

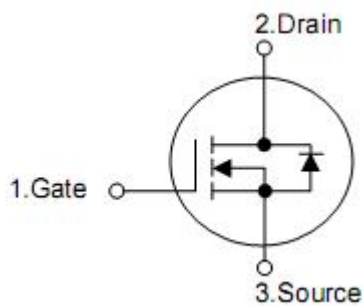
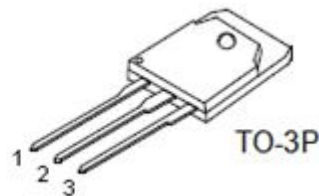
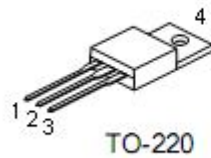
## 1. Features

- $R_{DS(ON)}=0.08\Omega$  (Max.) @ $V_{GS}=10V$
- 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



Pin	Function
1	Gate
2	Drain
3	Source
4	Drain

#### 4. Absolute maximum ratings

( $T_C=25^{\circ}\text{C}$ , unless otherwise specified)

Parameter	Symbol	Rating	Units
Drain-source voltage	$V_{DSS}$	200	V
Continuous drain current	$I_D$	40	A
Continuous drain current $T_C=100^{\circ}\text{C}$		19.2	A
Pulsed drain current, $V_{GS}@10\text{V}$ (note*1)	$I_{DM}$	120	A
Power dissipation	$P_D$	175	W
Derating factor above $25^{\circ}\text{C}$		1.43	W/ $^{\circ}\text{C}$
Gate-source voltage	$V_{GS}$	$\pm 30$	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 to 150	$^{\circ}\text{C}$
Maximum temperature for soldering 1/8" from case for 5 seconds	$T_L$	300	$^{\circ}\text{C}$

#### 5. Thermal characteristics

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

**6. Electrical characteristics**

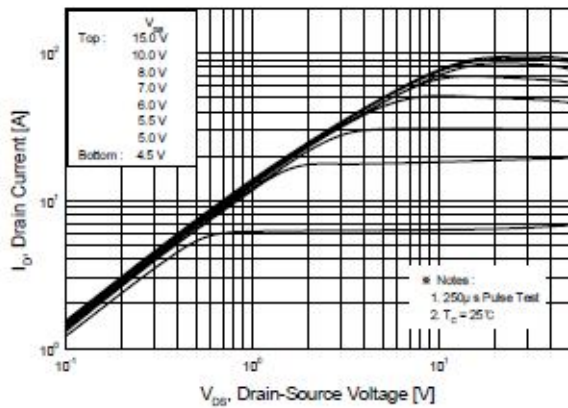
(T<sub>J</sub>=25°C, unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Drain-source breakdown voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	200	-	-	V
Breakdown voltage temperature coefficient Figure 11	ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	Reference 25°C I <sub>D</sub> =250uA	-	0.2	-	V/°C
Drain-source leakage current	I <sub>DSS</sub>	V <sub>DS</sub> =200V, V <sub>GS</sub> =0V	-	-	1	μA
		V <sub>DS</sub> =160V, T <sub>J</sub> =125°C	-	-	10	
Gate-source forward leakage	I <sub>GSS</sub>	V <sub>GS</sub> =30V	-	-	100	nA
Gate-source reverse leakage		V <sub>GS</sub> =-30V	-	-	-100	
Drain-source on-resistance Figure 9 and 10	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =16A	-	0.08	0.1	Ω
Gate threshold voltage, Figure 12	V <sub>GS(TH)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250uA	2	-	4	V
Forward transconductance	g <sub>fs</sub>	V <sub>DS</sub> =40V, I <sub>D</sub> =16A (note*4)	-	22	-	S
Input capacitance	C <sub>iss</sub>	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V f=1MHz Figure 14	-	1560	-	pF
Output capacitance	C <sub>oss</sub>		-	370	-	
Reverse transfer capacitance	C <sub>rss</sub>		-	150	-	
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> =100V, I <sub>D</sub> =32A, R <sub>G</sub> =25Ω, V <sub>GS</sub> =10V	-	26	-	ns
Rise time	t <sub>r</sub>		-	32	-	
Turn-off delay time	t <sub>d(off)</sub>		-	141	-	
Fall time	t <sub>f</sub>		-	83	-	
Total gate charge	Q <sub>g</sub>		V <sub>DS</sub> =160V, I <sub>D</sub> =32A, V <sub>GS</sub> =10V	-	50	
Gate-source charge	Q <sub>gs</sub>	-		12	-	
Gate-drain ("Miller") charge	Q <sub>gd</sub>	-		22	-	
Continuous source current (body diode)	I <sub>S</sub>	Integral pn-diode in MOSFET	-	-	40	A
Maximum pulsed current (body diode)	I <sub>SM</sub>		-	-	128	
Diode forward voltage	V <sub>SD</sub>	I <sub>S</sub> =32A, V <sub>GS</sub> =0V	-	-	1.4	V
Reverse recovery time	t <sub>rr</sub>	I <sub>S</sub> =32A, V <sub>GS</sub> =0V di/dt=100A/μs	-	215	-	ns
Reverse recovery charge	Q <sub>rr</sub>		-	1.8	-	uC

