



GWM28S50

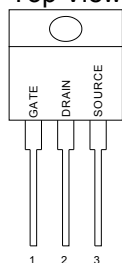
POWER FIELD EFFECT TRANSISTOR

GENERAL DESCRIPTION

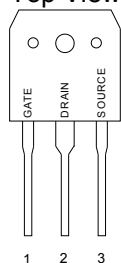
This high voltage MOSFET uses an advanced termination scheme to provide enhanced voltage-blocking capability without degrading performance over time. In addition, this advanced MOSFET is designed to withstand high energy in avalanche and commutation modes. The new energy efficient design also offers a drain-to-source diode with a fast recovery time. Designed for high voltage, high speed switching applications in power supplies, converters and PWM motor controls, these devices are particularly well suited for bridge circuits where diode speed and commutating safe operating areas are critical and offer additional and safety margin against unexpected voltage transients.

PIN CONFIGURATION

TO-220/TO-220F
Top View



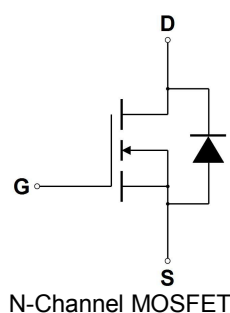
TO-3P/TO-247
Top View



FEATURES

- ◆ Robust High Voltage Termination
- ◆ Avalanche Energy Specified
- ◆ Source-to-Drain Diode Recovery Time Comparable to a Discrete Fast Recovery Diode
- ◆ Diode is Characterized for Use in Bridge Circuits
- ◆ I_{DSS} and $V_{DS(on)}$ Specified at Elevated Temperature
- ◆ Isolated Mounting Hole Reduces Mounting Hardware

SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous	$I_{D(1)}$	28	A
— Pulsed	I_{DM}	84	A
Gate-to-Source Voltage — Continue	V_{GS}	± 20	V
Total Power Dissipation TO-220	P_D	245	W
TO-220FP		42	
TO-3P		255	
TO-247		227	
Derate above 25°C TO-220	P_D	1.96	W/°C
TO-220FP		0.33	
TO-3P		2.04	
TO-247		1.82	
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C
Single Pulse Drain-to-Source Avalanche Energy — $T_J = 25^\circ\text{C}$ ($V_{DD} = 100\text{V}$, $V_{GS} = 10\text{V}$, $I_L = 8\text{A}$, $L = 10\text{mH}$, $R_G = 25\Omega$)	E_{AS}	320	mJ
Thermal Resistance — Junction to Case TO-220	θ_{JC}	0.51	°C/W
TO-220FP		3	
TO-3P		0.49	
TO-247		0.55	
— Junction to Ambient TO-220, TO-220FP	θ_{JA}	62.5	°C/W
TO-3P, TO-247		40	
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



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POWER FIELD EFFECT TRANSISTOR

ORDERING INFORMATION

Part Number	TOP MARK	Part Number	Packing Mthod	Note
GWM28S50XN220 (Note1)	GWM28S50X	TO-220	Tube	
GWM28S50XN220FP (Note1)	GWM28S50X	TO-220FP	Tube	
GWM28S50XN3P (Note2)	GWM28S50X	TO-3P	Tube	
GWM28S50XN247 (Note2)	GWM28S50X	TO-247	Tube	
GWM28S50GN220 (Note2)	GWM28S50G	TO-220	Tube	
GWM28S50GN220FP (Note2)	GWM28S50G	TO-220FP	Tube	
GWM28S50GN3P (Note2)	GWM28S50G	TO-3P	Tube	
GWM28S50GN247 (Note2)	GWM28S50G	TO-247	Tube	

