STP3NB80
POWER MOSFET

GENERAL DESCRIPTION

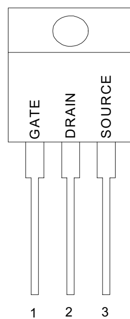
This advanced high voltage MOSFET is designed to withstand high energy in the avalanche mode and switch efficiently. This new high energy device also offers a drain-to-source diode with fast recovery time. Designed for high voltage, high speed switching applications such as power supplies, converters,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

FEATURES

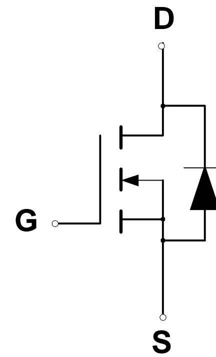
- Higher Current Rating
- Lower Rds(on)
- Lower Capacitances
- Lower Total Gate Charge
- Tighter VSD Specifications
- Avalanche Energy Specified

PIN CONFIGURATION

TO-220FP
Top View



SYMBOL



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Drain to Current — Continuous — Pulsed	I_D I_{DM}	3.0 12	A
Gate-to-Source Voltage — Continue — Non-repetitive	V_{GS} V_{GSM}	±30 ±40	V V
Total Power Dissipation Derate above 25℃	P_D	35 0.28	W W/℃
Operating and Storage Temperature Range	T_J, T_{STG}	-65 to 150	℃
Single Pulse Drain-to-Source Avalanche Energy — T_J = 25℃ (V_{DD} = 50V, V_{GS} = 10V, I_D = 3A, L = 10mH, R_G = 25Ω)	E_{AS}	176	mJ
Thermal Resistance — Junction to Case — Junction to Ambient	$θ_{JC}$ $θ_{JA}$	1.70 62	℃/W
Maximum Lead Temperature for Soldering Purposes, 1/8" from case for 10 seconds	T_L	300	℃

ORDERING INFORMATION

Part Number	Package
STP3NB80	TO-220 Full Package

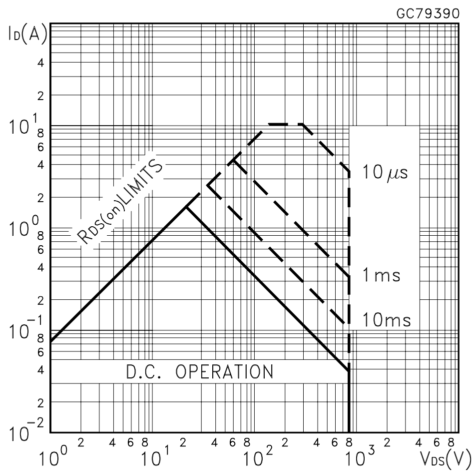
ELECTRICAL CHARACTERISTICS

Unless otherwise specified, $T_J = 25$ ℃ .

