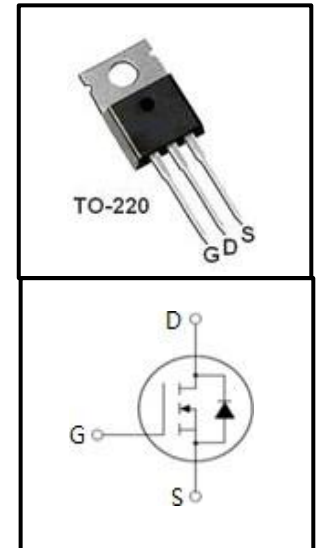


## FEATURES

- ★ Fast switching
- ★ 100% avalanche tested
- ★ Improved dv/dt capability

## APPLICATIONS

- ★ Switch Mode Power Supply (SMPS)
- ★ Uninterruptible Power Supply (UPS)
- ★ Hard switched and high frequency circuits



### Device Marking and Package Information

Device	Package	Marking
JSM162N04	TO-220	JSM162N04

### Absolute Maximum Ratings $T_C = 25^\circ\text{C}$ , unless otherwise noted

Parameter	Symbol	Value	Unit
		TO-220	
Drain-Source Voltage ( $V_{GS} = 0V$ )	$V_{DSS}$	40	V
Continuous Drain Current $V_{GS} = 10V$ $T_C = 25^\circ\text{C}$	$I_D$	162 (note5)	A
Pulsed Drain Current (note1)	$I_{DM}$	648	A
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Single Pulse Avalanche Energy (note2)	$E_{AS}$	1980	mJ
Avalanche Current (note1)	$I_{AS}$	95	A
Repetitive Avalanche Energy (note1)	$E_{AR}$	1188	mJ
Power Dissipation ( $T_C = 25^\circ\text{C}$ )	$P_D$	171	W
Peak Diode Recovery dv/dt (note1)	dv/dt	5.0	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~+150	$^\circ\text{C}$

### Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	$R_{thJC}$	0.73	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{thJA}$	62.5	

Specifications $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 40V, V_{GS} = 0V, T_J = 25^\circ\text{C}$	--	--	20	$\mu A$
		$V_{DS} = 32V, V_{GS} = 0V, T_J = 125^\circ\text{C}$	--	--	250	
Gate-Source Leakage	$I_{GSS}$	$V_{GS} = \pm 20V$	--	--	$\pm 200$	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	--	4.0	V
Drain-Source On-Resistance (Note3)	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 60A(\text{Note4})$	--	4	5	m $\Omega$
<b>Dynamic</b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$	--	3840	--	pF
Output Capacitance	$C_{oss}$		--	1710	--	
Reverse Transfer Capacitance	$C_{rss}$		--	470	--	
Total Gate Charge	$Q_g$	$V_{DD} = 20V, I_D = 162A,$ $V_{GS} = 10V(\text{Note4})$	--	96	--	nC
Gate-Source Charge	$Q_{gs}$		--	19	--	
Gate-Drain Charge	$Q_{gd}$		--	46	--	
Turn-on Delay Time	$t_{d(on)}$	$V_{DD} = 20V, I_D = 162A,$ $R_G = 10\Omega, V_{GS} = 10V$ (Note4)	--	32	--	ns
Turn-on Rise Time	$t_r$		--	92	--	
Turn-off Delay Time	$t_{d(off)}$		--	101	--	
Turn-off Fall Time	$t_f$		--	69	--	
<b>Drain-Source Body Diode Characteristics</b>						
Continuous Body Diode Current	$I_S$	$T_C = 25^\circ\text{C}$	--	--	162	A
Pulsed Diode Forward Current	$I_{SM}$		--	--	650	
Body Diode Voltage	$V_{SD}$	$T_J = 25^\circ\text{C}, I_{SD} = 60A, V_{GS} = 0V$	--	--	1.3	V
Reverse Recovery Time	$t_{rr}$	$V_{GS} = 0V, I_S = 162A,$ $di_F/dt = 100A/\mu s$	--	78	--	ns
Reverse Recovery Charge	$Q_{rr}$		--	200	--	$\mu C$

