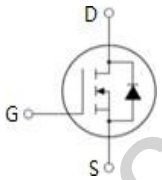
FEATURES

- Proprietary New Trench Technology
- Low Gate Charge Minimize Switching Loss
- Fast Recovery Body Diode

Applications

- High efficiency DC/DC Converters
- Synchronous Rectification
- UPS Inverter



Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value		Unit
		TO-220F	TO-220	
Drain-Source Voltage (V_{GS} = 0V)	V_{DSS}	80		V
Continuous Drain Current	I_D	85		A
Pulsed Drain Current (note1)	I_{DM}	340		A
Gate-Source Voltage	V_{GSS}	±30		V
Single Pulse Avalanche Energy (note2)	E_{AS}	570		mJ
Single Pulse Avalanche Current (note1)	I_{AS}	36.6		A
Repetitive Avalanche Energy (note1)	E_{AR}	342		mJ
Power Dissipation (T_C = 25ºC)	P_D	55	43	W
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55~+150		ºC

Thermal Resistance

Parameter	Symbol	Value		Unit
		TO-220F	TO-220	
Thermal Resistance, Junction-to-Case	R_{thJC}	5	4.2	K/W
Thermal Resistance, Junction-to-Ambient	R_{thJA}	62.5	60	

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Drain-to-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250uA	80	--	--	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=80V, V_{GS}=0V	--	--	1	μA
		V_{DS}=64V, V_{GS}=0V, T_J=125℃	--	--	100	
Gate-to-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	--	--	±100	nA
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=VGS, I_D=250uA	2.0	--	4.0	V
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=40A	--	9.5	12	mΩ
Dynamic						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1.0MHz	--	2728	--	pF
Output Capacitance	C_{rss}		--	782	--	
Reverse Transfer Capacitance	C_{oss}		--	339	--	
Total Gate Charge	Q_g	V_{DD}=40V, I_D=40A, V_{GS}=0 to 10V	--	164	--	nC
Gate-to-Source Charge	Q_{gs}		--	15	--	
Gate-to-Drain (Miller) Charge	Q_{gd}		--	71	--	
Turn-on Delay Time	$t_{d(ON)}$	V_{DD}=40V, I_D=10A, V_{GS}= 10V R_G=25Ω	--	50	--	nS
Rise Time	t_{rise}		--	106	--	
Turn-Off Delay Time	$t_{d(OFF)}$		--	408	--	
Fall Time	t_{fall}		--	183	--	
Drain-Source Body Diode Characteristics						
Continuous Source Current (note2)	I_{SD}	Integral PN-diode in MOSFET	--	--	85	A
Pulsed Source Current (note2)	I_{SM}		--	--	340	
Diode Forward Voltage	V_{SD}	I_S=75A, V_{GS}=0V	--	--	1.2	V
Reverse recovery time	t_{rr}	V_{GS}=0V ,I_F=10A, d_{iF}/dt=100A/μs	--	100	--	ns
Reverse recovery charge	Q_{rr}		--	410	--	nC

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. L=1mH, V_{DD} = 50V, R_G = 25 Ω, Starting T_J = 25ºC
3. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 1. Typical Output Characteristics

