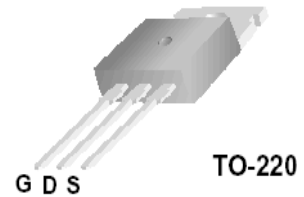
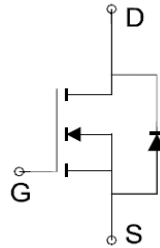


**N-Channel 200V Power MOSFET**

**Features:**

- Avalanche Rugged Technology
- Rugged Gate Oxide Technology
- High di/dt Capability
- Improved Gate Charge



**Application**

- DC-DC Converters
- UPS & Monitors
- High Power Switching
- Car Inverter

$B_{VDSS}=200\text{ V,}$   
 $R_{DS(ON)}=0.18\Omega,$   
 $Typ=0.15\Omega$   
 $ID=18\text{ A}$

**Absolute Maximum Ratings** ( $T_A=25^\circ\text{C}$  Unless Otherwise Noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DSS}$	200	V
Gate-Source Voltage	$V_{GSS}$	$\pm 25$	V
Continuous Drain Current	$I_D$	$T_C=25^\circ\text{C}$	18
		$T_C=100^\circ\text{C}$	11.4
Pulsed Drain Current	$I_{DM}$	72	A
Power Dissipation	$P_D$	140	W
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to 150	$^\circ\text{C}$
Avalanche Current	$I_{AS}$	18	A
Avalanche Energy with Single Pulse	$E_{AS}$	300	mJ
Thermal Resistance-Junction to Ambient (max.)	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$
Thermal Resistance-Junction to Case	$R_{\theta JC}$	0.9	

a. Pulse width limited by safe operating area  
 b. Starting  $T_J=25^\circ\text{C}$ ,  $L=1.32\text{mH}$ ,  $I_{AS}=18\text{A}$ ,  $V_{DD}=50\text{V}$ ,  $R_G=25\Omega$

\* The device mounted on 1in2 FR4 board with 2 oz copper

**N-Channel 200V Power MOSFET**
**Electrical Characteristics** (TA = 25°C Unless Otherwise Specified)

Symbol	Parameter	Limit	Min.	Typ.	Max.	Unit
<b>STATIC</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	200			V
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	2.0		4.0	V
I <sub>GSS</sub>	Gate-Body Leakage	V <sub>GS</sub> =±25V			±100	nA
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =Max Rating, V <sub>GS</sub> =0V			1	μA
R <sub>DS(ON)</sub>	Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =9A		0.15	0.18	Ω
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =30V, I <sub>D</sub> =9A		11		S
<b>DYNAMIC</b>						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =160V, V <sub>GS</sub> =10V, I <sub>D</sub> =18A		37	48	nC
Q <sub>gs</sub>	Gate-Source Charge			6.3		
Q <sub>gd</sub>	Gate-Drain Charge			18.3		
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, f=1MHz		870	1130	pF
C <sub>oss</sub>	Output Capacitance			165	215	
C <sub>rss</sub>	Reverse Transfer Capacitance			60	80	
t <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =100V, I <sub>D</sub> =18A, R <sub>G</sub> =25Ω		15	40	ns
t <sub>r</sub>	Turn-On Rise Time			125	260	
t <sub>d(off)</sub>	Turn-Off Delay Time			100	210	
t <sub>f</sub>	Turn-Off Fall Time			50	110	

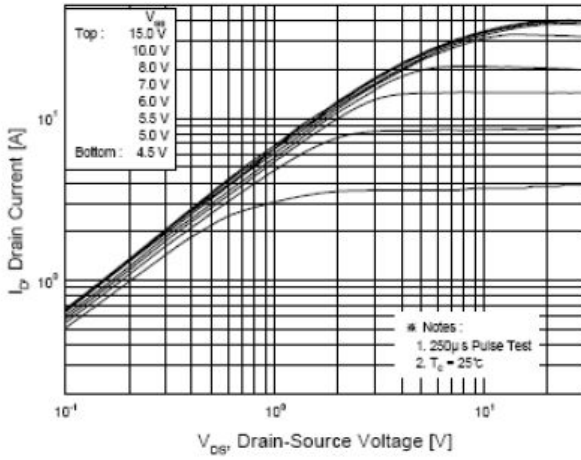
**Source-Drain Diode Ratings and Characteristics**

