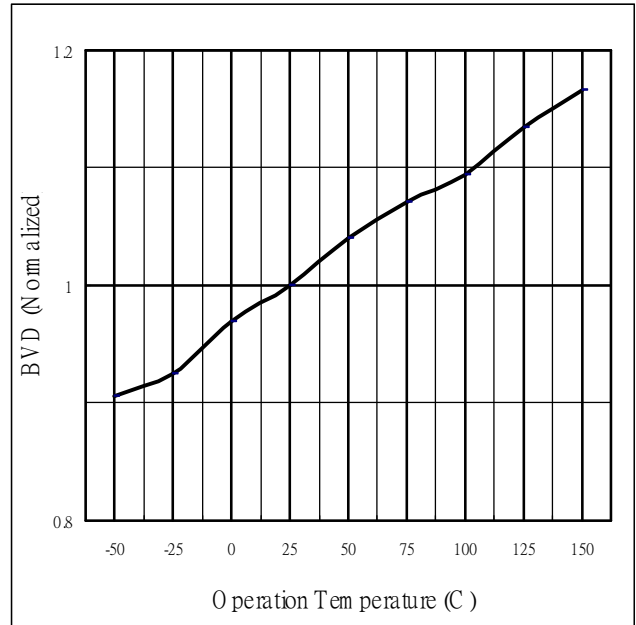


Fig.2 Breakdown Voltage Variation vs. Temperature

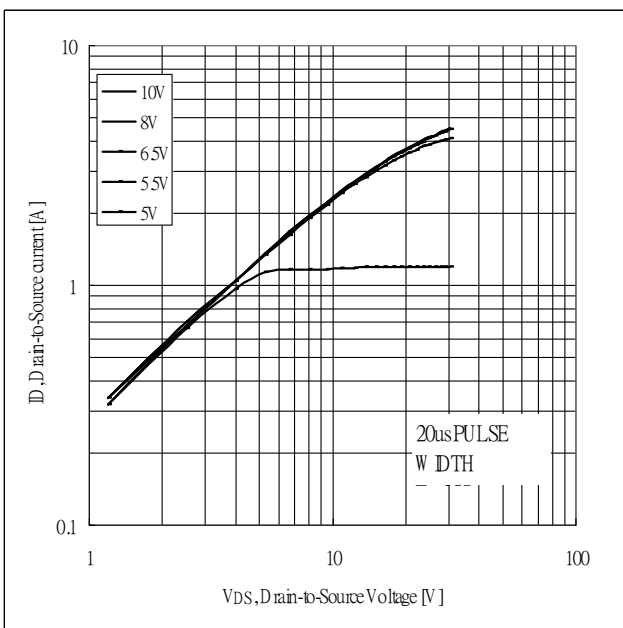


Fig 3. Typical Output Characteristics

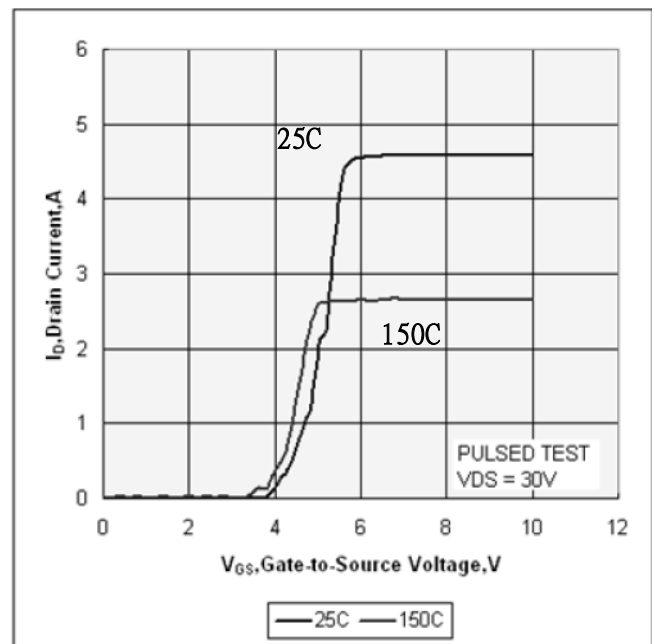