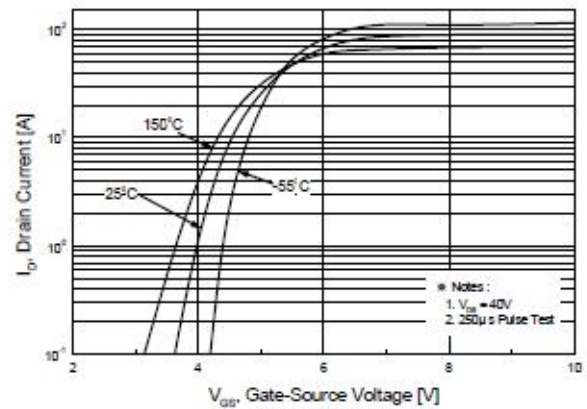
Note:\*1. I<sub>AS</sub>=32A, V<sub>DD</sub>=50V, R<sub>G</sub>=25Ω, T<sub>J</sub>=25°C

- \*2. Repetitive rating; pulse width limited by maximum junction temperature.
- \*3. I<sub>SD</sub> ≤ 40A di/dt ≤ 200A/μs, V<sub>DD</sub> ≤ BV<sub>DSS</sub>. T<sub>J</sub>=175°C.
- \*4. Pulse width ≤ 300μs, duty cycle ≤ 2%.
- \*5. Essentially independent of operating temperature.

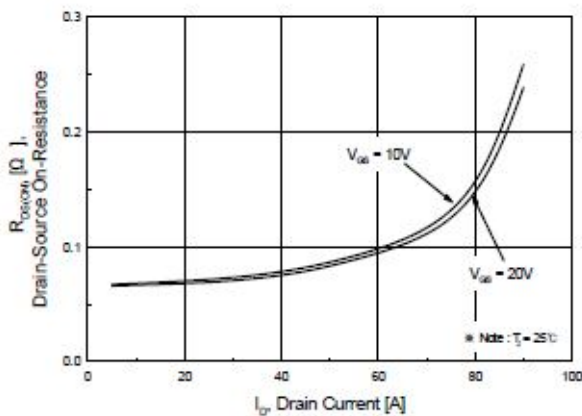
**7. Typical operating characteristics**



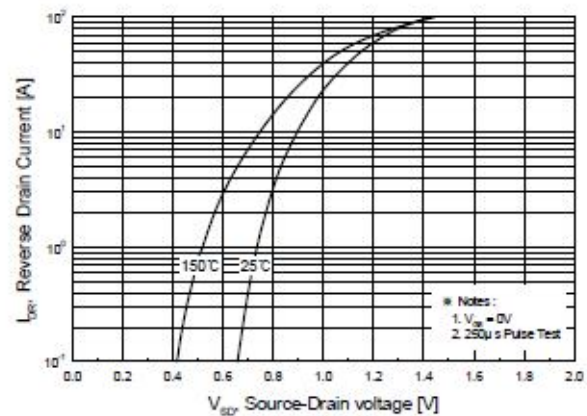
**Figure 1. On-Region Characteristics**



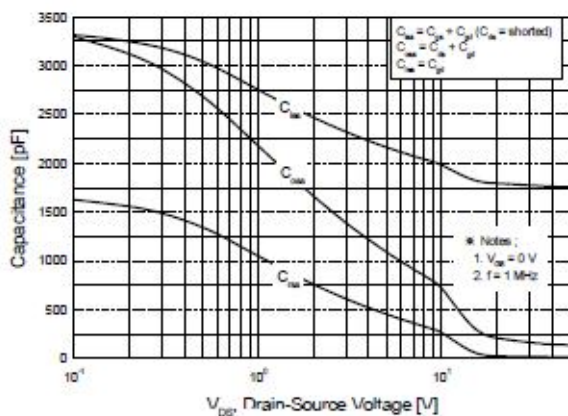
**Figure 2. Transfer Characteristics**



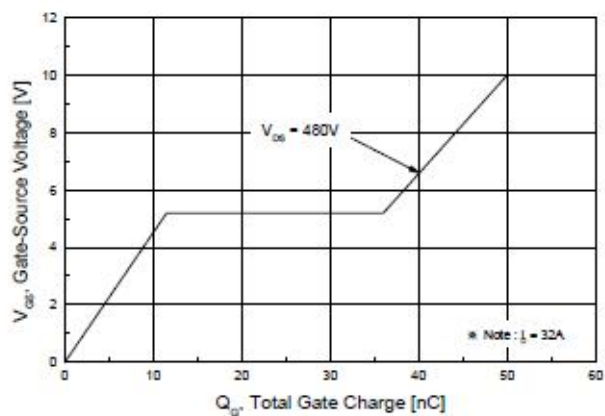
**Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage**



