

GENERAL DESCRIPTION

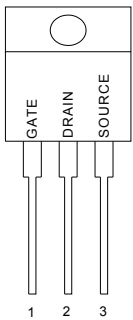
This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters,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

FEATURES

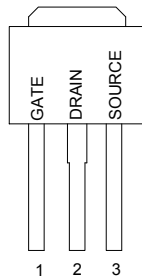
- ◆ SJ MOS
- ◆ Higher Current Rating
- ◆ Lower Rds(on)
- ◆ Lower Capacitances
- ◆ Lower Total Gate Charge

PIN CONFIGURATION

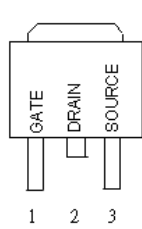
TO-220/TO-220FP
Top View



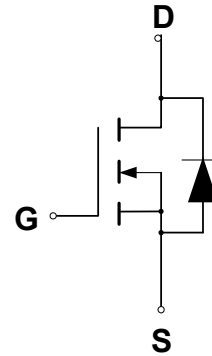
TO-251
Front View



TO-252
Front View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current – Continuous	$I_{D(1)}$	7.0	A
– Pulsed	I_{DM}	21.0	
Gate-to-Source Voltage – Continue	V_{GS}	±20	V
Total Power Dissipation TO251/TO252	P_D	81.2	W
TO-220		85.0	
TO-220FP		27	
Derate above 25°C TO251/TO252		0.65	W/°C
TO220		0.68	
TO220FP		0.22	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy – $T_J = 25^\circ\text{C}$ ($V_{DD} = 100\text{V}, V_{GS} = 10\text{V}, I_L = 3.3\text{A}, L = 10\text{mH}, R_G = 25\Omega$)	E_{AS}	54.5	mJ
Thermal Resistance – Junction to Case TO251/TO252	θ_{JC}	1.54	°C/W
TO-220		1.47	
TO220FP		4.56	
– Junction to Ambient TO251/TO252/ TO-220/ TO-220FP	θ_{JA}	62.5	
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	260	°C

(1) Drain current limited by maximum junction temperature (TO220)

ORDERING INFORMATION

Part Number	TOP MARK	Part Number	Packing Method	Note
GP07S65XN251 (Note1)	GP07S65X	TO-251	Tube	
GP07S65XN252 (Note1)	GP07S65X	TO-252	Tube	
GP07S65XN252TR (Note1)	GP07S65X	TO-252	Tape and Reel	
GP07S65XN220 (Note1)	GP07S65X	TO-220	Tube	
GP07S65XN220FP (Note1)	GP07S65X	TO-220FP	Tube	

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

ELECTRICAL CHARACTERISTICS

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

Characteristic	Symbol	GP07S65			Units	
		Min	Typ	Max		
Drain-Source Breakdown Voltage ($V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$)	$V_{(BR)DSS}$	650			V	
Drain-Source Leakage Current ($V_{DS} = 650\text{ V}$, $V_{GS} = 0\text{ V}$)	I_{DSS}			1	μA	
Gate-Source Leakage Current-Forward ($V_{gsf} = 20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSSF}			100	nA	
Gate-Source Leakage Current-Reverse ($V_{gsr} = -20\text{ V}$, $V_{DS} = 0\text{ V}$)	I_{GSSR}			100	nA	
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$)	$V_{GS(th)}$	2	3	4	V	
Static Drain-Source On-Resistance ($V_{GS} = 10\text{ V}$, $I_D = 2.4\text{A}$) *	$R_{DS(on)}$			0.7	Ω	
Input Capacitance	$(V_{DS} = 25\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1.0\text{ MHz}$)	C_{iss}	521.7		pF	
Output Capacitance		C_{oss}	261.3		pF	
Reverse Transfer Capacitance		C_{rss}	48.0		pF	
Turn-On Delay Time	$(V_{DD} = 250\text{ V}$, $I_D = 7\text{ A}$, $V_{GS} = 10\text{ V}$, $R_G = 9.1\Omega$) *	$t_{d(on)}$	10.6		ns	
Rise Time		t_r	37.2		ns	
Turn-Off Delay Time		$t_{d(off)}$	53.6		ns	
Fall Time		t_f	51.2		ns	
Total Gate Charge	$(V_{DS} = 400\text{ V}$, $I_D = 7\text{ A}$, $V_{GS} = 10\text{ V}$)*	Q_g	15.7		nC	
Gate-Source Charge		Q_{gs}	3.4		nC	
Gate-Drain Charge		Q_{gd}	7.5		nC	
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	$(I_S = 7\text{ A}$, $d_i/d_t = 100\text{A}/\mu\text{s}$)	V_{SD}			1.5	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		232		ns

