

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
650V	130mΩ@10V	26A

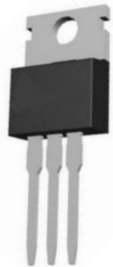
### Feature

- New technology for high voltage device
- Ultra low on-resistance and ultra low conduction losses
- Ultra Low Gate Charge cause lower driving requirements
- Diode reverse recovery speed is super fast

### Application

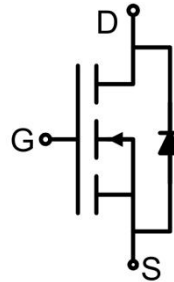
- Power factor correction(PFC)
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply(UPS)
- On-board charger(OBC)

### Package

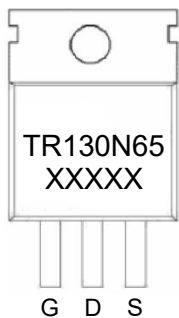


TO-220AB

### Circuit diagram



### Marking



### Absolute maximum ratings (T<sub>C</sub>=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DS</sub>	650	V
Gate-Source Voltage (V <sub>DS</sub> = 0V) AC (f > 1Hz)	V <sub>GS</sub>	±30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	26	A
Continuous Drain Current (T <sub>C</sub> = 100°C)	I <sub>D</sub> (100°C)	18.2	A
Pulsed Drain Current <sup>1)</sup>	I <sub>DM</sub>	78	A
Maximum Power Dissipation (T <sub>C</sub> = 25°C)	P <sub>D</sub>	237	W
De-rate above 25°C		1.58	W/°C
Thermal Resistance, Junction-to-Case	R <sub>θJC</sub>	0.63	°C/W
Avalanche current <sup>1)</sup>	I <sub>AS</sub>	7	A
Drain Source voltage slope, V <sub>DS</sub> ≤ 480V	dv/dt	50	V/ns
Reverse diode dv/dt, V <sub>DS</sub> ≤ 480V, I <sub>SD</sub> < I <sub>D</sub>	dv/dt	50	V/ns
Junction Temperature	T <sub>J</sub>	175	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +175	°C

### Electrical characteristics (T<sub>A</sub> = 25 °C unless otherwise noted)

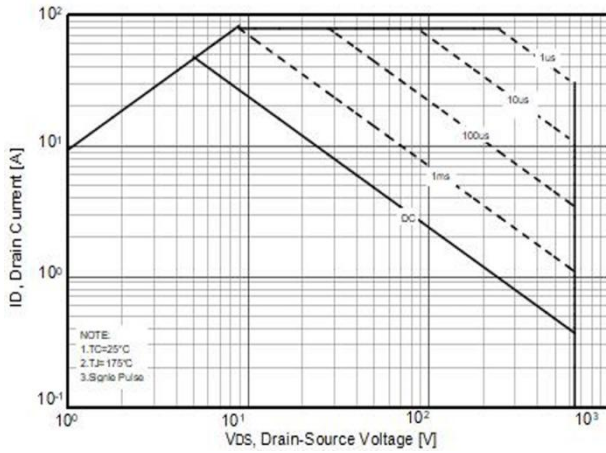
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA	650			V
Zero gate voltage drain current	I <sub>DSS</sub>	V <sub>DS</sub> = 650V, V <sub>GS</sub> = 0V, T <sub>C</sub> = 25°C			10	μA
		V <sub>DS</sub> = 650V, V <sub>GS</sub> = 0V, T <sub>C</sub> = 125°C			400	
Gate-body leakage current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V			±100	nA
Gate threshold voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 500μA	3.5	4.2	5.0	V
Drain-source on-resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A		110	130	mΩ
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V, f = 1.0MHz		2161		pF
Output Capacitance	C <sub>oss</sub>			95		
Reverse Transfer	C <sub>rss</sub>			50		
Intrinsic Gate Resistance	R <sub>G</sub>	f = 1MHz open drain		1.5		Ω
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> = 480V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A		41.2		nC
Gate-Source Charge	Q <sub>gs</sub>			16.3		
Gate-Drain Charge	Q <sub>gd</sub>			12.8		
Gate plateau voltage	V <sub>gp</sub>			7		V
Turn-on delay time	t <sub>d(on)</sub>	V <sub>DD</sub> = 380V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 13A, R <sub>G</sub> = 1.7Ω		43		nS
Turn-on rise time	t <sub>r</sub>			16		
Turn-off delay time	t <sub>d(off)</sub>			93		
Turn-off fall time	t <sub>f</sub>			20		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current	I <sub>SD</sub>	T <sub>C</sub> = 25°C			26	A
Source-drain current (Body Diode)	I <sub>SDM</sub>				78	A
Diode Forward voltage	V <sub>SD</sub>	V <sub>GS</sub> = 0V, I <sub>SD</sub> = 26A, T <sub>J</sub> = 25°C			1.2	V
Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 13A, di/dt = 100A/μs, T <sub>J</sub> = 25°C		1.45		nS
Reverse Recovery Charge	Q <sub>rr</sub>			0.725		μC
Peak Reverse Recovery Current	I <sub>rrm</sub>			10		A