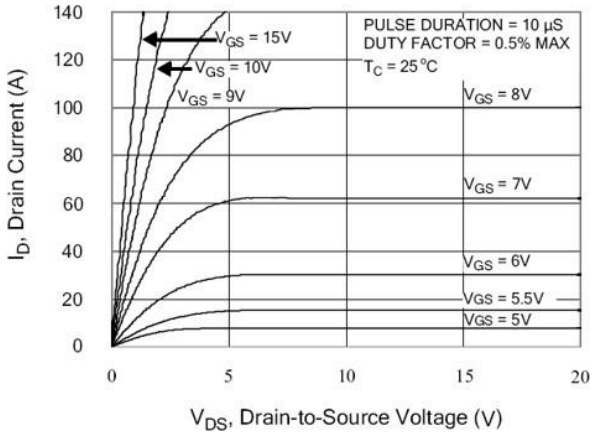


Figure 2. Maximum Power Dissipation vs Case Temperature

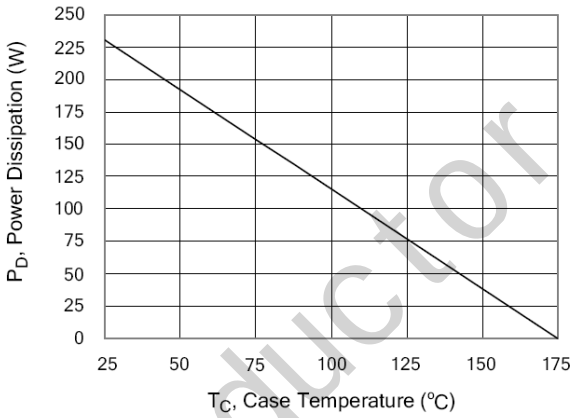


Figure 3. Maximum Continuous Drain Current vs Case Temperature

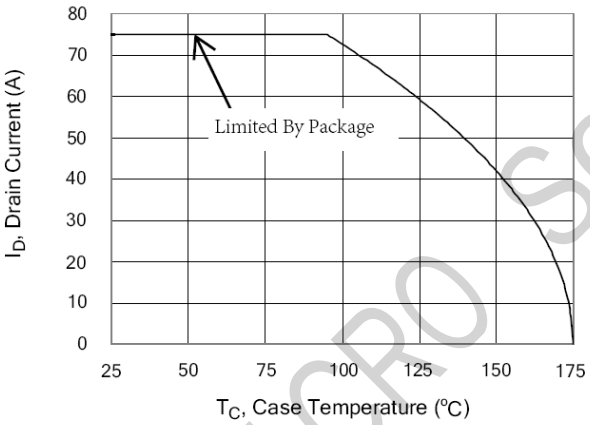


Figure 4. Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

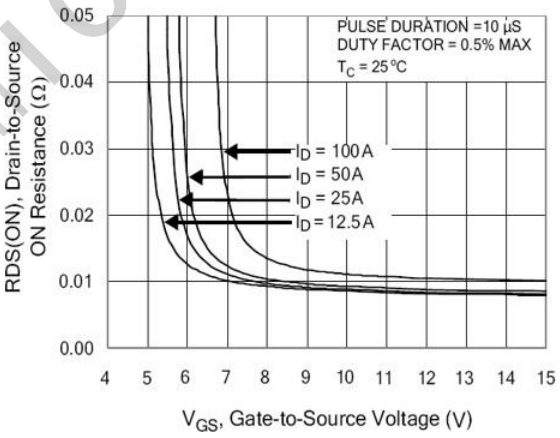


Figure 7. Typical Drain-to-Source ON Resistance vs Drain Current

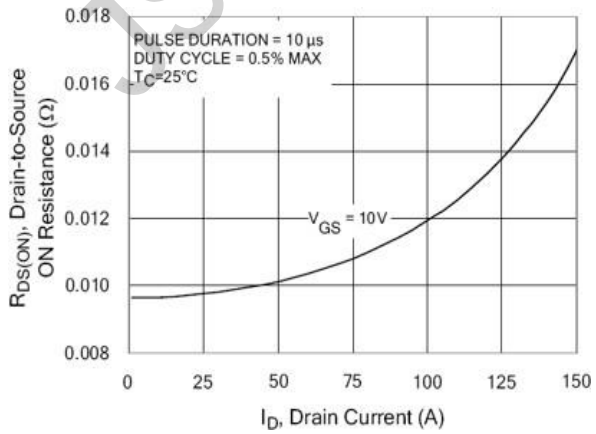
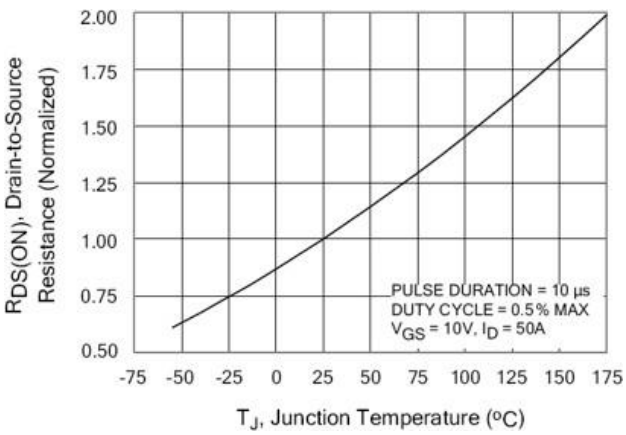