Symbol	Characteristic	Min.	Typ.	Max.	Units	Test Condition
I <sub>S</sub>	Continuous Source current			18	A	Integral reverse PN diode in The MOSFET
I <sub>SM</sub>	Pulsed Source Current			72		
V <sub>SD</sub>	Diode Forward voltage			1.5	V	I <sub>S</sub> =18A, V <sub>GS</sub> =0V
t <sub>rr</sub>	Reverse Recovery Time		170		ns	I <sub>F</sub> =18A, V <sub>GS</sub> =0V, diF/dt=100A/μs
Q <sub>rr</sub>	Reverse Recovery Charge		0.99		nC	

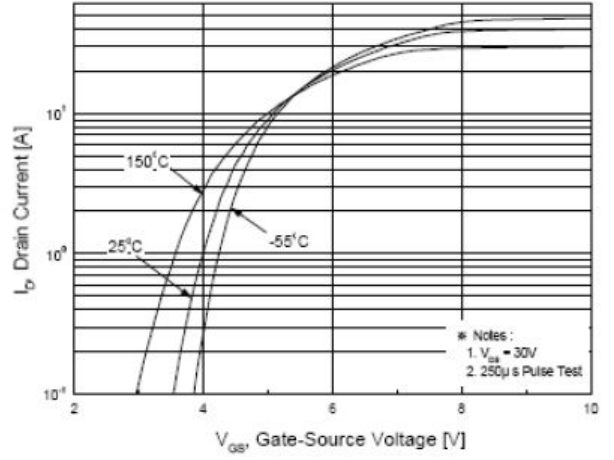
Note: Pulse test: pulse width ≤ 300μs, duty cycle ≤ 2%

**N-Channel 200V Power MOSFET**

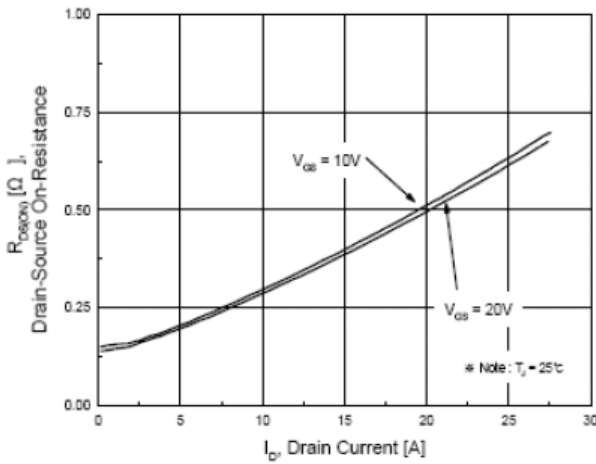
**Typical Characteristics (T<sub>J</sub> = 25°C Noted)**