Notes:

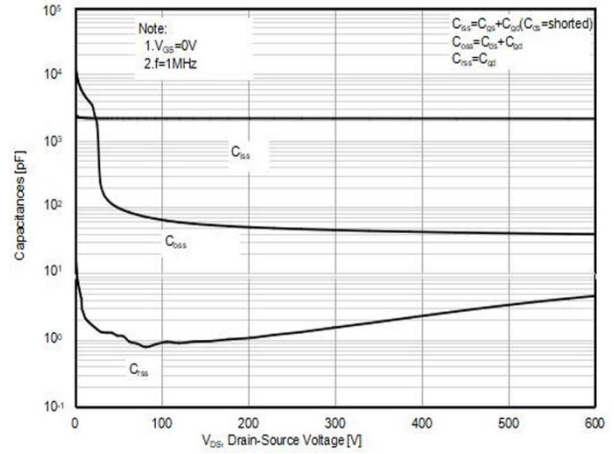
- 1) Repetitive Rating: Pulse width limited by maximum junction temperature.
- 2) Guaranteed by design, not subject to production

## Typical Characteristics

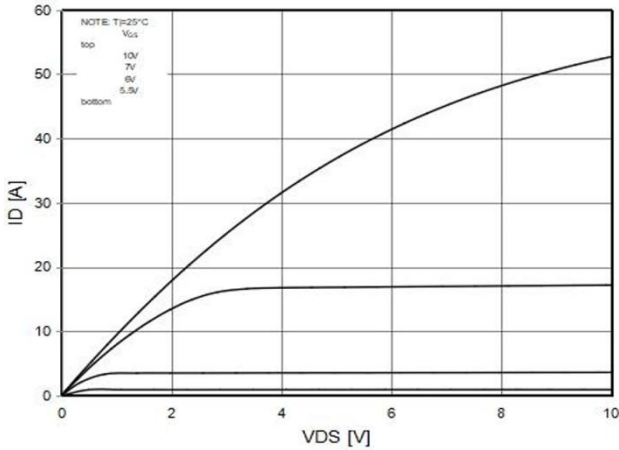
**Figure1. Safe operating area**



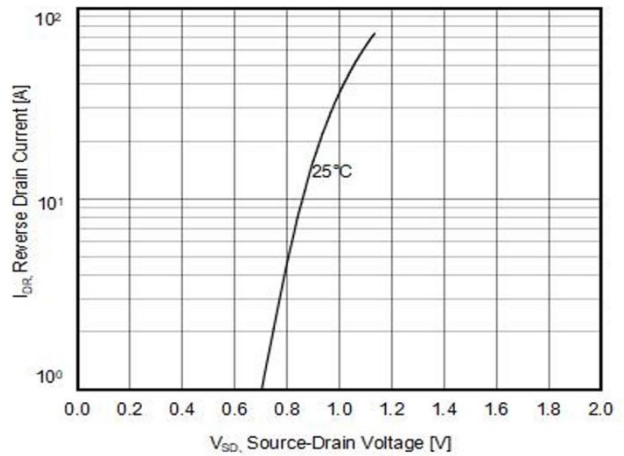
**Figure2. Capacitance**



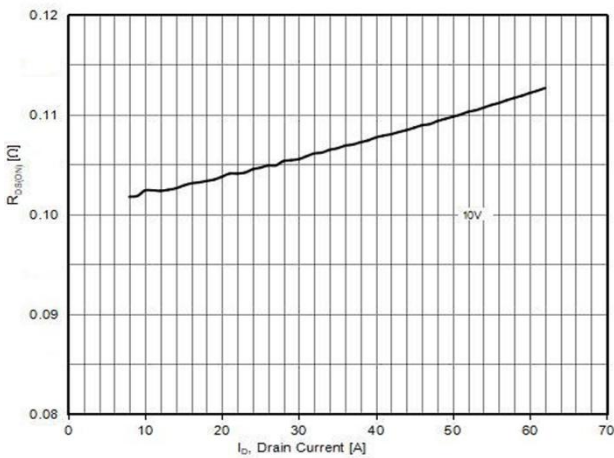
**Figure3. Output characteristics**



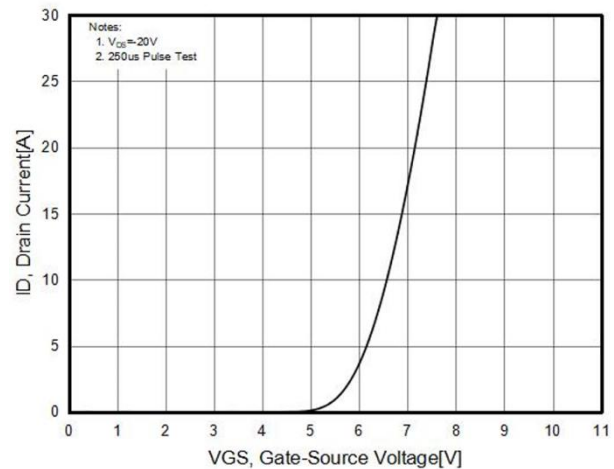
**Figure4. Source-Drain Diode Forward Voltage**