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

** Negligible, Dominated by circuit inductance

TYPICAL ELECTRICAL CHARACTERISTICS

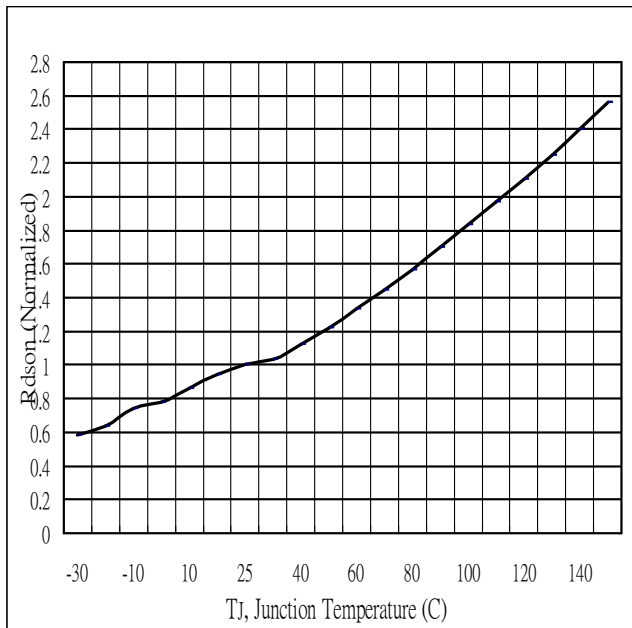


Fig 1. On-Resistance Variation with vs. Temperature

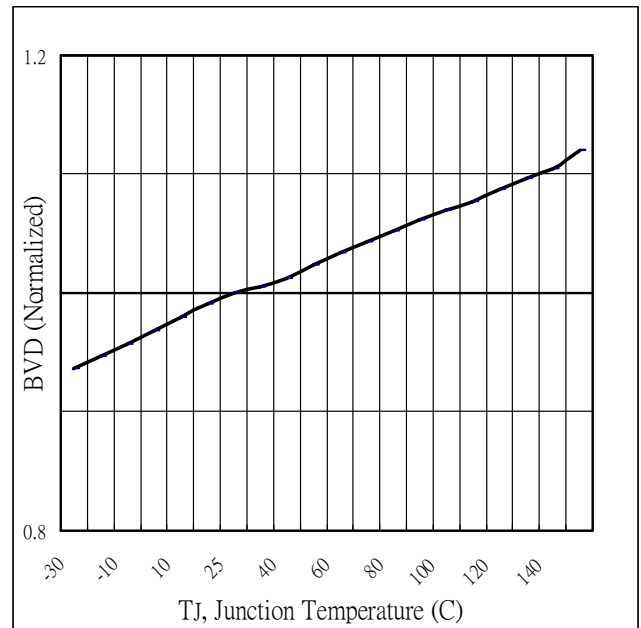


Fig.2 Breakdown Voltage Variation vs. Temperature

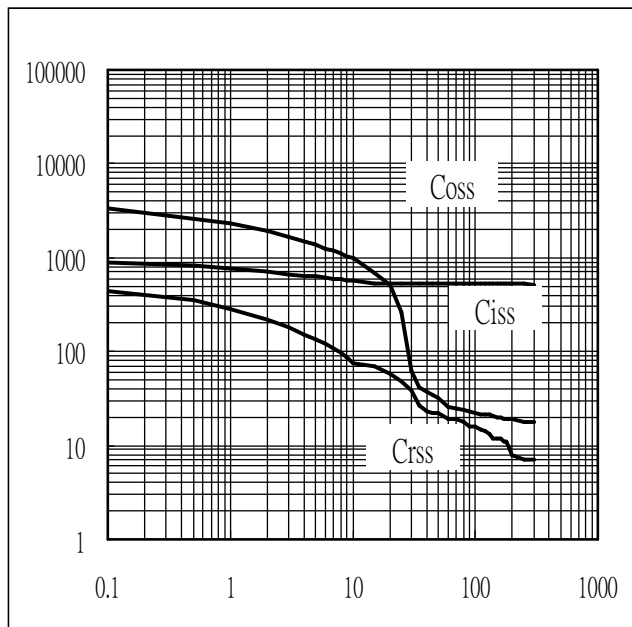


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

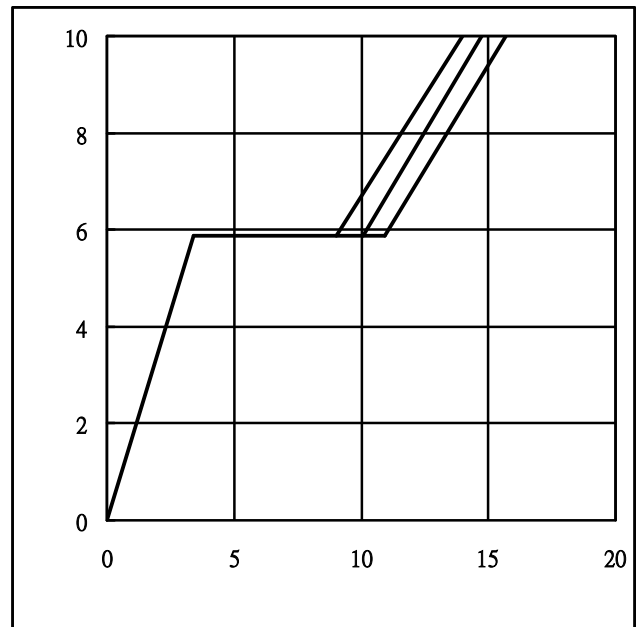
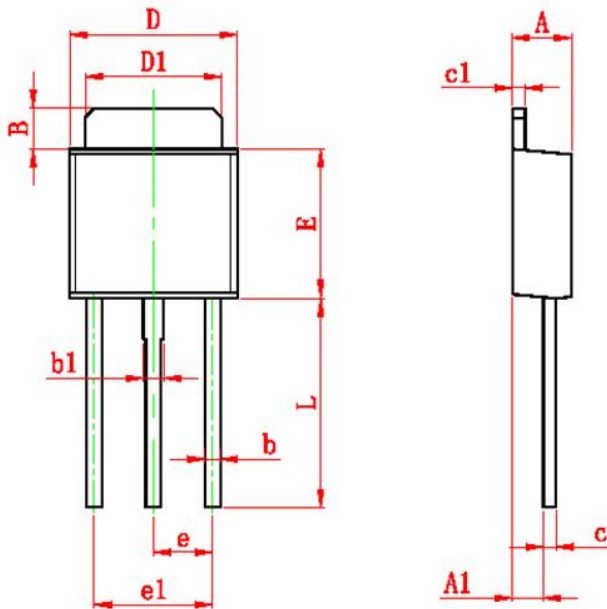