Fig 4. Typical Transfer Characteristics

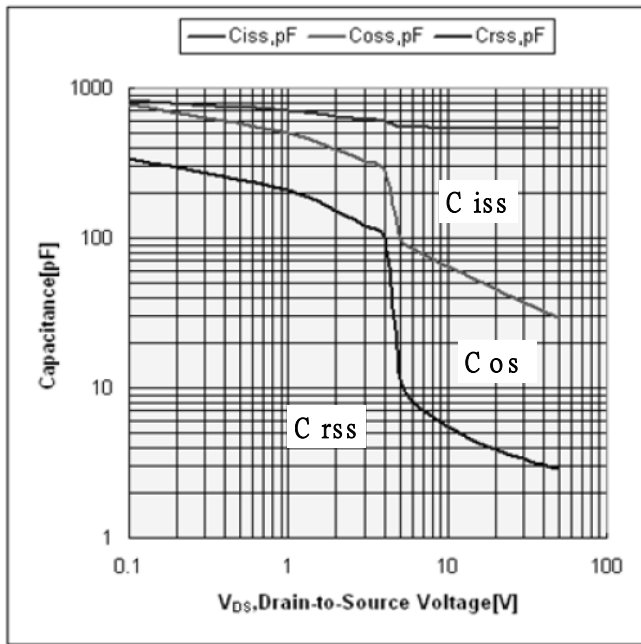


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

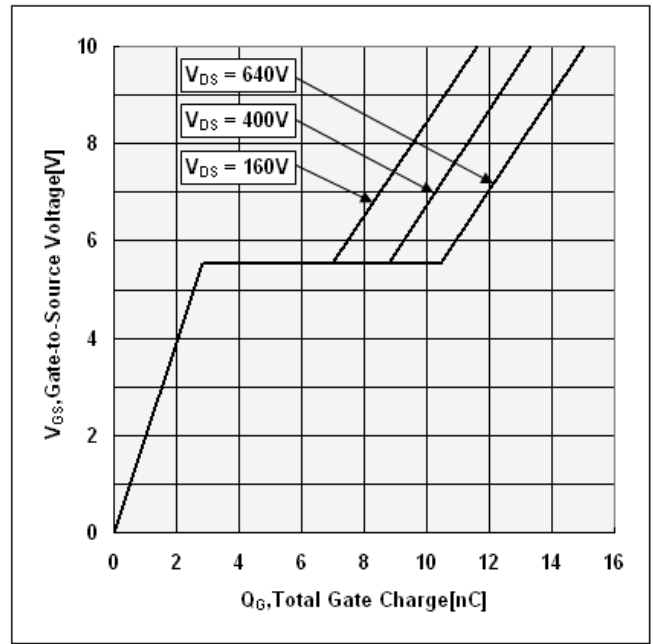
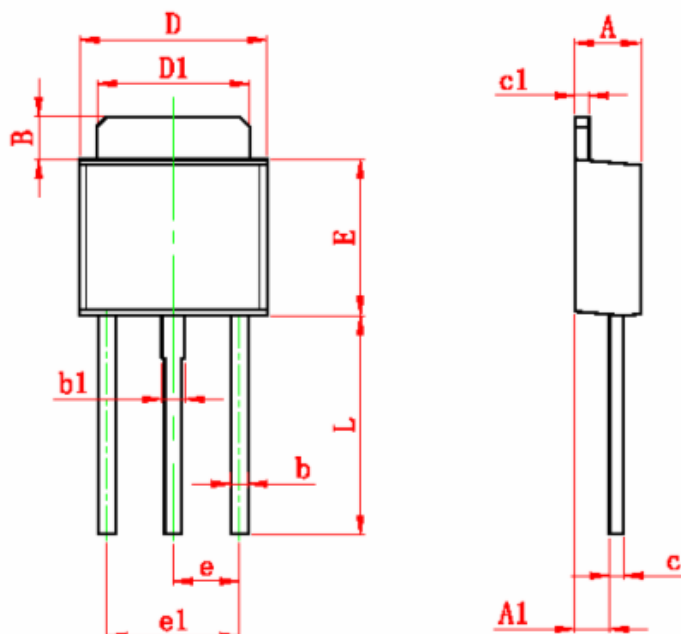


