ATM8N80TF

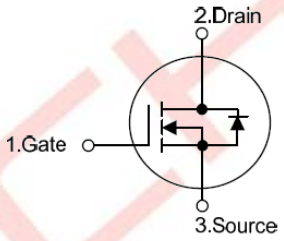
N-Channel Enhancement Mode Power MOSFET

Drain-Source Voltage: 800V Continuous Drain Current: 8A

DESCRIPTION

The ATM8N80TF is a N-channel mode power MOSFET, it uses ATs advanced technology to provide costumers planar stripe and DMOS technology. This technology allows a minimum on-state resistance, superior switching performance. It also can withstand high energy pulse in the avalanche and commutation mode.

The ATM8N80TF is generally applied in high efficiency switch mode power supplies.



FEATURES

- Typically 35 nC Low Gate Charge
- $R_{DS(ON)}$ < 1.45Ω @ V_{GS} = 10V, I_D = 4.0A
- Typically 13 pF Low C_{RSS}
- Improved dv/dt Capability
- Fast Switching Speed
- 100% Avalanche Tested
- RoHS–Compliant Product

ABSOLUTE MAXIMUM RATINGS (T_C=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DSS}	800	V
Gate-Source Voltage		V_{GSS}	±30	V
Drain Current (Continuous) (T_C=25°C)		I_D	8	A
Drain Current (Pulsed) (Note1)		I_{DM}	32	A
Avalanche Current (Note 1)		I_{AR}	8	A
Single Pulse Avalanche Energy (Note 3)		E_{AS}	850	mJ
Repetitive Avalanche Energy (Note 1)		E_{AR}	17.8	mJ
Peak Diode Recovery dv/dt (Note 4)		dv/dt	4.5	V/ns
Power Dissipation	TO-220F	P_D	59	W
Linear Derating Factor above (T_C=25°C)	TO-220F		0.47	W/°C
Junction Temperature		T_J	+150	°C
Storage Temperature		T_{STG}	-55 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L = 25mH, I_{AS} = 8A, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25°C
4. I_{SD} ≤ 8A, di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, Starting T_J = 25°C

ATM8N80TF

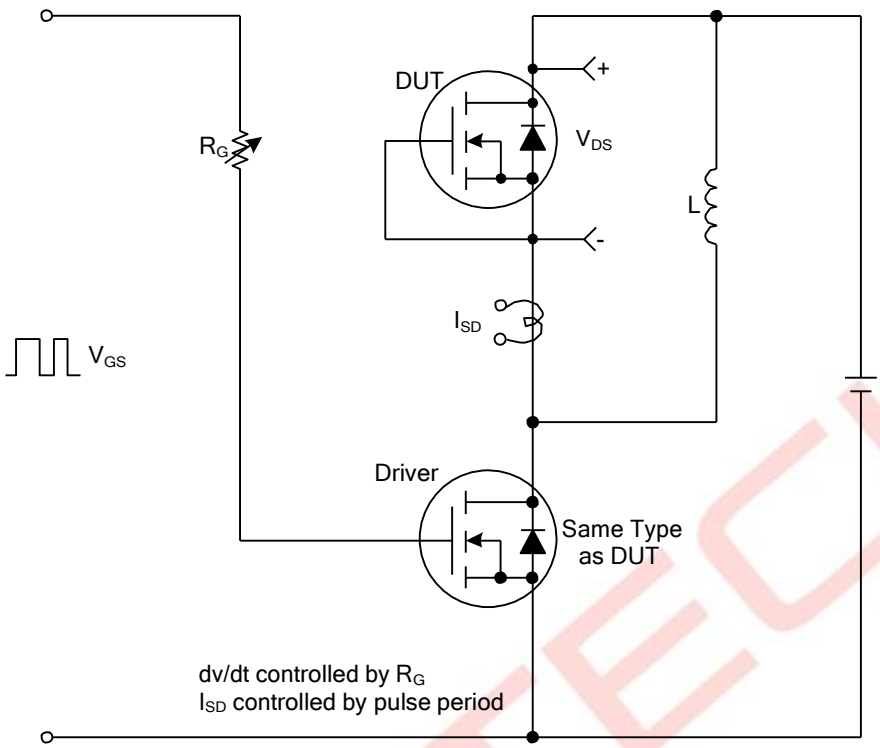
ELECTRICAL CHARACTERISTICS (T_C=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	800			V
Breakdown Voltage Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=250μA		0.5		V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=800V, V_{GS}=0V			10	μA
		V_{DS}=640V, T_C=125°C			100	
Gate- Source Leakage Current	I_{GSS}	V_{GS}=±30V, V_{DS}=0V			±100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_D=250μA	3.0		5.0	V
Static Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=4A		1.18	1.45	Ω
Forward Transconductance (Note 1)	g_{FS}	V_{DS}=50V, I_D=4A		5.6		S
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	V_{GS}=0V, V_{DS}=25V, f=1.0MHz		1580	2050	pF
Output Capacitance	C_{OSS}			135	175	pF
Reverse Transfer Capacitance	C_{RSS}			13	17	pF
SWITCHING PARAMETERS (Note 1, Note 2)						
Total Gate Charge	Q_G	V_{GS}=10V, V_{DS}=400V, I_D=8A R_L=50Ω		47	60	nC
Gate to Source Charge	Q_{GS}			10		nC
Gate to Drain Charge	Q_{GD}			14		nC
Turn-ON Delay Time	$t_{D(ON)}$	V_{DD}=400V, I_D=8A, R_G=25Ω		40	90	ns
Rise Time	t_R			110	230	ns
Turn-OFF Delay Time	$t_{D(OFF)}$			65	140	ns
Fall-Time	t_F			70	150	ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Continuous Drain-Source Diode Forward Current	I_S				8	A
Maximum Pulsed Drain-Source Diode Forward Current	I_{SM}				32	A
Drain-Source Diode Forward Voltage	V_{SD}	I_S=8A, V_{GS}=0V			1.4	V
Reverse Recovery Time (Note 1)	t_{rr}	I_S=8A, V_{GS}=0V, dI_F/dt=100A/μs		690		ns
Reverse Recovery Charge (Note 1)	Q_{RR}			8.2		μC

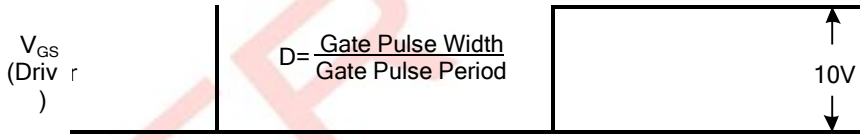
Note: 1. Pulse Test: Pulse width ≤ 300μs, Duty cycle ≤ 2%

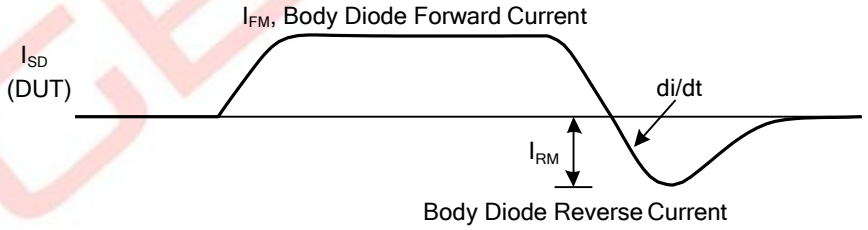
2. Essentially independent of operating temperature

TEST CIRCUITS AND WAVEFORMS

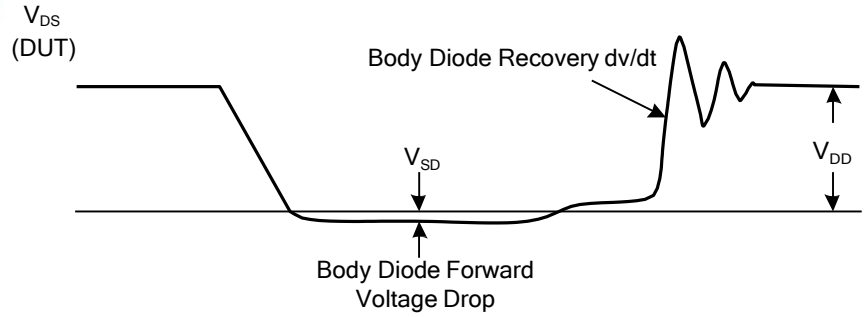


Peak Diode Recovery dv/dt Test Circuit & Waveforms



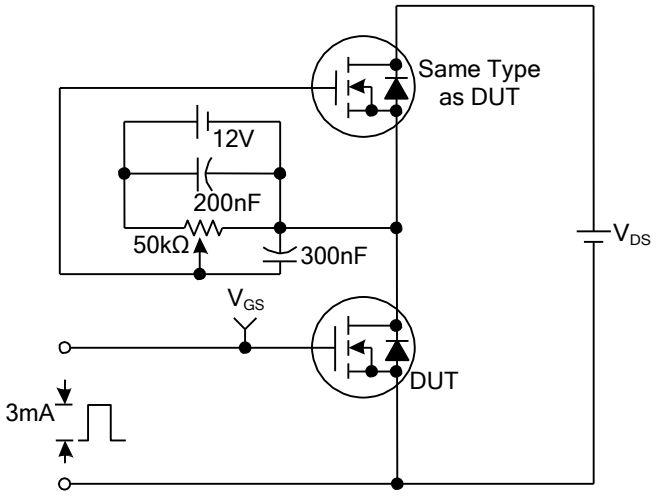


Body Diode Reverse Current

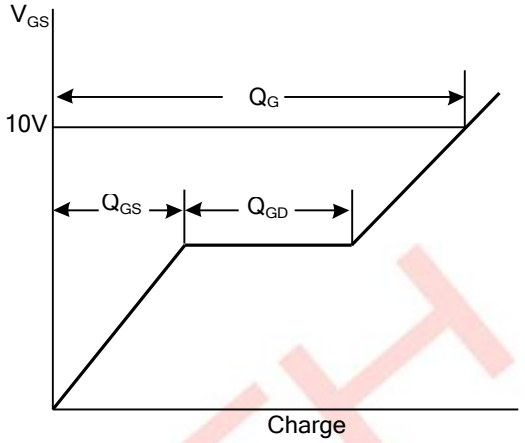


Body Diode Forward
Voltage Drop

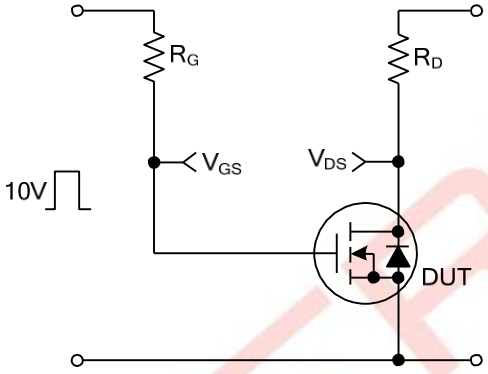
TEST CIRCUITS AND WAVEFORMS(Cont.)



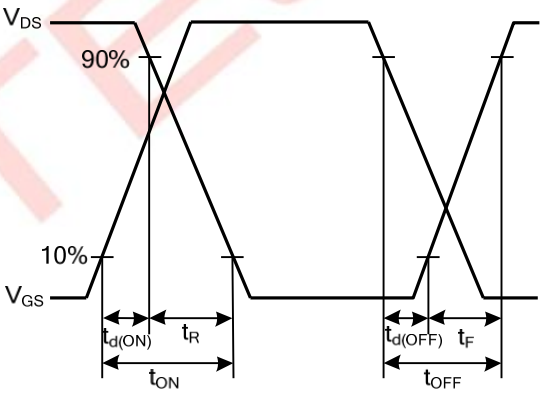
Gate Charge Test Circuit



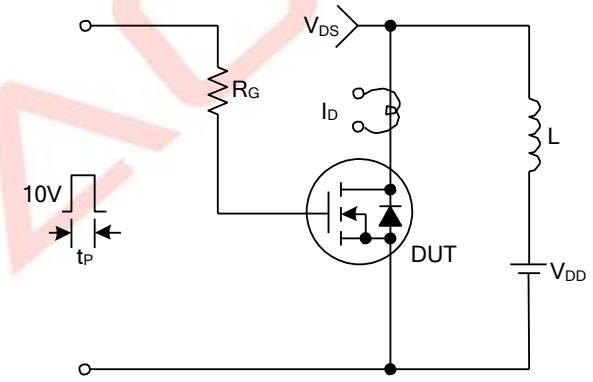
Gate Charge Waveforms



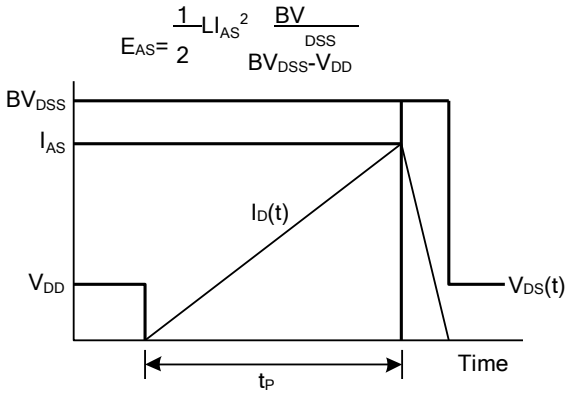
Resistive Switching Test Circuit



Resistive Switching Waveforms



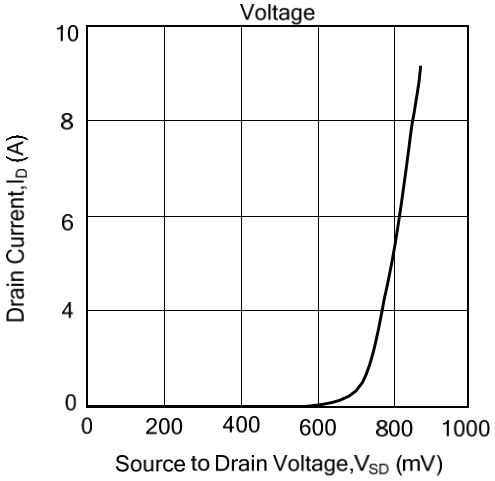
Unclamped Inductive Switching Test Circuit



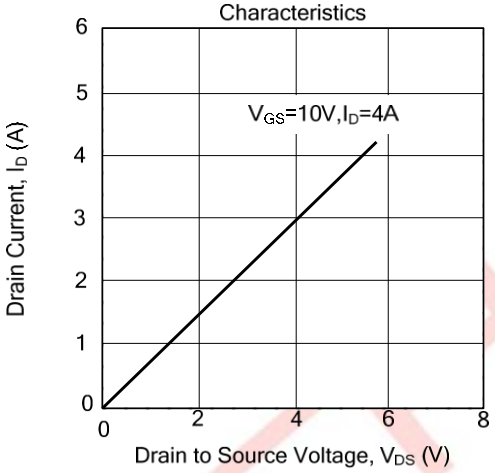