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

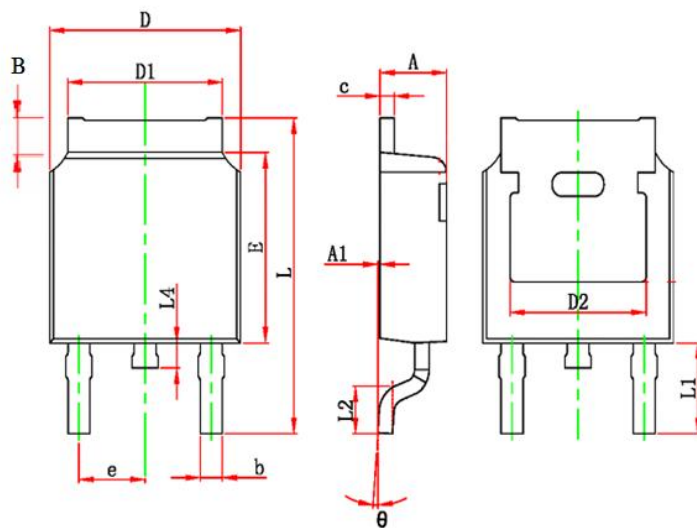
PACKAGE DIMENSION

TO-251



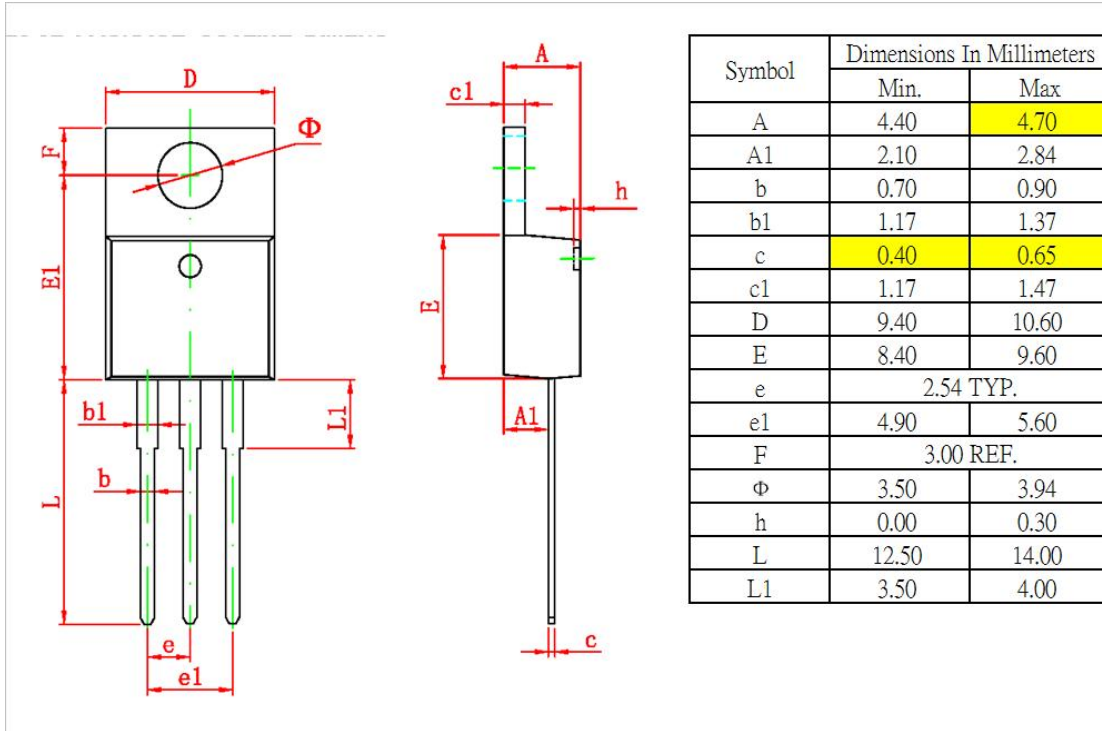
Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.75
b1	0.65	0.95
c	0.40	0.60
c1	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
E	5.40	6.30
e	2.3 TYP.	
e1	4.40	4.80
L	7.40	9.60

TO-252