Note1: X : Suffix for Halogen Free Product,

Note2: G : Suffix for PB Free Product,

ELECTRICAL CHARACTERISTICS

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

		GWM28S50				
Characteristic		Symbol	Min	Typ	Max	Units
Drain-Source Breakdown Voltage (V _{GS} = 0V, I _D = 250 μA)		V _{(BR)DSS}	500			V
Drain-Source Leakage Current (V _{DS} =500V, V _{GS} = 0V)		I _{DSS}			1	uA
Gate-Source Leakage Current-Forward (V _{gsf} = 20V, V _{DS} = 0V)		I _{GSSF}			100	nA
Gate-Source Leakage Current-Reverse (V _{gsr} = - 20V, V _{DS} = 0V)		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} = 10V, I _D = 9.4A) *		R _{DS(on)}			125	mΩ
Gate resistance (f=1MHz, open drain)		R _G		2.7		Ω
Input Capacitance	(V _{DS} = 100V, V _{GS} = 0V, f = 1.0 MHz)	C _{iss}		1472		pF
Output Capacitance		C _{oss}		68		pF
Reverse Transfer Capacitance		C _{rss}		25		pF
Turn-On Delay Time	(V _{DD} = 250V, I _D = 28A, R _G = 25Ω) *	t _{d(on)}		34.9		ns
Rise Time		t _r		104.5		ns
Turn-Off Delay Time		t _{d(off)}		97.4		ns
Fall Time		t _f		65.0		ns
Total Gate Charge	(V _{DS} = 400V, I _D = 28A, V _{GS} = 10V)*	Q _g		40.7		nC
Gate-Source Charge		Q _{gs}		10.1		nC
Gate-Drain Charge		Q _{gd}		18.7		nC
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	(I _S = 28A, dI _S /d _t = 100A/μs)	V _{SD}			1.5	V
Forward Turn-On Time		t _{on}		**		ns
Reverse Recovery Time		t _{rr}		372.2		ns