Unclamped Inductive Switching Waveforms

TYPICAL CHARACTERISTICS CURVES

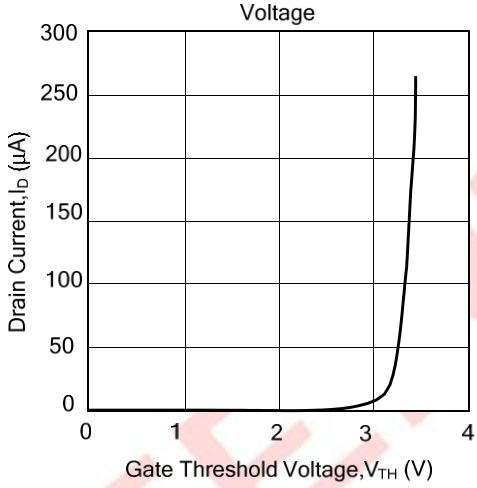
Drain Current vs. Source to Drain Voltage



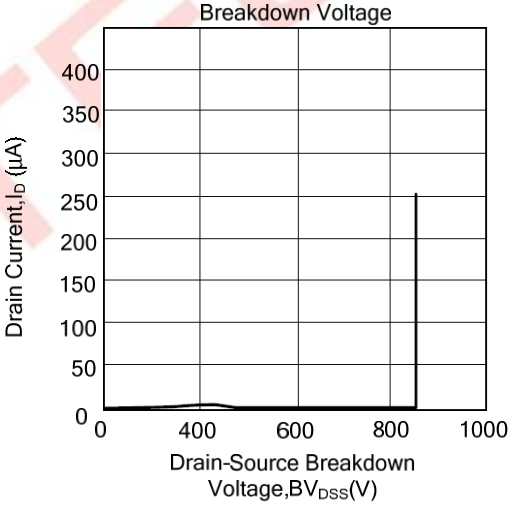
Drain-Source On State Resistance Characteristics



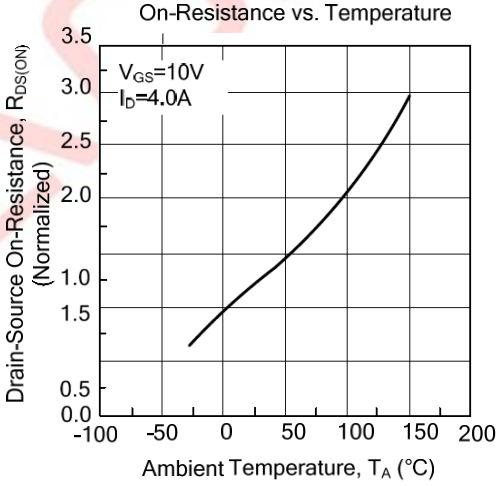
Drain Current vs. Gate Threshold Voltage