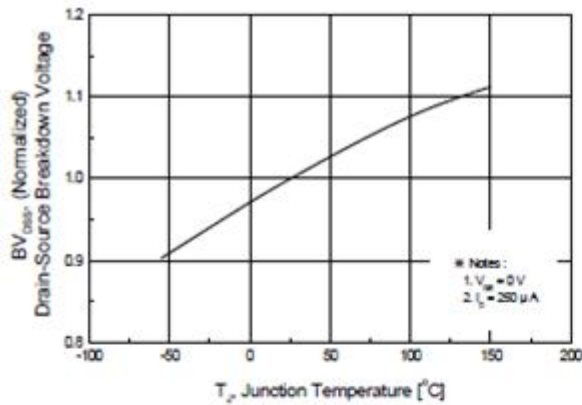
**Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature**



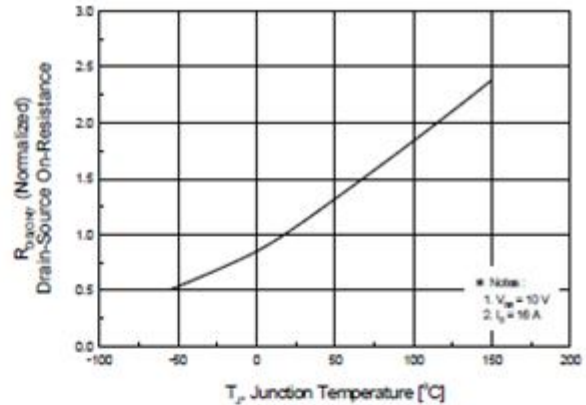
**Figure 5. Capacitance Characteristics**



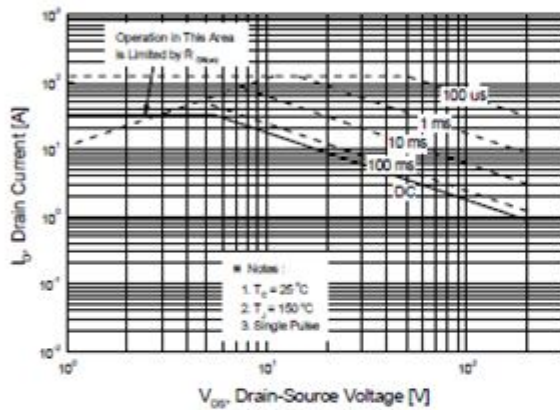
**Figure 6. Gate Charge Characteristics**



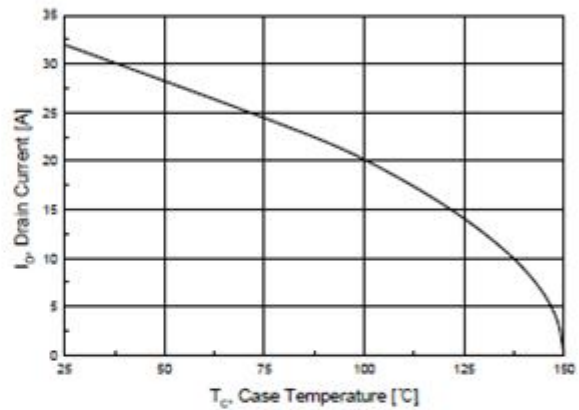
**Figure 7. Breakdown Voltage Variation vs Temperature**



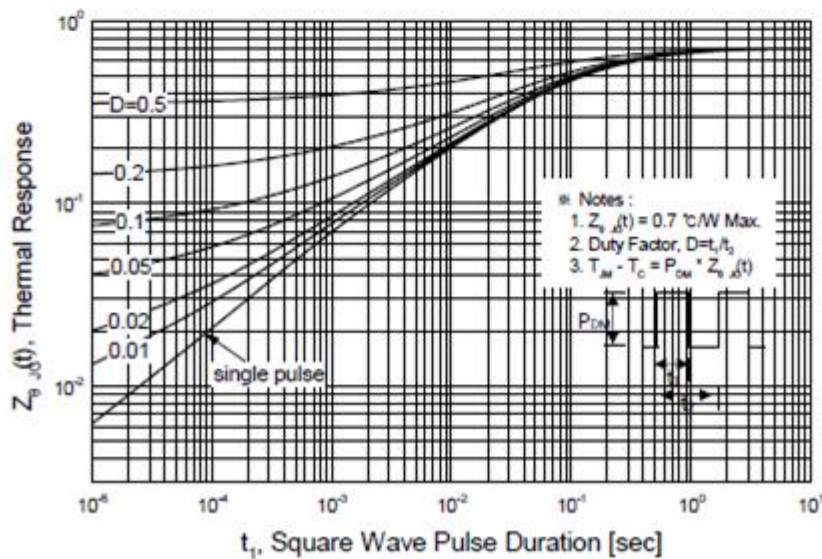
**Figure 8. On-Resistance Variation vs Temperature**



**Figure 9. Maximum Safe Operating Area**



**Figure 10. Maximum Drain Current vs Case Temperature**



**Figure 11. Transient Thermal Response Curve**