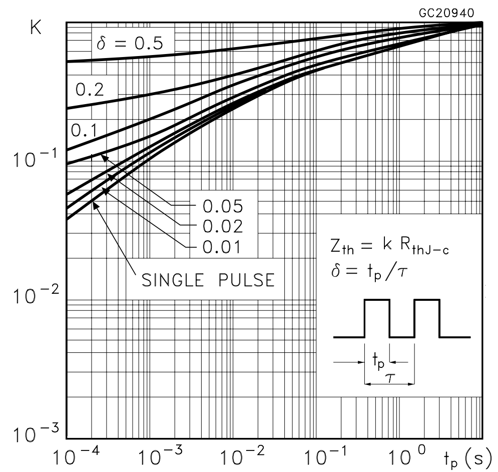
Characteristic	Test Conditions	Symbol	STP3NB80 Min	Typ	Max	Units
Drain-Source Breakdown Voltage ($V_{GS} = 0$ V, $I_D = 250$ μA)		$V_{(BR)DSS}$	800			V
Drain-Source Leakage Current ($V_{DS} =800$ V , $V_{GS} = 0$ V)		I_{DSS}			1	μA
Gate-body Leakage Current ($V_{GS} = \pm30$ V, $V_{DS} = 0$ V)		I_{GSS}			±100	nA
Gate-Source Leakage Current-Reverse ($V_{gsr} = 20$ V, $V_{DS} = 0$ V)		I_{GSSR}			-100	nA
Gate Threshold Voltage ($V_{DS} = V_{GS}$, $I_D = 250$ μA)		$V_{GS(th)}$	3.0		5.0	V
Static Drain-Source On-Resistance ($V_{GS} = 10$ V, $I_D = 1.5$A) *		$R_{DS(on)}$		2.5	4.0	mhos
Forward Transconductance ($V_{DS} = I_{D(ON)} \times R_{DS(ON)max}$, $I_D = 1.5$ A) *		g_{FS}	1.5			S
Input Capacitance	($V_{DS} = 25$ V, $V_{GS} = 0$ V, f = 1.0 MHz)	C_{iss}		445	580	pF
Output Capacitance		C_{oss}		60	80	pF
Reverse Transfer Capacitance		C_{rss}		7	9	pF
Turn-On Delay Time	($V_{DD} = 400$ V, $I_D = 1.5$ A, $V_{GS} = 10$ V, $R_G = 4.7\Omega$) *	$t_{d(on)}$		12	17	ns
Rise Time		t_r		10	14	ns
Turn-Off Delay Time		$t_{d(off)}$		19	40	ns
Fall Time		t_f		10	20	ns
Total Gate Charge	($V_{DS} = 640$ V, $I_D = 3.0$ A, $V_{GS} = 10$ V)*	Q_g		17	24	nC
Gate-Source Charge		Q_{gs}		6.5		nC
Gate-Drain Charge		Q_{gd}		7.5		nC
Internal Drain Inductance (Measured from the drain lead 0.25” from package to center of die)		L_D		4.5		nH
Internal Drain Inductance (Measured from the source lead 0.25” from package to source bond pad)		L_S		7.5		nH
SOURCE-DRAIN DIODE CHARACTERISTICS						
Forward On-Voltage(1)	($I_{SD} = 3.0$ A, $d_{IS}/d_t = 100$A/μs)	V_{SD}			1.6	V
Forward Turn-On Time		t_{on}		**		ns
Reverse Recovery Time		t_{rr}		650		ns

* Pulse Test: Pulse Width ≦300μs, Duty Cycle ≦2%
** Negligible, Dominated by circuit inductance

