



# 10N65

## 10A N-Channel Power MOSFET

### Features

New technology for high voltage device  
 Low on-resistance and low conduction losses  
 Small package  
 Ultra Low Gate Charge cause lower driving requirements  
 100% Avalanche Tested  
 ROHS compliant

### Mechanical Data

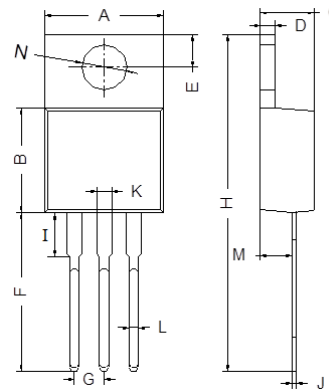
**Case :** TO-220AB

**Terminals :** Solder plated, solderable per MIL-STD-750, Method 2026

**Polarity :** As marked

**Mounting Position :** Any

### TO-220AB

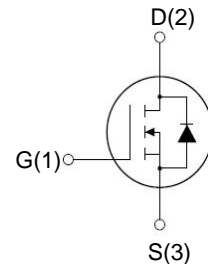
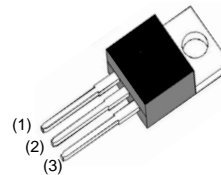


TO-220AB		
Dim	Min	Max
A	9.80	10.30
B	8.30	8.90
C	4.37	4.77
D	1.10	1.45
E	2.62	2.87
F	13.14	13.74
G	2.41	2.67
H	28.40	29.16
I	3.55	4.05
J	0.35	0.58
K	1.20	1.32
L	0.68	0.94
M	2.40	2.60
N	3.71	3.91

All Dimensions in mm

### Application

Power factor correction (PFC)  
 Switched mode power supplies(SMPS)  
 Uninterruptible Power Supply (UPS)



### Maximum Ratings And Electrical Characteristics

Ratings at 25°C ambient temperature unless otherwise specified. Single phase half-wave 60Hz, resistive or inductive load, for capacitive load current derate by 20%.

**Table 1. Absolute Maximum Ratings (T<sub>c</sub>=25°C)**

Parameter	Symbol	10N65	Unit
Drain-Source Voltage (V <sub>GS</sub> =0V)	V <sub>DS</sub>	650	V
Gate-Source Voltage (V <sub>DS</sub> =0V) AC (f>1 Hz)	V <sub>GS</sub>	±30	V
Continuous Drain Current at T <sub>c</sub> =25°C	I <sub>D(DC)</sub>	10	A
Continuous Drain Current at T <sub>c</sub> =100°C	I <sub>D(DC)</sub>	6.0	A
Pulsed drain current (Note 1)	I <sub>DM(pluse)</sub>	40	A
Maximum Power Dissipation(T <sub>c</sub> =25°C)	P <sub>D</sub>	178	W
Derate above 25°C		4.13	W/°C
Single pulse avalanche energy (Note 2)	E <sub>AS</sub>	1000	mJ
Avalanche current (Note 1)	I <sub>AR</sub>	10	A
Repetitive Avalanche energy , t <sub>AR</sub> limited by T <sub>Jmax</sub> (Note 1)	E <sub>AR</sub>	15.6	mJ



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Parameter	Symbol	10N65	Unit
Drain Source voltage slope, $V_{DS} \leq 480 V$ ,	dv/dt	50	V/ns
Reverse diode dv/dt, $V_{DS} \leq 480 V, I_{SD} < I_D$	dv/dt	15	V/ns
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55...+150	°C

\* limited by maximum junction temperature

**Table 2. Thermal Characteristic**

Parameter	Symbol	10N65	Unit
Thermal Resistance, Junction-to-Case (Maximum)	$R_{thJC}$	0.70	°C /W
Thermal Resistance, Junction-to-Ambient (Maximum)	$R_{thJA}$	62.5	°C /W

**Table 3. Electrical Characteristics (TA=25°C unless otherwise noted)**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>On/off states</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	650			V
Zero Gate Voltage Drain Current( $T_C=25^\circ C$ )	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			10	$\mu A$
Zero Gate Voltage Drain Current( $T_C=125^\circ C$ )	$I_{DSS}$	$V_{DS}=650V, V_{GS}=0V$			100	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$			$\pm 100$	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2		4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$		730	850	$\Omega$
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=50V, V_{GS}=0V,$ $F=1.0MHz$		590		pF
Output Capacitance	$C_{oss}$			37		pF
Reverse Transfer Capacitance	$C_{rss}$			0.9		pF
Total Gate Charge	$Q_g$	$V_{DS}=480V, I_D=10A,$ $V_{GS}=10V$		14.6	22	nC
Gate-Source Charge	$Q_{gs}$			4		nC
Gate-Drain Charge	$Q_{gd}$			6.7		nC
<b>Switching times</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=380V, I_D=4A,$ $R_G=4.7\Omega, V_{GS}=10V$		8		nS
Turn-on Rise Time	$t_5$			6		nS
Turn-Off Delay Time	$t_{d(off)}$			59	75	nS
Turn-Off Fall Time	$t_f$			10	15	nS
<b>Source- Drain Diode Characteristics</b>						
Source-drain current(Body Diode)	$I_{SD}$	$T_C=25^\circ C$			10	A
Pulsed Source-drain current(Body Diode)	$I_{SDM}$				32	A
Forward On Voltage	$V_{SD}$	$T_J=25^\circ C, I_{SD}=10A, V_{GS}=0V$		0.9	1.2	V
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ C, I_F=5 A, di/dt=100A/\mu s$		230		nS
Reverse Recovery Charge	$Q_{rr}$			1.2		$\mu C$
Peak Reverse Recovery Current	$I_{rrm}$			10.5		A