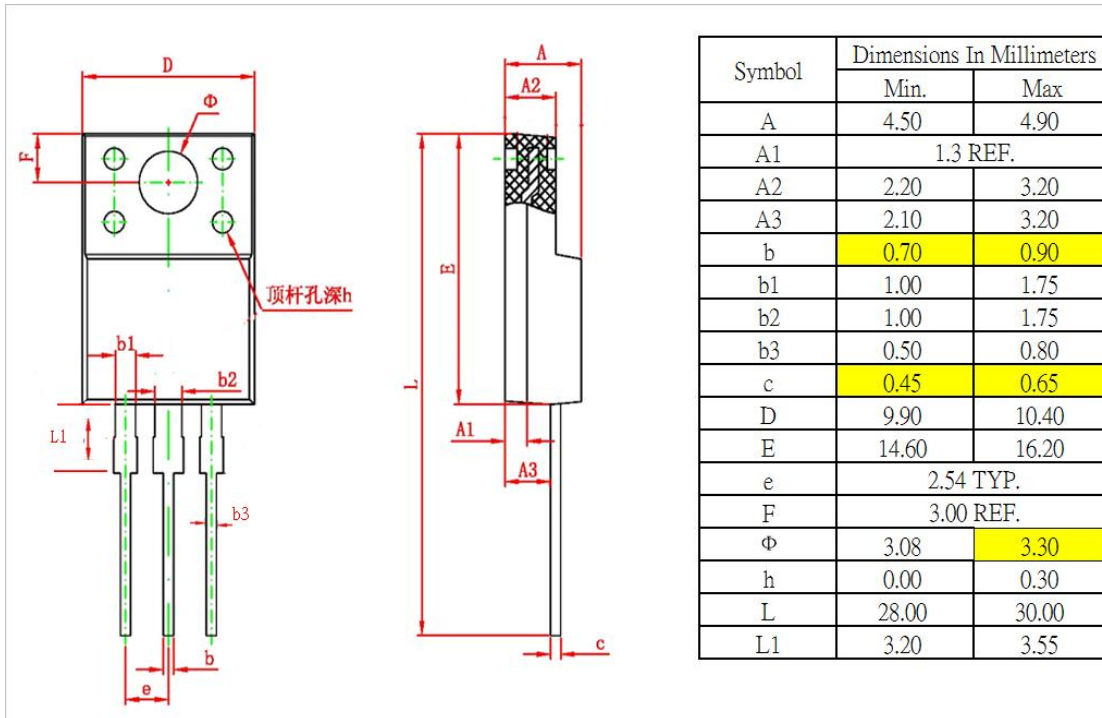


Symbol	Dimensions In Millimeters	
	Min.	Max
A	2.10	2.50
A1	0.90	1.35
B	0.90	1.65
b	0.45	0.90
c	0.40	0.60
D	6.30	6.80
D1	5.00	5.50
D2	4.83 TYP.	
E	5.90	6.30
e	2.3 TYP.	
L	9.30	10.50
L2	1.20	1.80
L4	0.60	1.00
Θ	0.00	10.00

TO-220



TO-220FP



IMPORTANT NOTICE

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