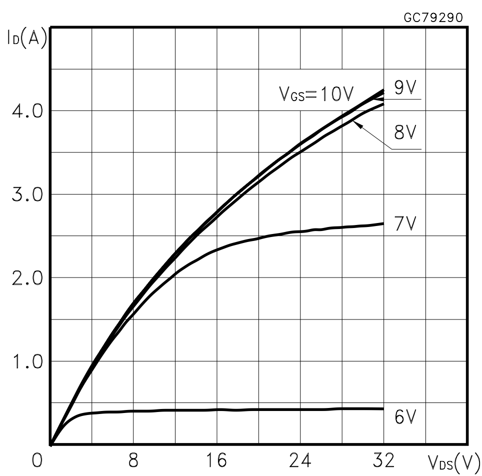
Safe Operating Area for TO-220FP



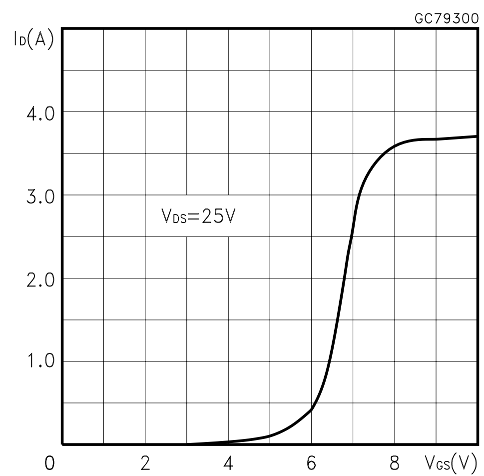
Thermal Impedance forTO-220FP



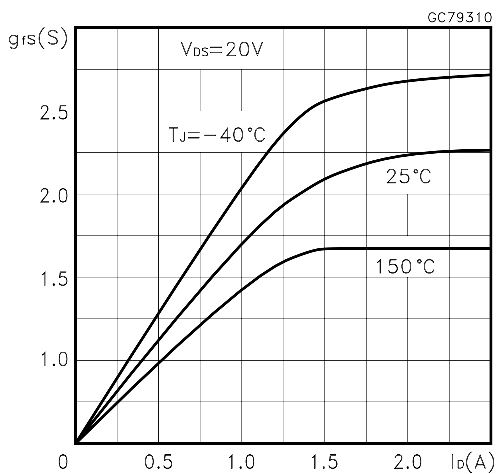
Output Characteristics



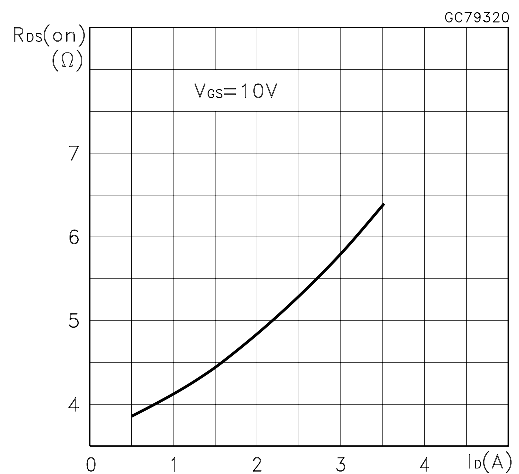
Transfer Characteristics



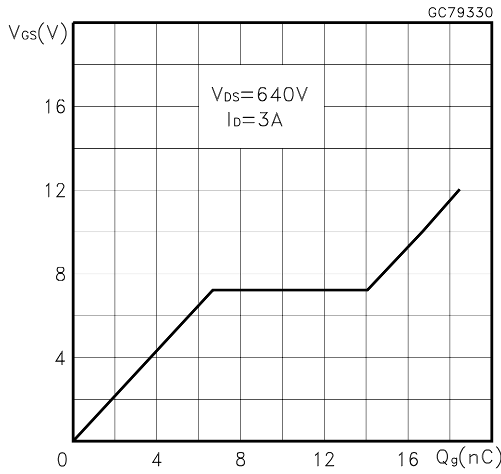
Transconductance



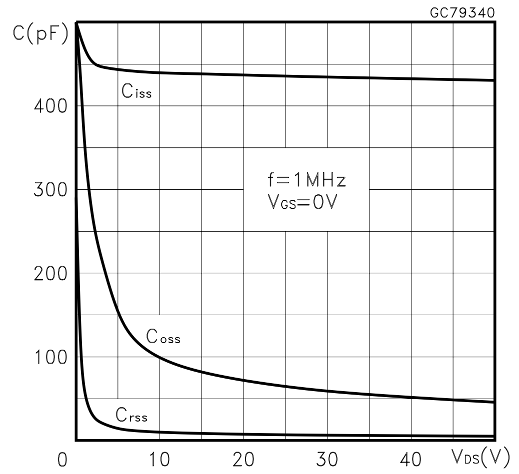
Static Drain-source On Resistance



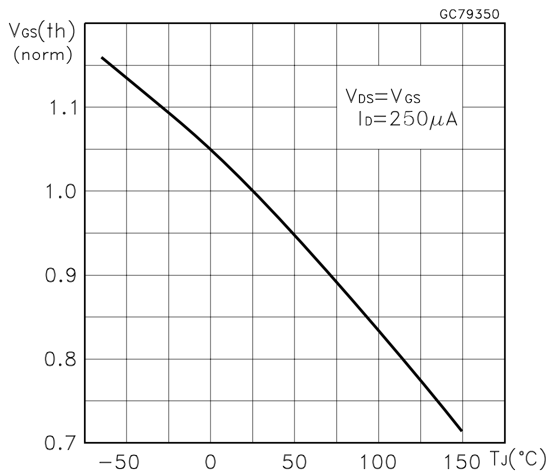
Gate Charge vs Gate-source Voltage



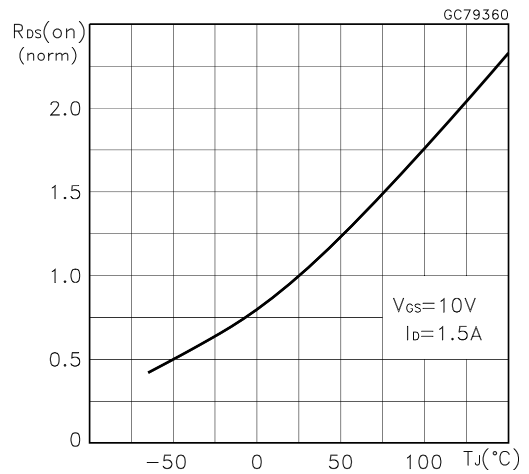
Capacitance Variations



Normalized Gate Threshold Voltage vs Temperature



Normalized On Resistance vs Temperature



Source-drain Diode Forward Characteristics