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

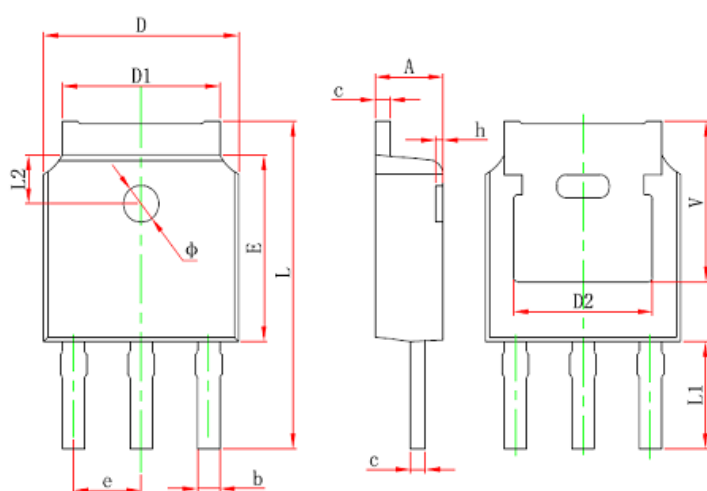
PACKAGE DIMENSION

TO-251



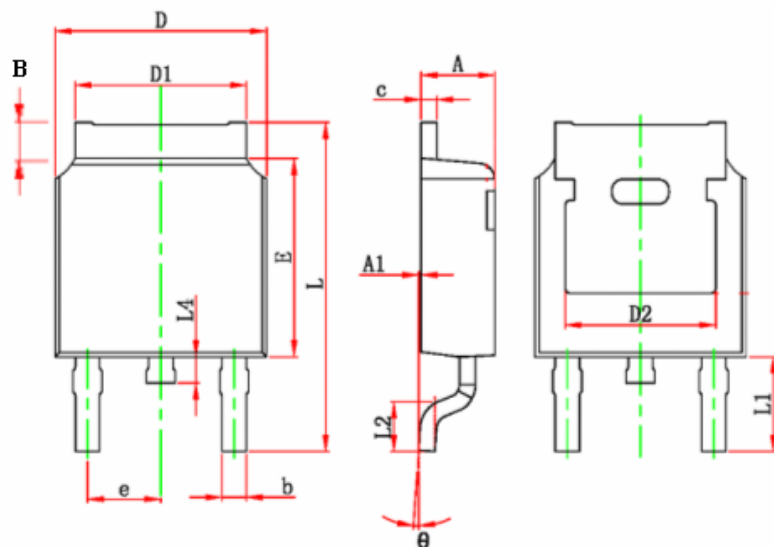
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.75
b1	0.65	0.95
c	0.40	0.60
c1	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
E	5.40	6.30
e	2.3 TYP.	
e1	4.40	4.80
L	7.40	8.00