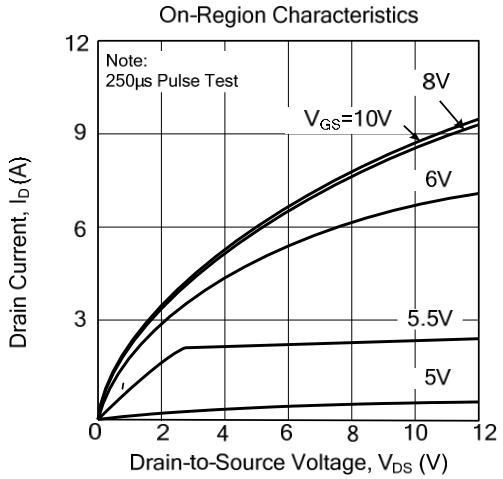
Drain Current vs. Drain-Source Breakdown Voltage



On-Resistance vs. Temperature

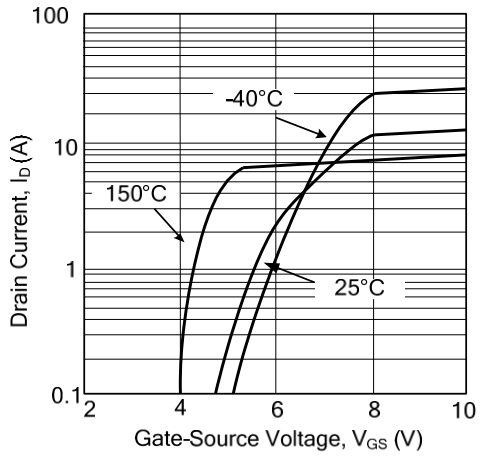


On-Region Characteristics

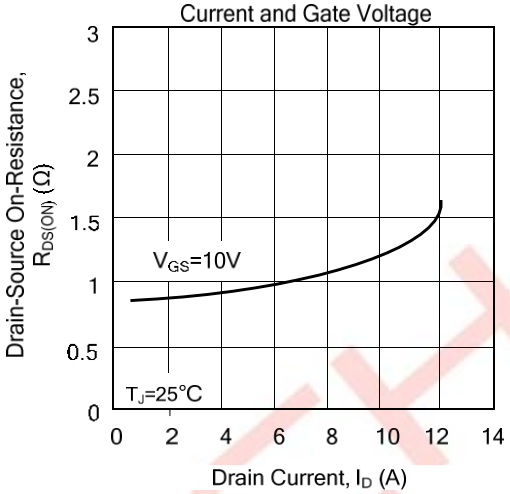


TYPICAL CHARACTERISTICS CURVES (Cont.)

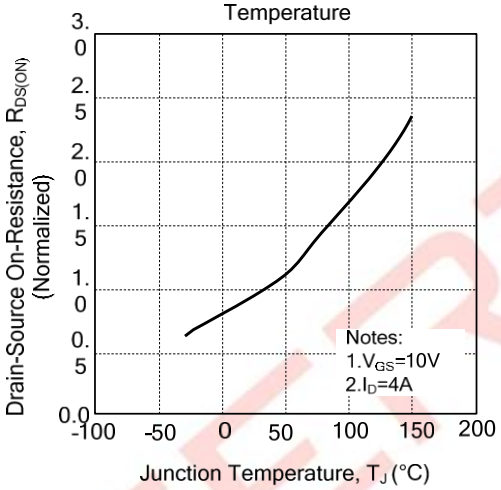
Transfer Characteristics



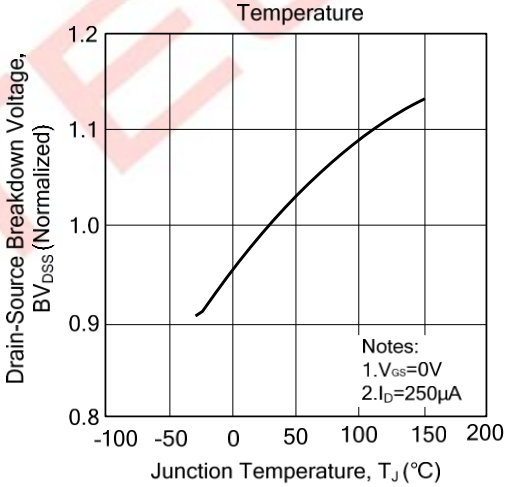
On-Resistance Variation vs. Drain Current and Gate Voltage