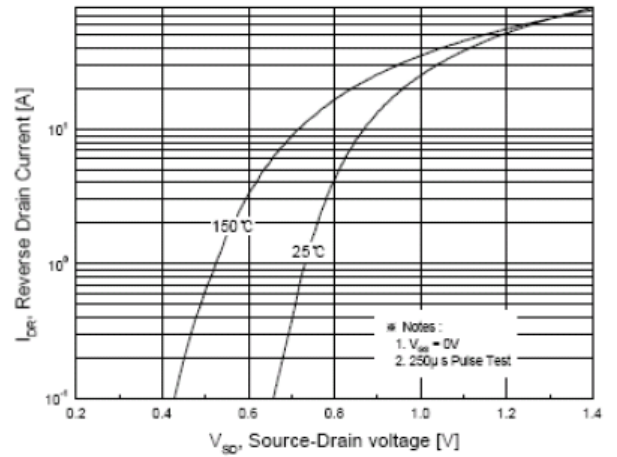
**Fig 1. On-Region Characteristics**



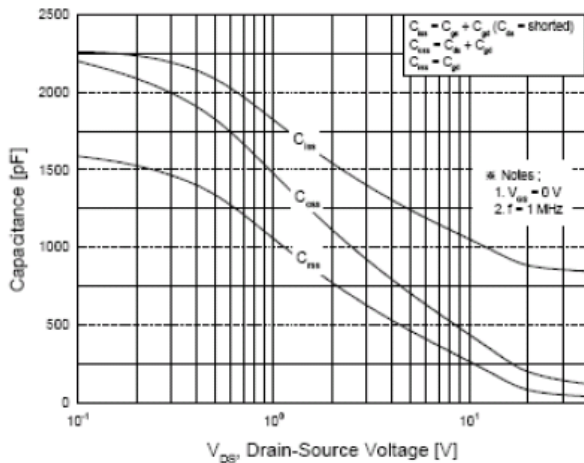
**Fig 2. Transfer Characteristics**



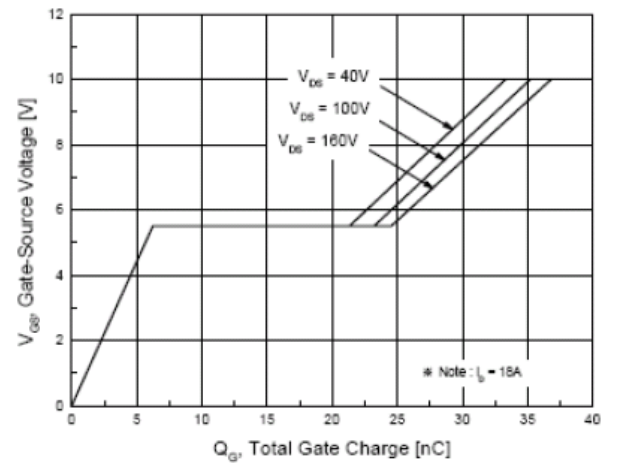
**Fig 3. On-Resistance Variation vs. Drain Current and Gate Voltage**



**Fig 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**



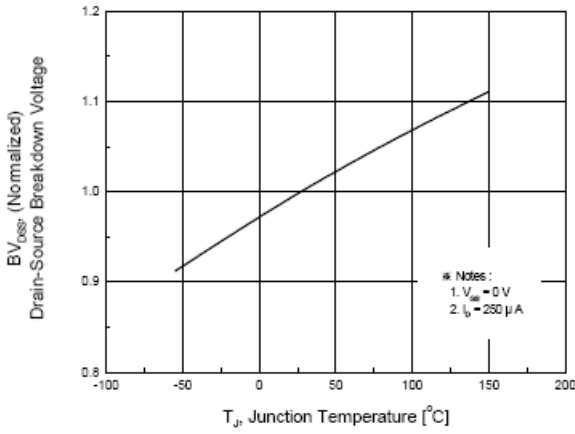
**Fig 5. Capacitance Characteristics**



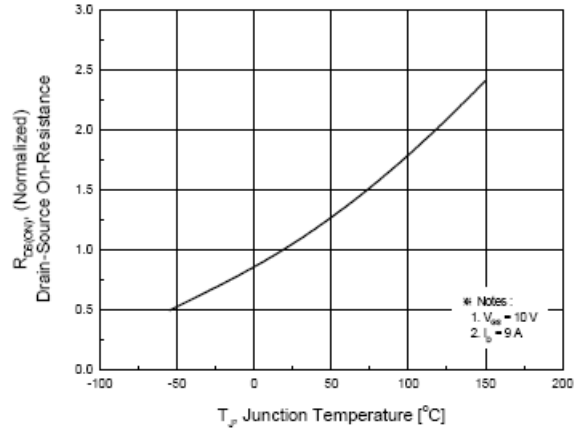
**Fig 6. Gate Charge Characteristics**

**N-Channel 200V Power MOSFET**

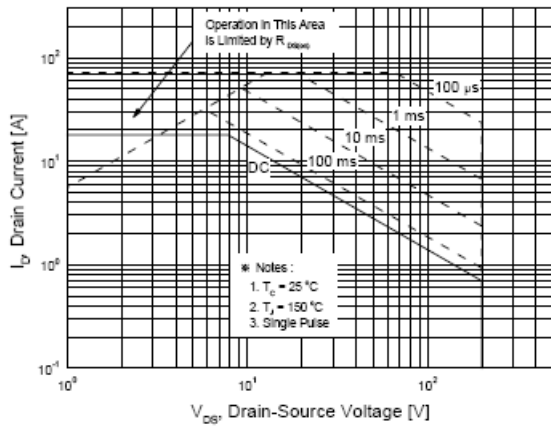
**typical Characteristics (T<sub>J</sub>=25°C Noted)**



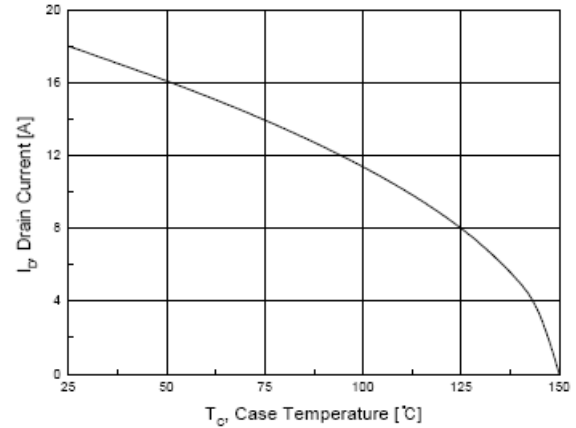
**Fig 7. Breakdown Voltage Variation vs. Temperature**