TO-251S



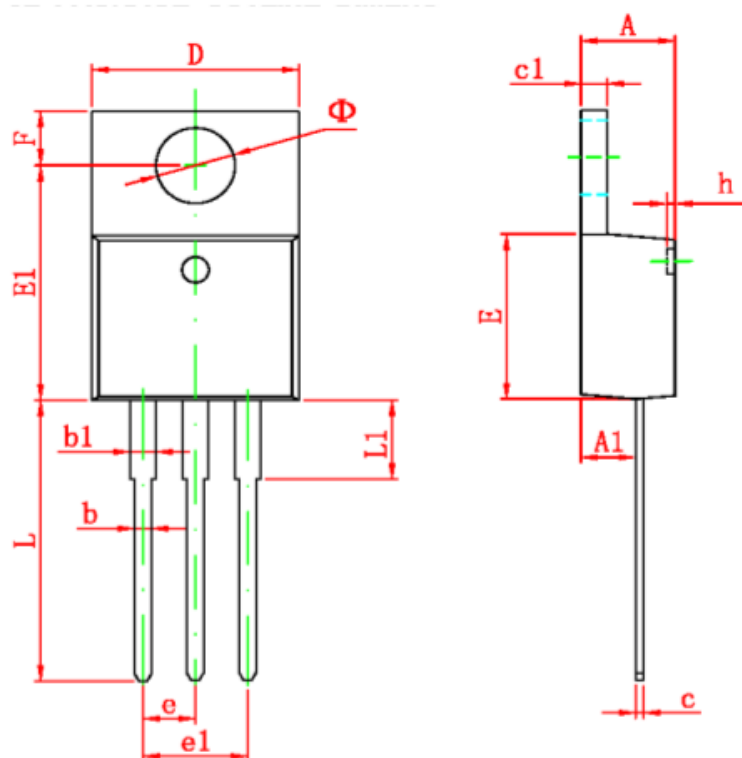
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
b	0.64	0.90
c	0.44	0.60
D	6.30	6.90
D1	5.00	5.50
D2	4.83 TYP.	
E	5.80	6.40
e	2.286 TYP.	
L1	3.5 TYP.	
L2	1.6 TYP.	
Φ	1.2 TYP.	
h	0.00	0.30
V	5.35 TYP.	

TO-252



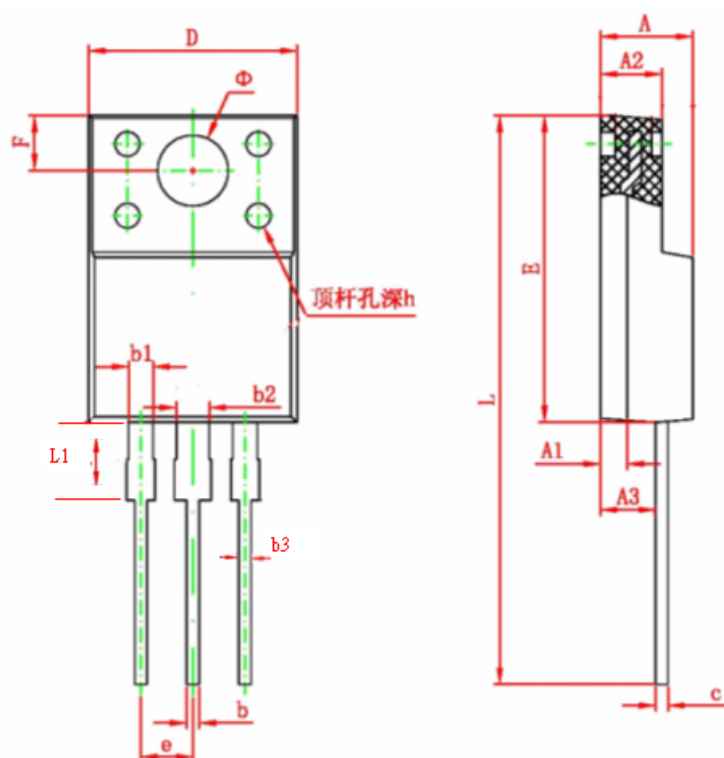
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.90
c	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
D2	4.83 TYP.	
E	5.90	6.30
e	2.3 TYP.	
L	9.30	10.50
L2	1.20	1.80
L4	0.60	1.00
Θ	0.00	10.00

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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