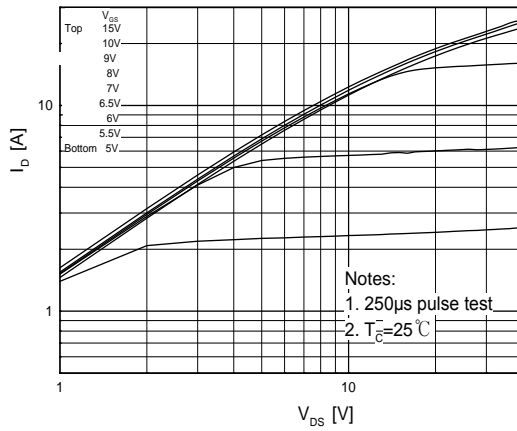
Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature

2.  $T_J=25^\circ C, V_{DD}=50V, V_G=10V, R_G=25\Omega$

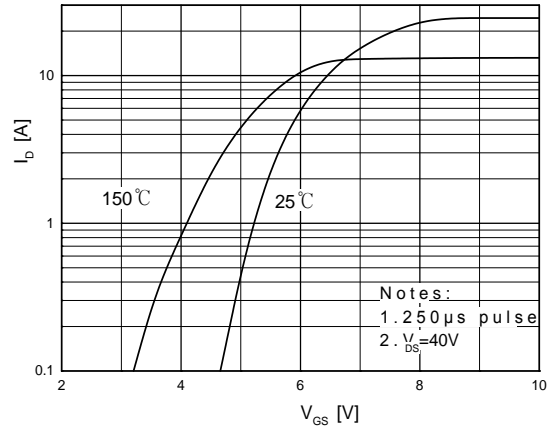


## ELECTRICAL CHARACTERISTICS (curves)

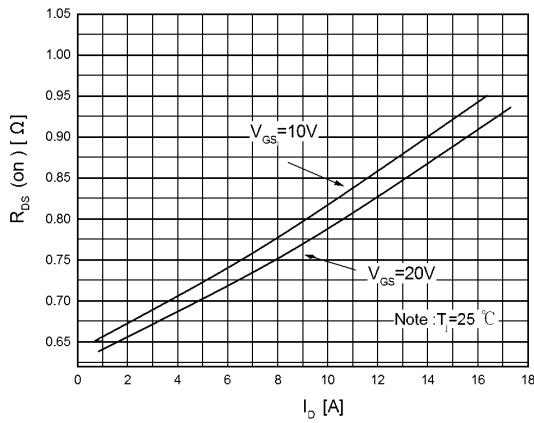
### On-Region Characteristics



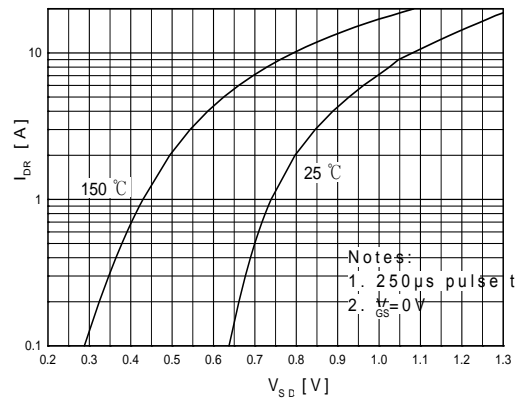
### Transfer Characteristics



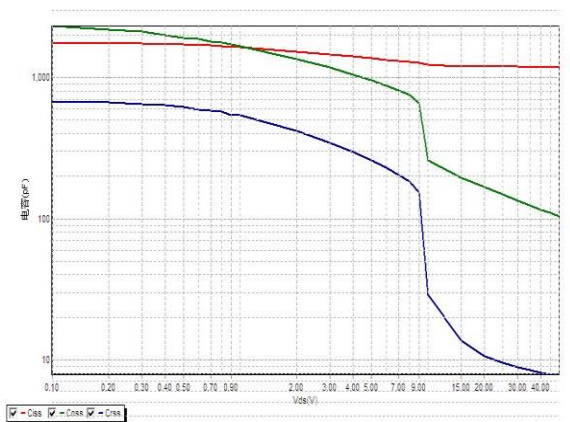
### On-Resistance Variation vs. Drain Current and Gate Voltage