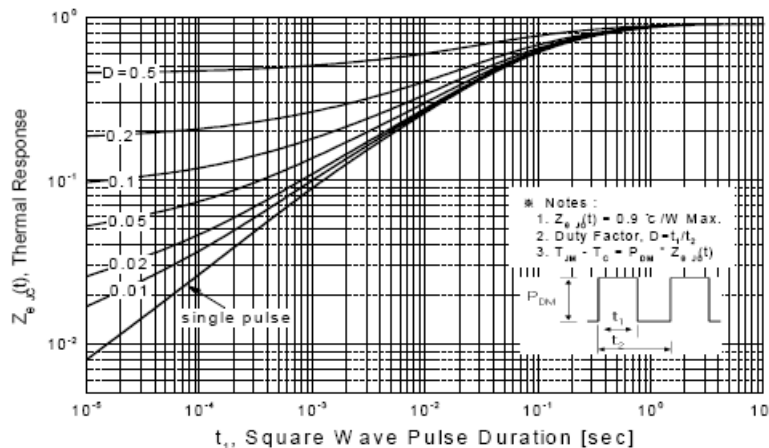
**Fig 8. On-Resistance Variation vs. Temperature**



**Fig 9. Maximum Safe Operating Area**



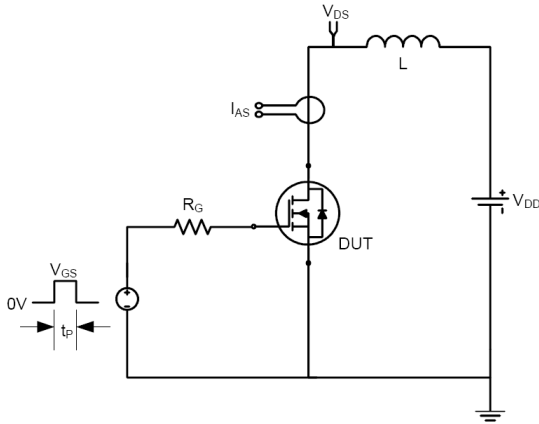
**Fig 10. Maximum Drain Current vs. Case Temperature**



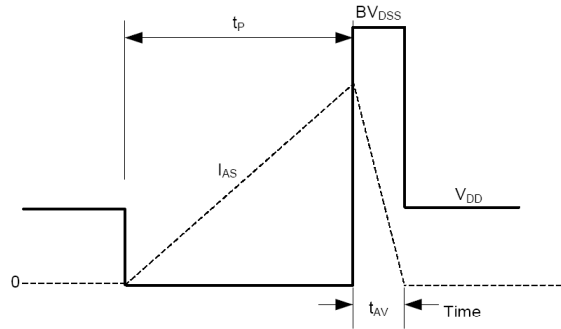
**Fig 11. Transient Thermal Response Curve**