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

** Negligible, Dominated by circuit inductance



TYPICAL ELECTRICAL CHARACTERISTICS

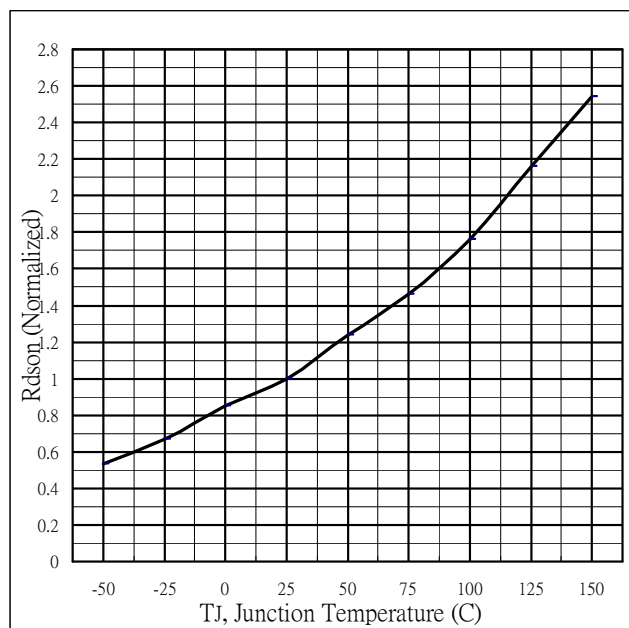


Fig 1. On-Resistance Variation with vs. Temperature

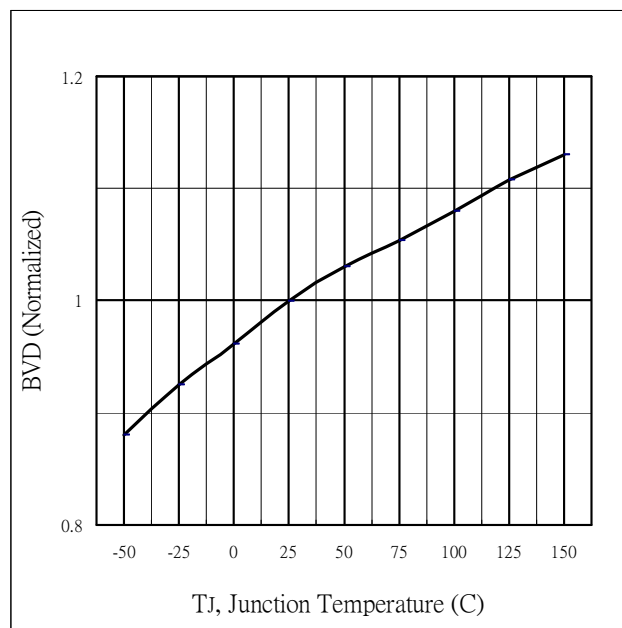


Fig.2 Breakdown Voltage Variation vs. Temperature

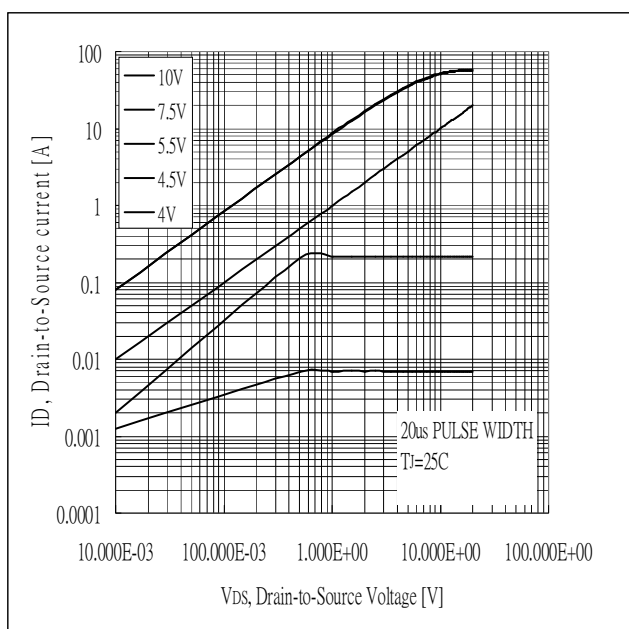


Fig 3. Typical Output Characteristics

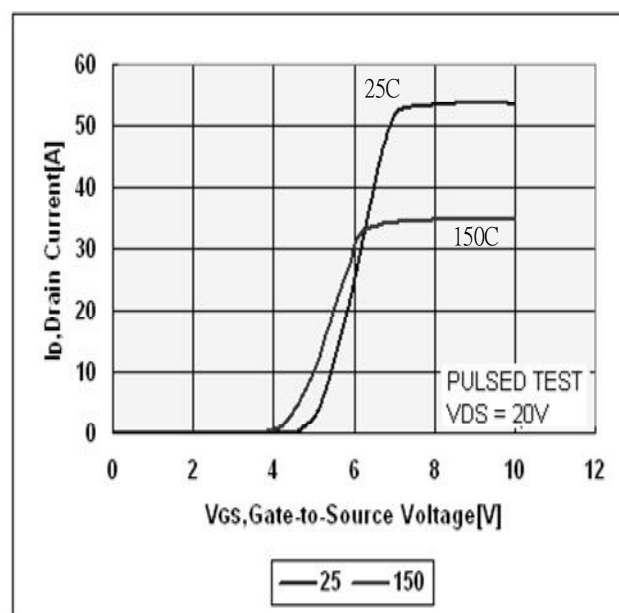


Fig 4. Typical Transfer Characteristics

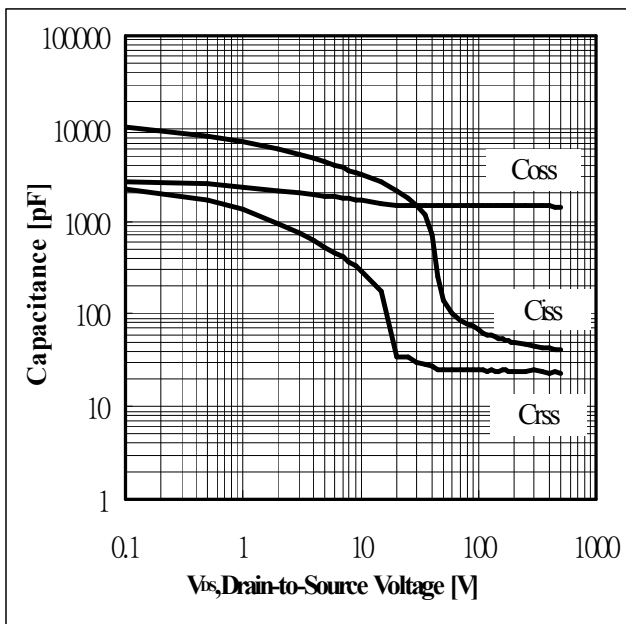


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

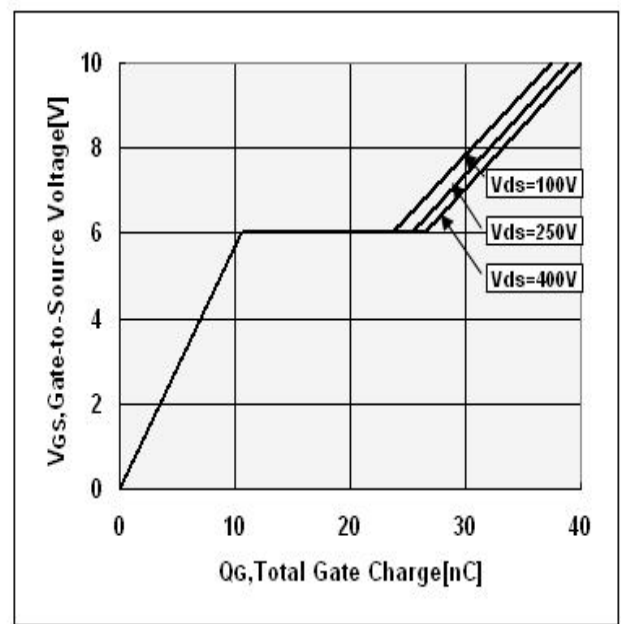


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage