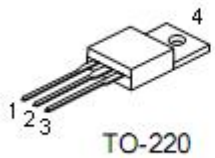
1. Features

- $R_{DS(ON)}$=0.08Ω @V_{GS}=10V
- RoHS compliant
- Low on resistance
- Low gate charge
- Fast switching

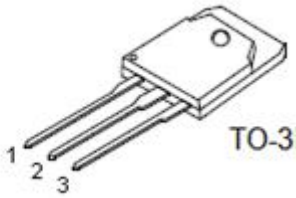
2. Applications

- DC-DC converters
- DC-AC converters for UPS
- SMPS and motor controls

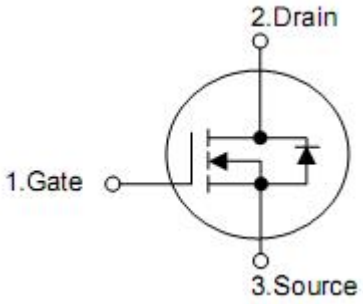
3.Symbol



TO-220



TO-3P



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

4. Absolute maximum ratings

(T_C=25°C,unless otherwise specified)

Parameter	Symbol	Rating	Units
Drain-source voltage	V_{DSS}	200	V
Continuous drain current	I_D	40	A
Continuous drain current T_C=100 ºC		19.2	A
Pulsed drain current, V_{GS}@10V (note*1)	I_{DM}	120	A
Power dissipation	P_D	175	W
Derating factor above 25ºC		1.43	W/ºC
Gate-source voltage	V_{GS}	±30	V
Single pulse avalanche energy (note*2)	E_{AS}	800	mJ
Avalanche current (note*1)	I_{AR}	32	A
Repetitive avalanche energy (note*1)	E_{AR}	17.5	mJ
Peak diode recovery dv/dt (note*3)	dv/dt	4.5	V/ns
Operating junction and storage temperature range	T_J ,T_{STG}	-55 to150	ºC
Maximum temperature for soldering 1/8″ from case for 5 seconds	T_L	300	ºC

5. Thermal characteristics

Parameter	Symbol	TO-220	TO-3P	Unit
Junction-case	$R_{\theta JC}$	0.49	0.6	ºC/W
Case-sink typ	$R_{\theta JS}$	0.5	-	
Junction-ambient	$R_{\theta JA}$	62.5	60	ºC/W

6. Electrical characteristics

(T_J=25°C,unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV_{DSS}	V_{GS}=0V,I_D=250μA	200	-	-	V
Breakdown voltage temperature coefficient Figure 11	$\triangle BV_{DSS}/\triangle T_J$	Reference 25℃ I_D=250uA	-	0.2	-	V/ºC
Drain-source leakage current	I_{DSS}	V_{DS}=200V, V_{GS}=0V	-	-	1	μA
		V_{DS}=160V, T_J=125°C	-	-	10	
Gate-source forward leakage	I_{GSS}	V_{GS}=30V	-	-	100	nA
Gate-source reverse leakage		V_{GS}=-30V	-	-	-100	
Drain-source on-resistance Figure 9 and 10	$R_{DS(on)}$	V_{GS}=10V,I_D=16A	-	0.08	0.1	Ω
Gate threshold voltage, Figure 12	$V_{GS(TH)}$	V_{DS}= V_{GS}, I_D=250uA	2	-	4	V
Forward transconductance	gfs	V_{DS}=40V, I_D=16A (note*4)	-	22	-	S
Input capacitance	C_{iss}	V_{DS}=25V,V_{GS}=0V f=1MHz Figure 14	-	1560	-	pF
Output capacitance	C_{oss}		-	370	-	
Reverse transfer capacitance	C_{rss}		-	150	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=100V, I_D=32A, R_G=25Ω,V_{GS}=10V	-	26	-	ns
Rise time	t_r		-	32	-	
Turn-off delay time	$t_{d(off)}$		-	141	-	
Fall time	t_f		-	83	-	
Total gate charge	Q_g	V_{DS}=160V, I_D=32A, V_{GS}=10V	-	50	-	nC
Gate-source charge	Q_{gs}		-	12	-	
Gate-drain (“Miller”)charge	Q_{gd}		-	22	-	
Continuous source current（body diode）	I_S	Integral pn-diode in MOSFET	-	-	40	A
Maximum pulsed current（body diode）	I_{SM}		-	-	128	
Diode forward voltage	V_{SD}	I_S=32A, V_{GS}=0V	-	-	1.4	V
Reverse recovery time	t_{rr}	I_S=32A, V_{GS}=0V dI/dt=100A/μs	-	215	-	ns
Reverse recovery charge	Q_{rr}		-	1.8	-	uC

Note:*1. I_{AS}=32A, V_{DD}=50V, R_G=25Ω, T_J=25°C

*2. Repetitive rating; pulse width limited by maximum junction temperature.

*3. I_{SD}≤ 40A di/dt ≤ 200A/μs, V_{DD} ≤ BV_{DSS}, T_J=175°C.

*4. Pulse width ≤ 300μs, duty cycle ≤ 2%.

*5. Essentianlly independent of operating temperature.

7. Typical operating characteristics

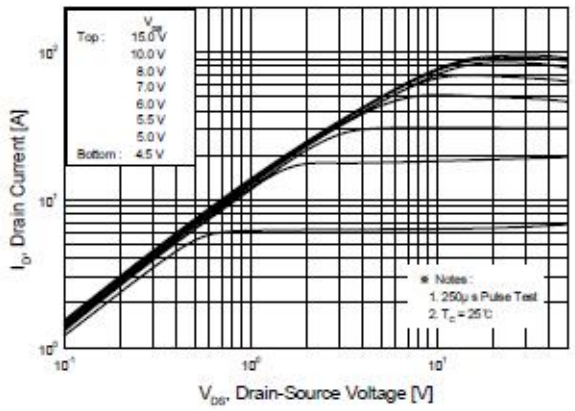


Figure 1. On-Region Characteristics

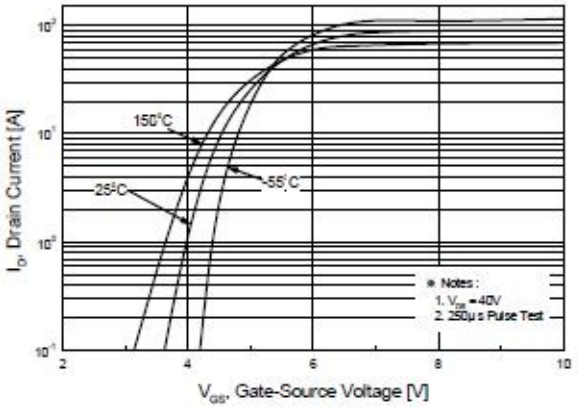


Figure 2. Transfer Characteristics

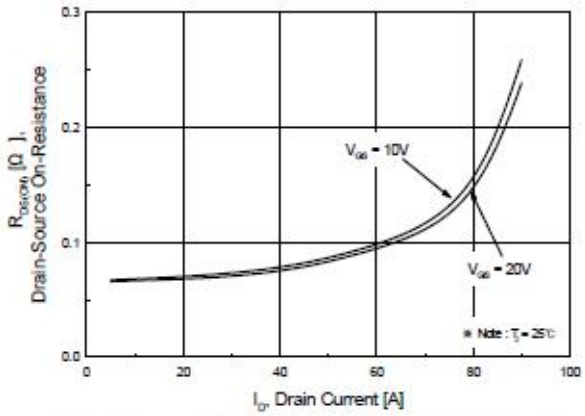


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

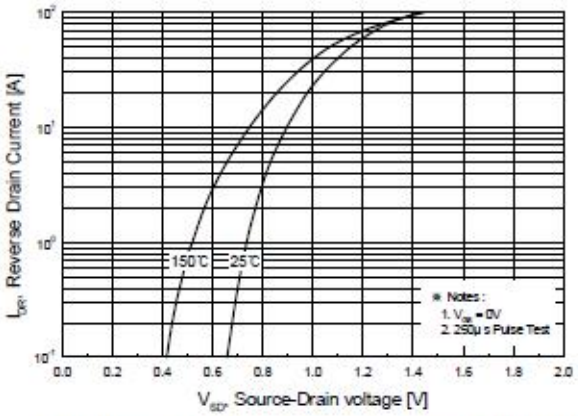


Figure 4. Body Diody Forward Voltage Variation with Source Current and Temperature

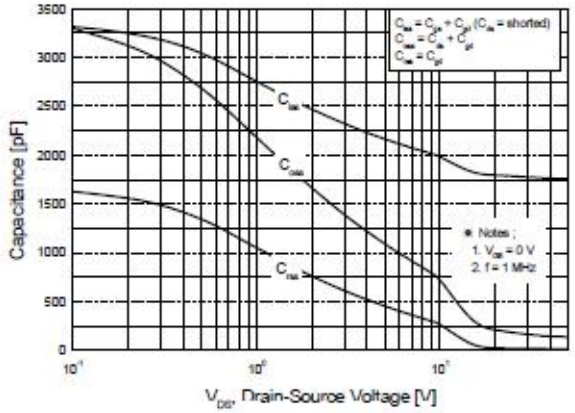


Figure 5. Capacitance Characteristics

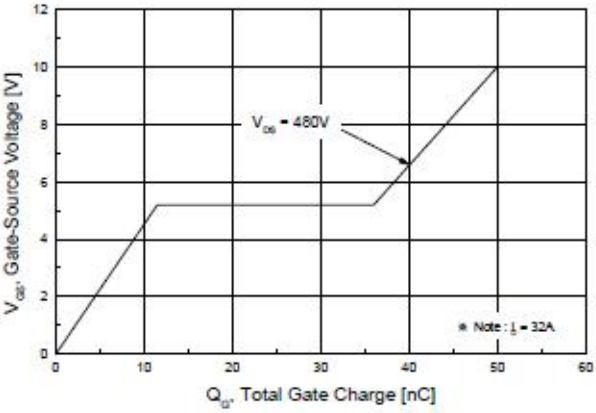


Figure 6. Gate Charge Characteristics

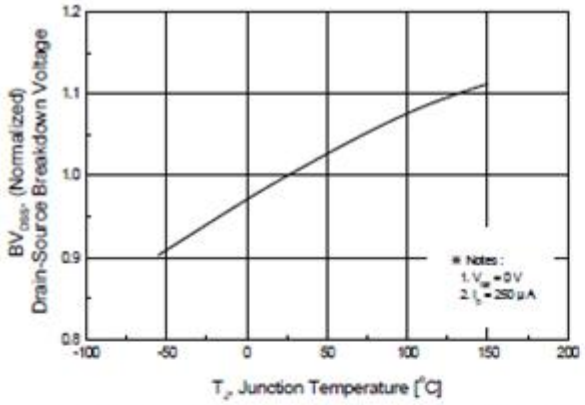


Figure 7. Breakdown Voltage Variation vs Temperature

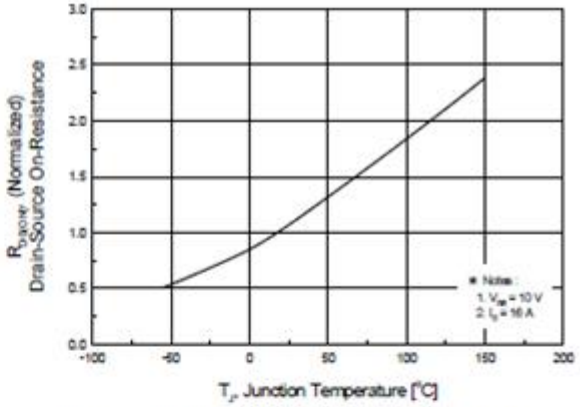


Figure 8. On-Resistance Variation vs Temperature

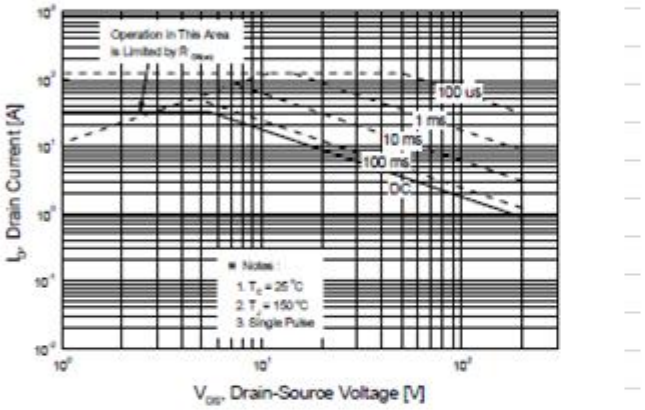


Figure 9. Maximum Safe Operating Area

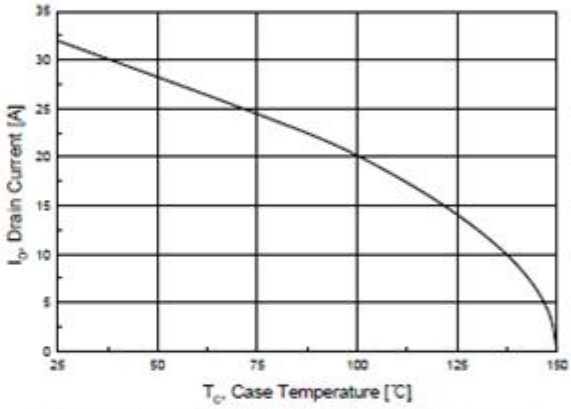


Figure 10. Maximum Drain Current vs Case Temperature

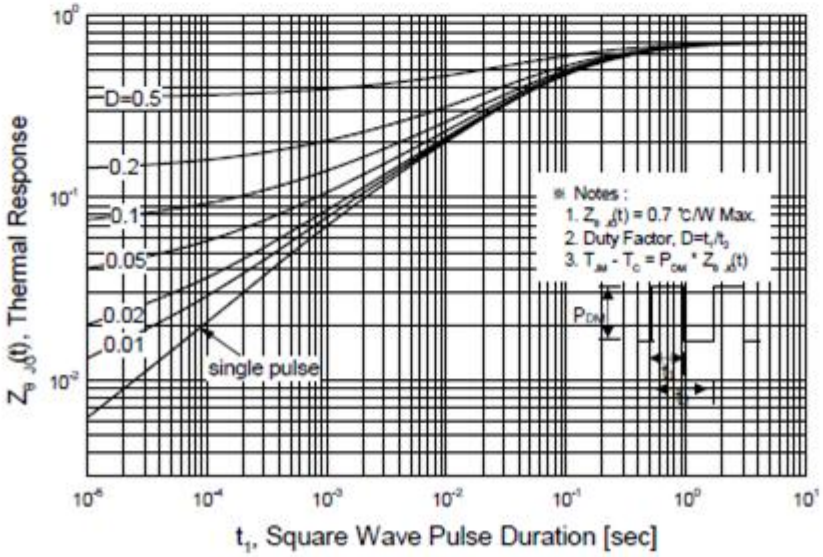


Figure 11. Transient Thermal Response Curve