**Notes**

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Starting  $T_J = 25^\circ\text{C}, L = 1\text{mH}, V_{DD} = 20V$
3.  $I_{SD} \leq 95A, di/dt \leq 150A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J = 175^\circ\text{C}$
4. Pulse Test: Pulse width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$
5. Calculated continuous current based on maximum allowable junction temperature, Package limitation current is 75A

Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

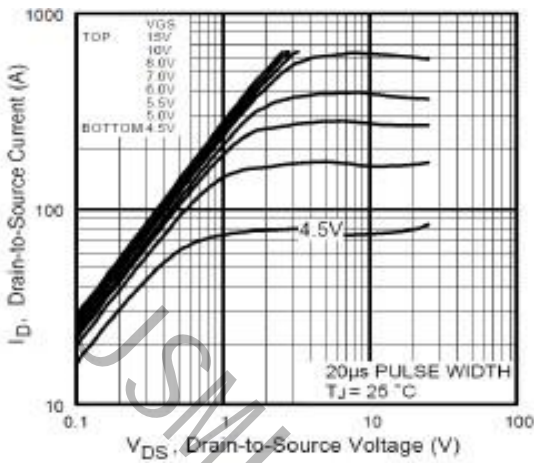


Fig 1. Typical Output Characteristics

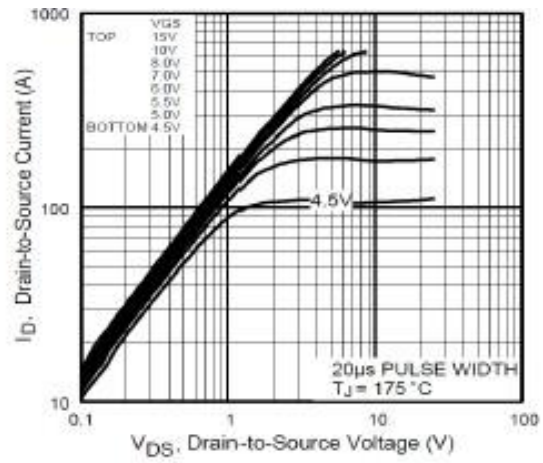


Fig 2. Typical Output Characteristics

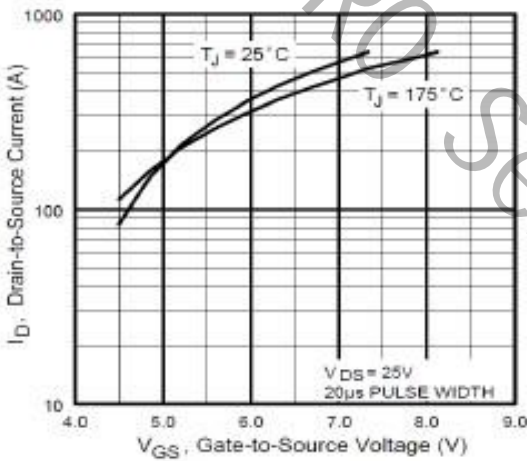


Fig 3. Typical Transfer Characteristics

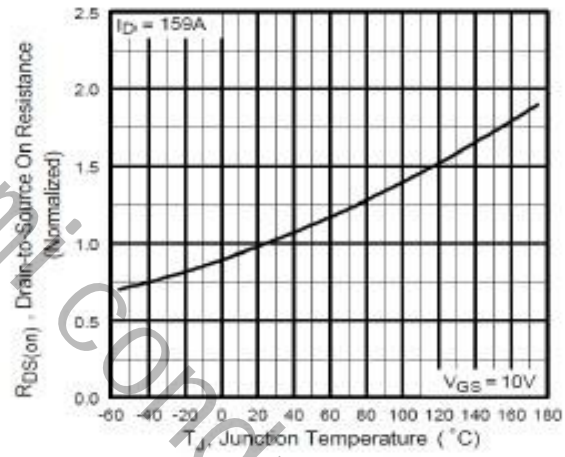


Fig 4. Normalized On-Resistance Vs. Temperature

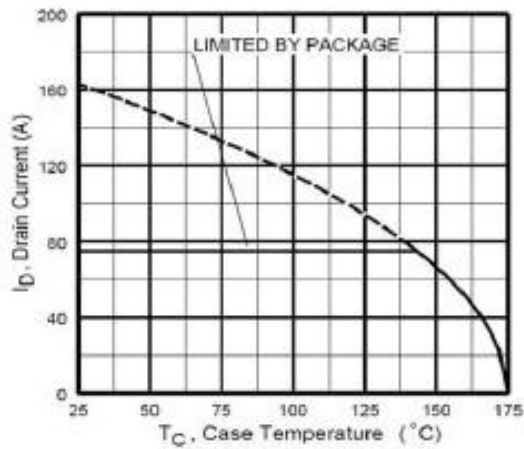


Fig 5. Maximum Drain Current Vs. Case Temperature