Figure 8. Typical Drain-to-Source ON Resistance vs Junction Temperature



Typical Characteristics T_J = 25ºC, unless otherwise noted

Figure 7. Capacitance

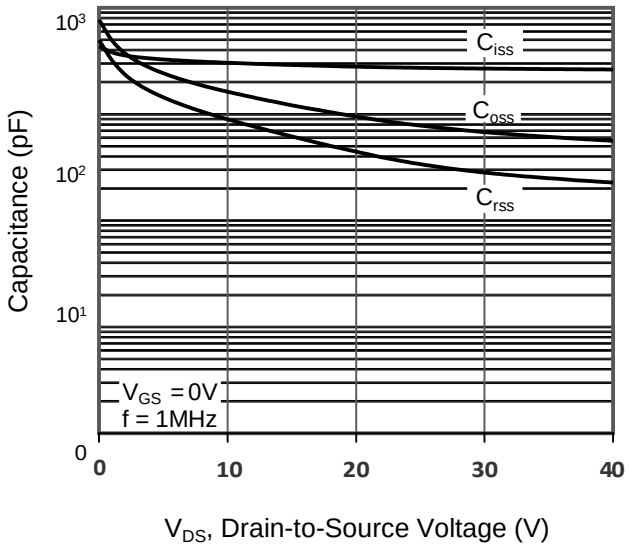


Figure 8. Gate Charge