**Figure5. Static drain-source on resistance**

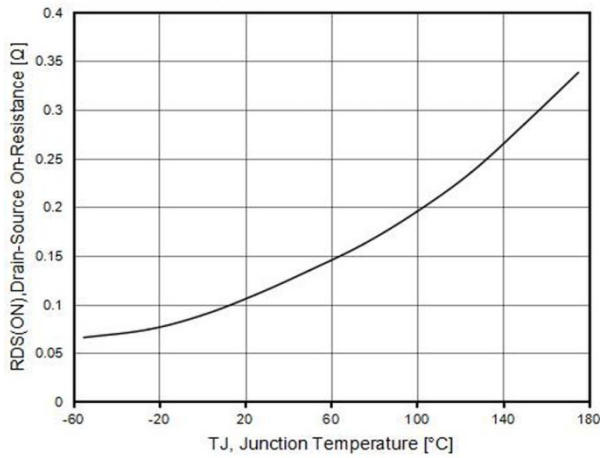


**Figure6. Transfer characteristics**

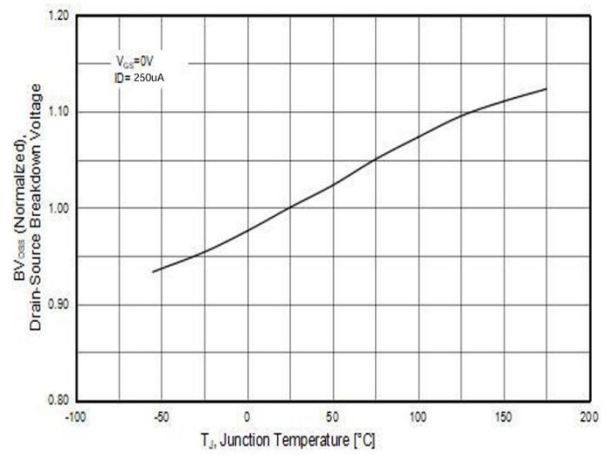


## Typical Characteristics

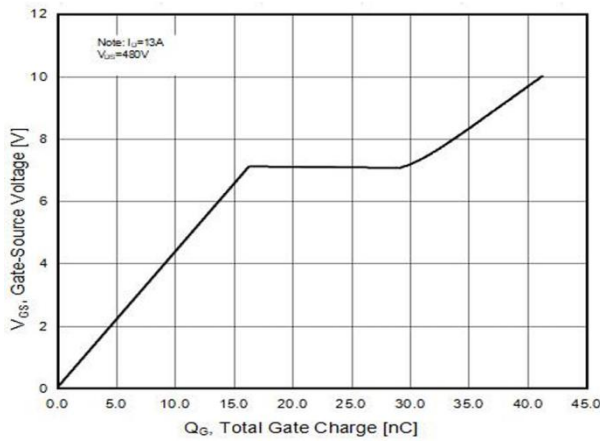