**N-Channel 200V Power MOSFET**

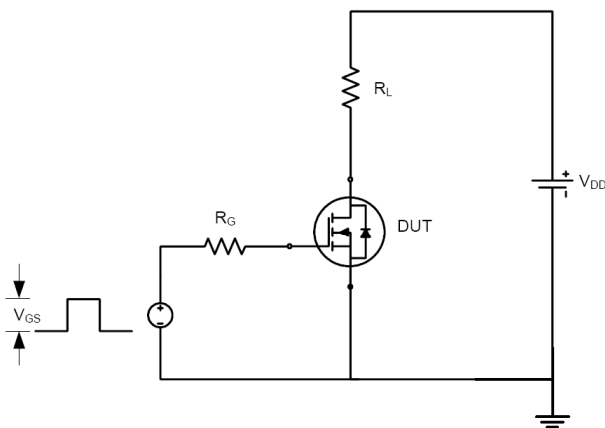
**Test Circuit and Waveform**



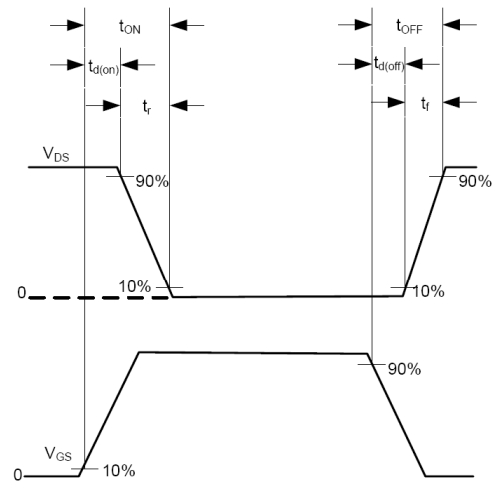
**Unclamped Energy Test Circuit**



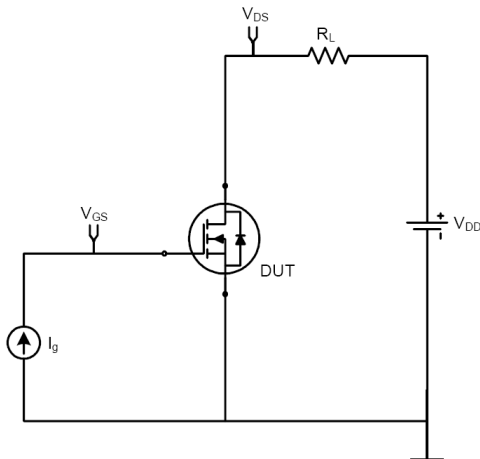
**Unclamped Energy Waveforms**



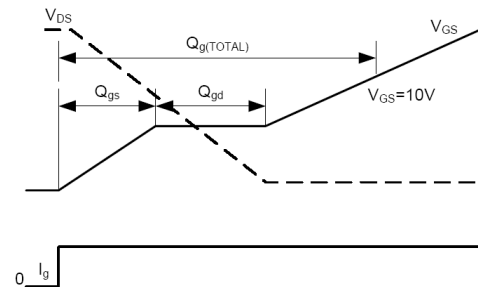
**Switching Time Test Circuit**



**Resistive Switching Waveforms**



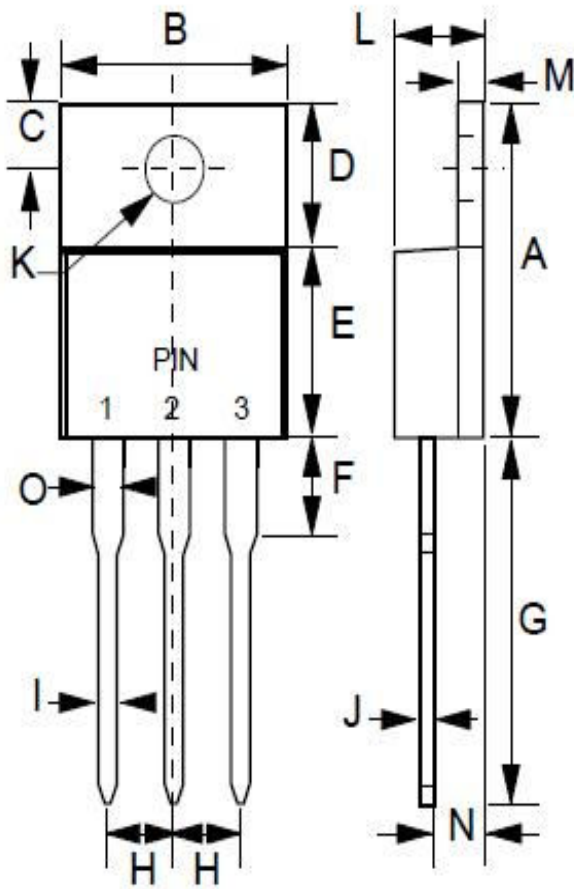
**Gate Charge Test Circuit**



**Gate Charge Waveforms**

**N-Channel 200V Power MOSFET  
Package Dimension**

**TO-220AB**



TO-220AB		
DIM.	MIN.	MAX.
A	14.22	15.88
B	9.65	10.67
C	2.54	3.43
D	5.84	6.86
E	8.26	9.28
F	-	6.35
G	12.70	14.73
H	2.29	2.79
I	0.51	1.14
J	0.30	0.64
K	3.53 $\varnothing$	4.09 $\varnothing$
L	3.56	4.83
M	1.14	1.40
N	2.03	2.92
O	1.14	1.50
All Dimensions in millimeter		

**N-Channel 200V Power MOSFET****Important Notice and Disclaimer**

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