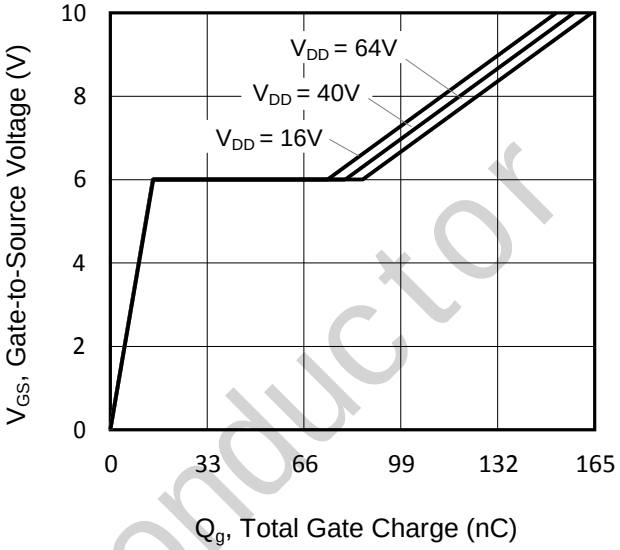


Figure 9. Transient Thermal Impedance TO-251,TO-252,TO-220

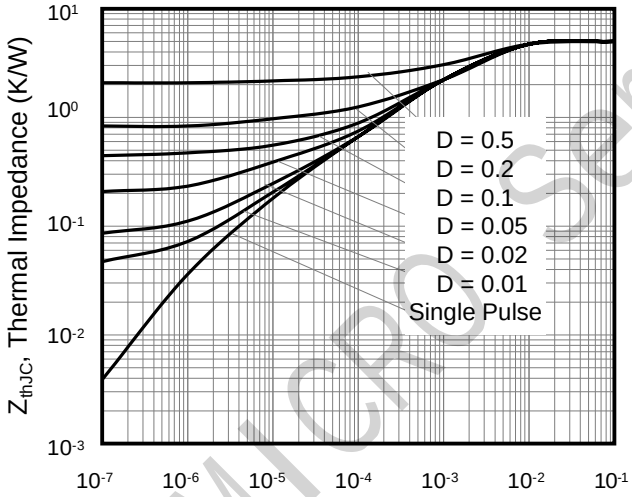


Figure 10. Transient Thermal Impedance TO-220F

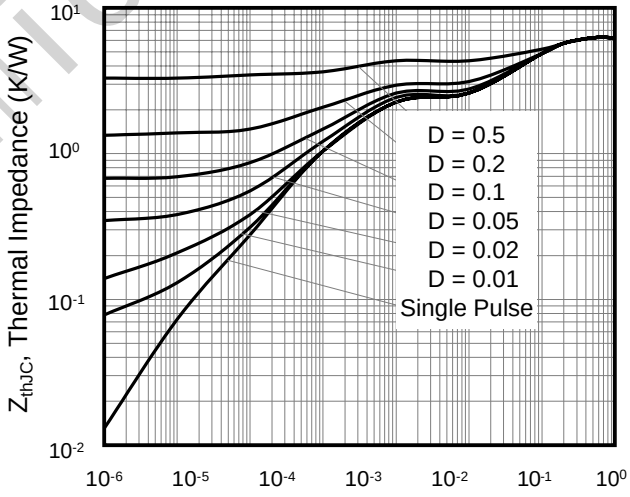