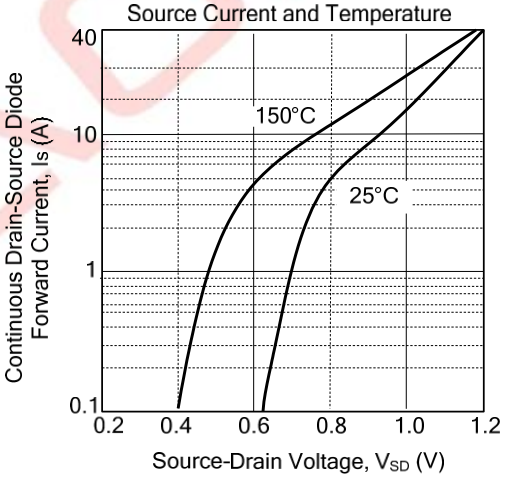
On-Resistance Variation vs. Temperature



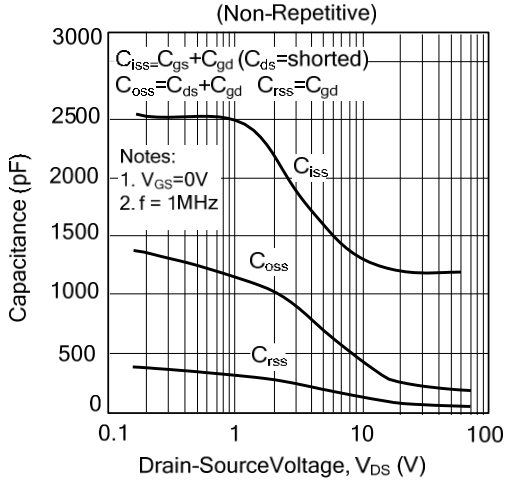
Breakdown Voltage Variation vs. Temperature



Body Diode Forward Voltage Variation with Source Current and Temperature

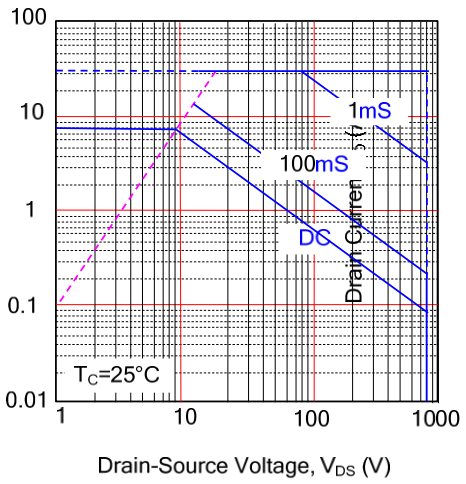


Capacitance Characteristics (Non-Repetitive)

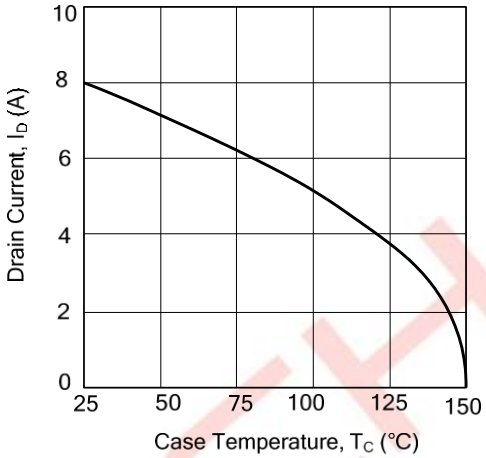


TYPICAL CHARACTERISTICS CURVES (Cont.)

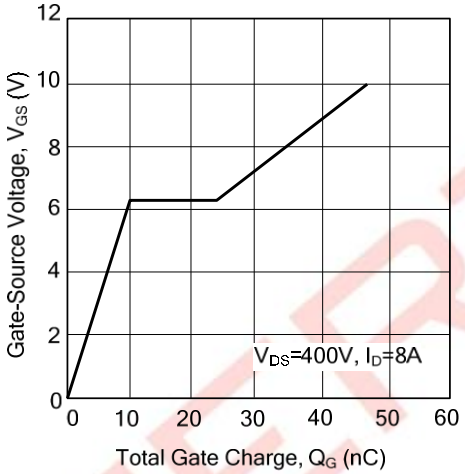
Safe Operating Area



Maximum Drain Current vs.Case Temperature



Gate Charge Characteristics



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Package Outline

TO-220F