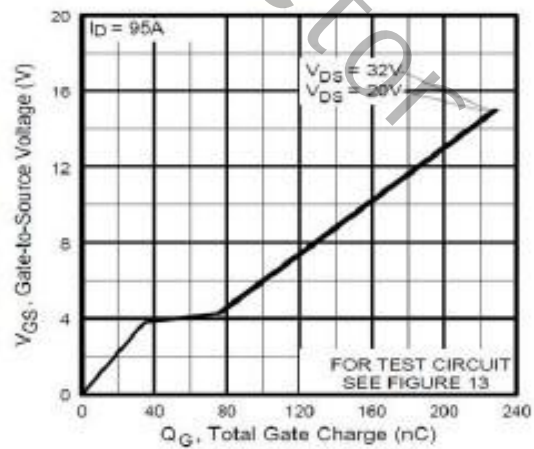


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

Typical Characteristics  $T_J = 25^\circ\text{C}$ , unless otherwise noted

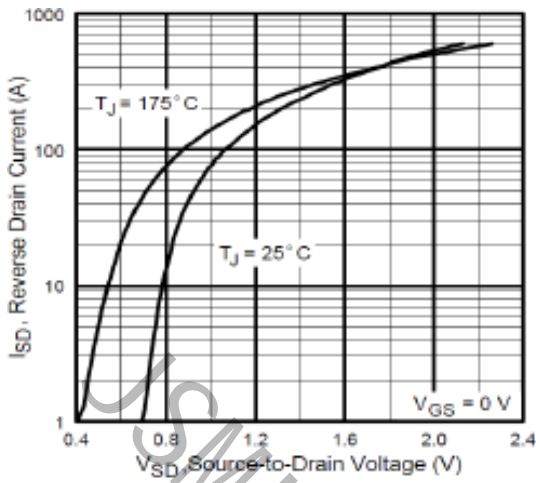


Fig 7. Typical Source-Drain Diode Forward Voltage

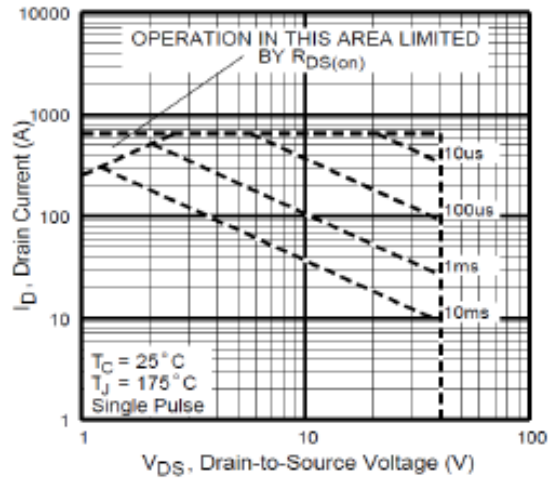
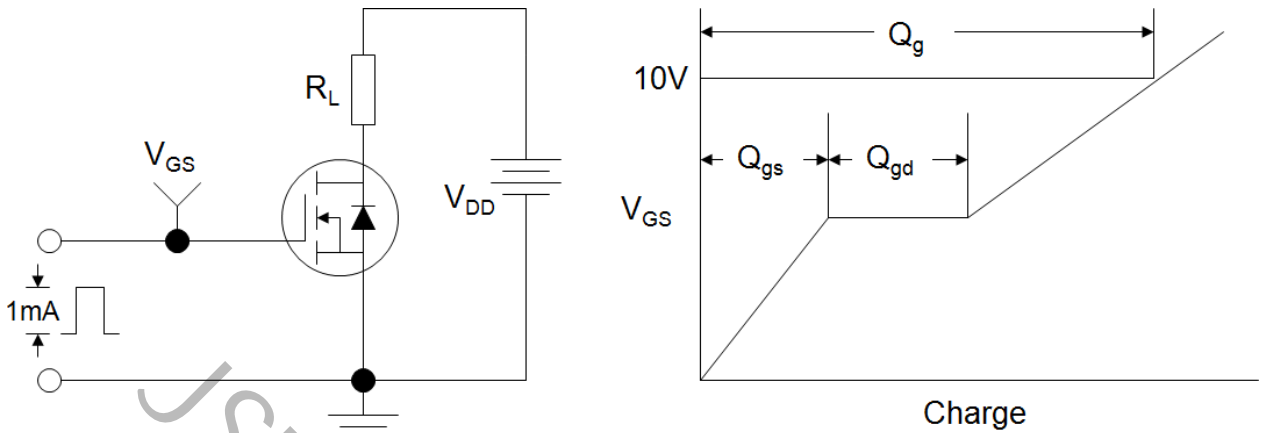
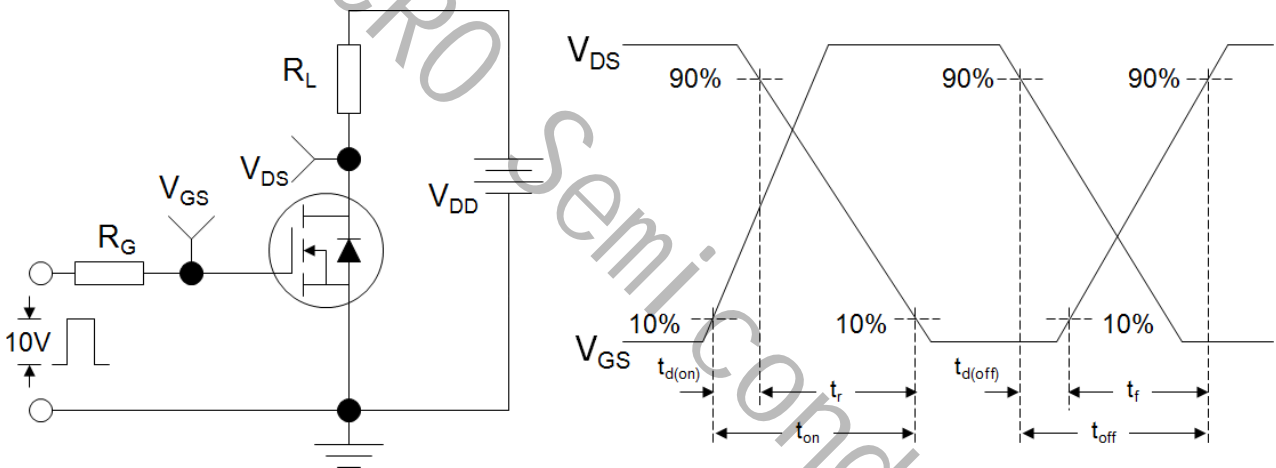


Fig 8. Maximum Safe Operating Area

**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**