Figure A：Gate Charge Test Circuit and Waveform

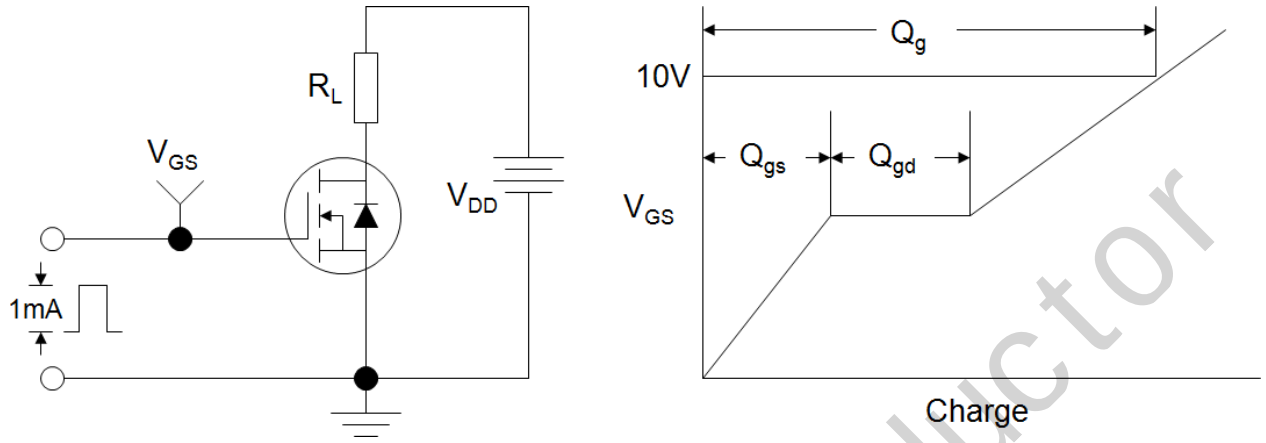


Figure B：Resistive Switching Test Circuit and Waveform

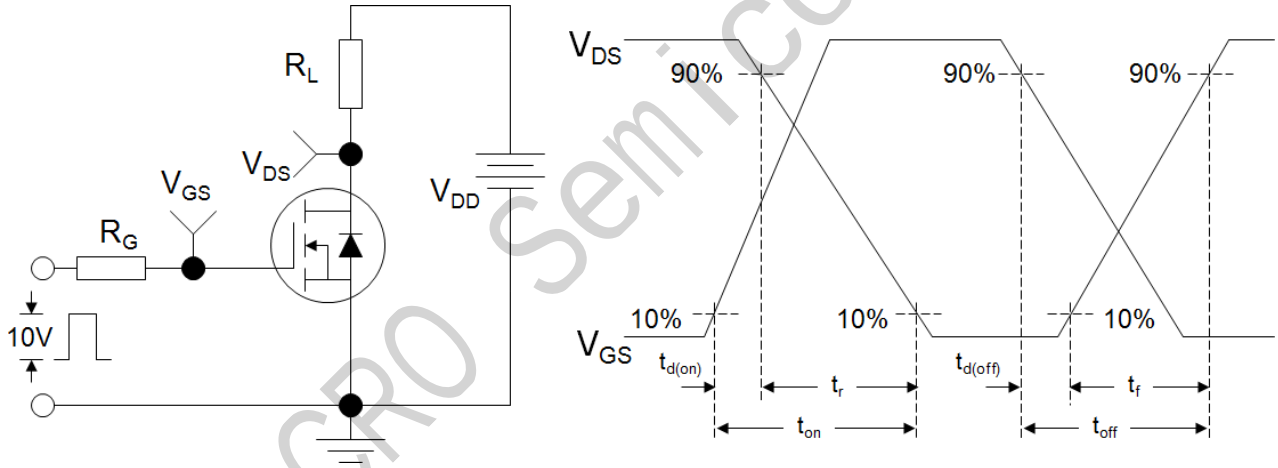
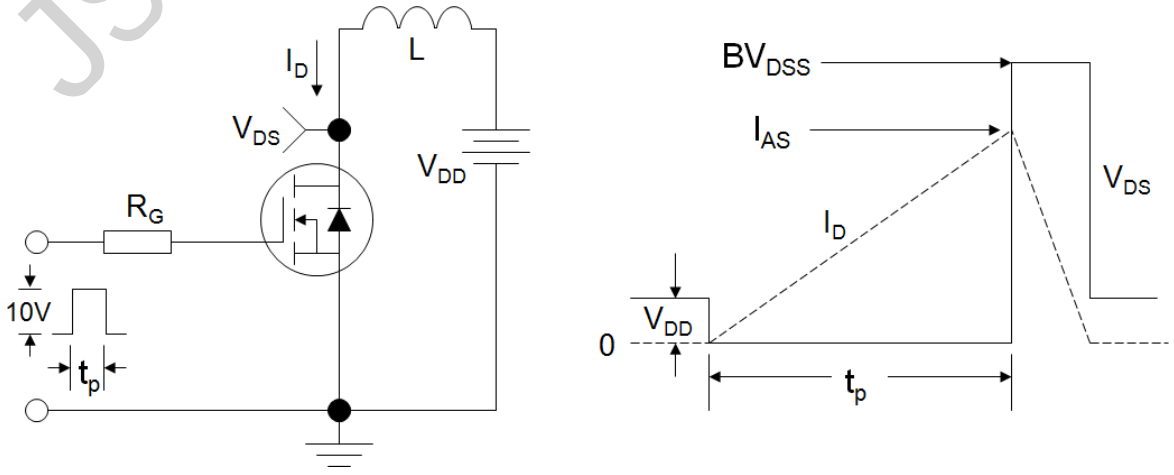