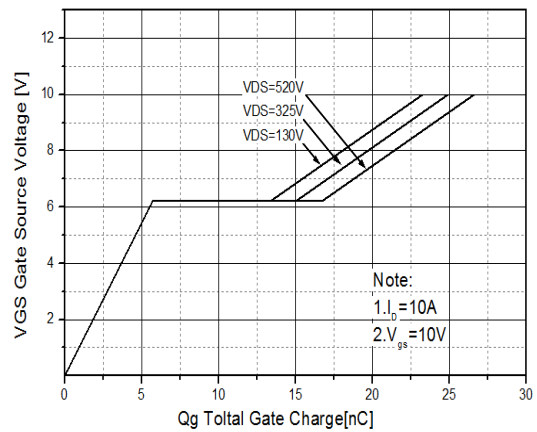
### Body Diode Forward Voltage Variation vs. Source Current and Temperature



### Capacitance Characteristics



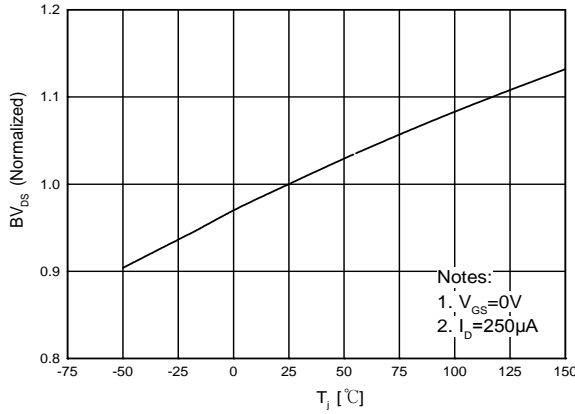
### Gate Charge Characteristics



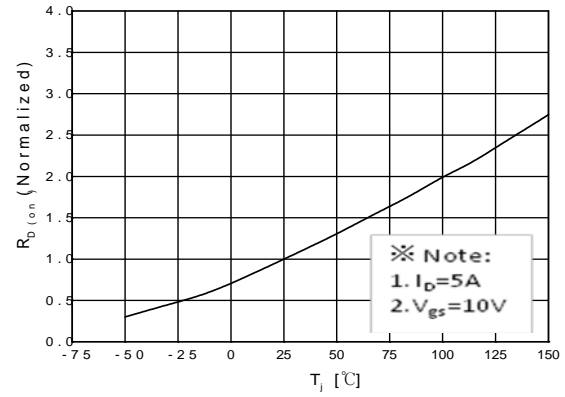


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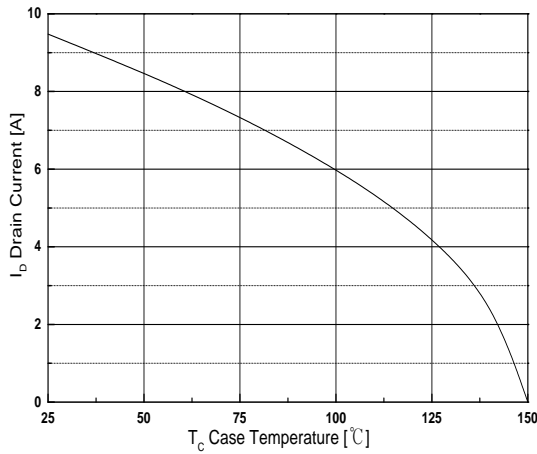
### Breakdown Voltage Variation vs. Temperature



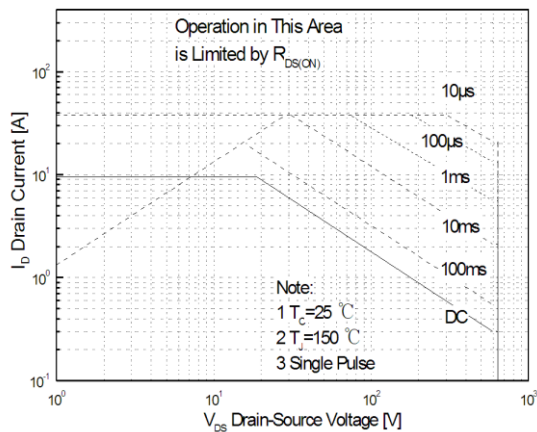
### On-Resistance Variation vs. Temperature



### Maximum Drain Current vs. Case Temperature



### Maximum Safe Operating Area For 10N65



### Avalanche Energy vs. Temperature