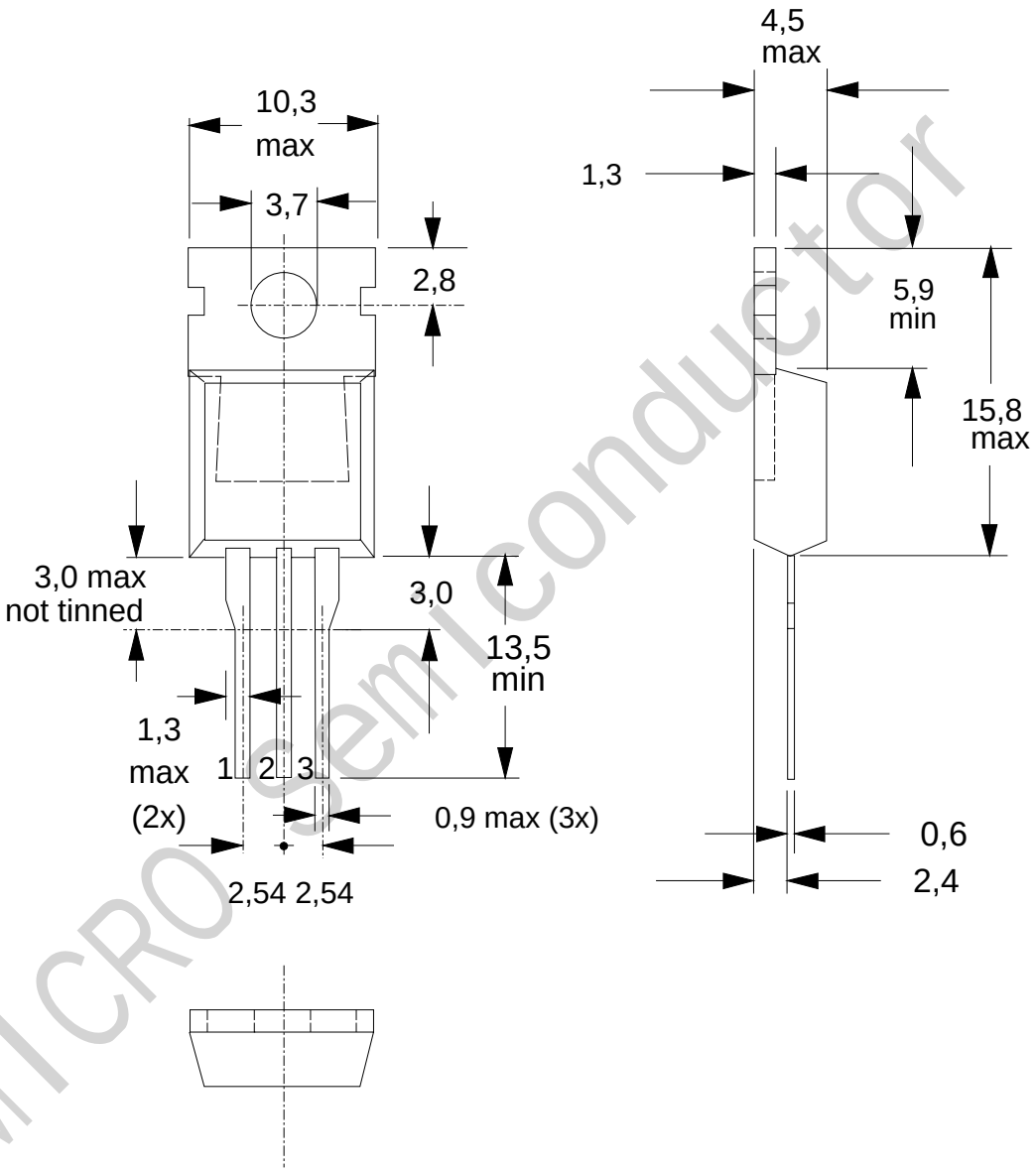
Figure C：Unclamped Inductive Switching Test Circuit and Waveform



PACKAGE OUTLINE

TO-220

Dimensions in mm



TO-220F Package Dimensions

UNIT：mm

SYMBOL	min	nom	max	SYMBOL	min	nom	max
A	9.80		10.60	D		2.54	
A1		7.00		D1	1.15		1.55
A2	2.90		3.40	D2	0.60		1.00
A3	9.10		9.90	D3	0.20		0.50
B1	15.40		16.40	E	2.24		2.84
B2	4.35		4.95	E1		0.70	
B3	6.00		7.40	E2		1.0×45°	
C	3.00		3.70	E3	0.35		0.65
C1	15.00		17.00	E4	2.30		3.30
C2	8.80		10.80	α（度）		30°