**Figure7.  $R_{DS(ON)}$  vs Junction Temperature**



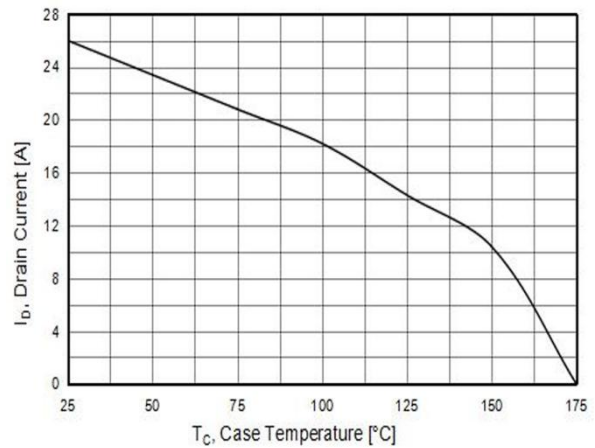
**Figure8.  $BV_{DSS}$  vs Junction Temperature**



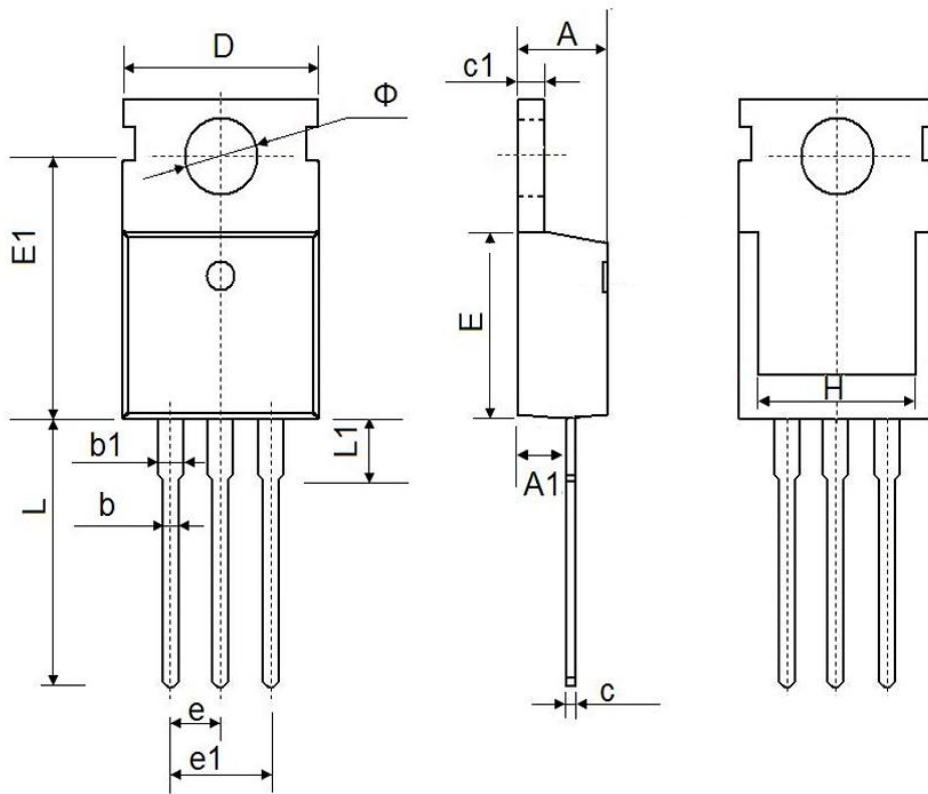
**Figure9. Gate charge waveforms**



**Figure10. Maximum  $I_D$  vs Junction Temperature**

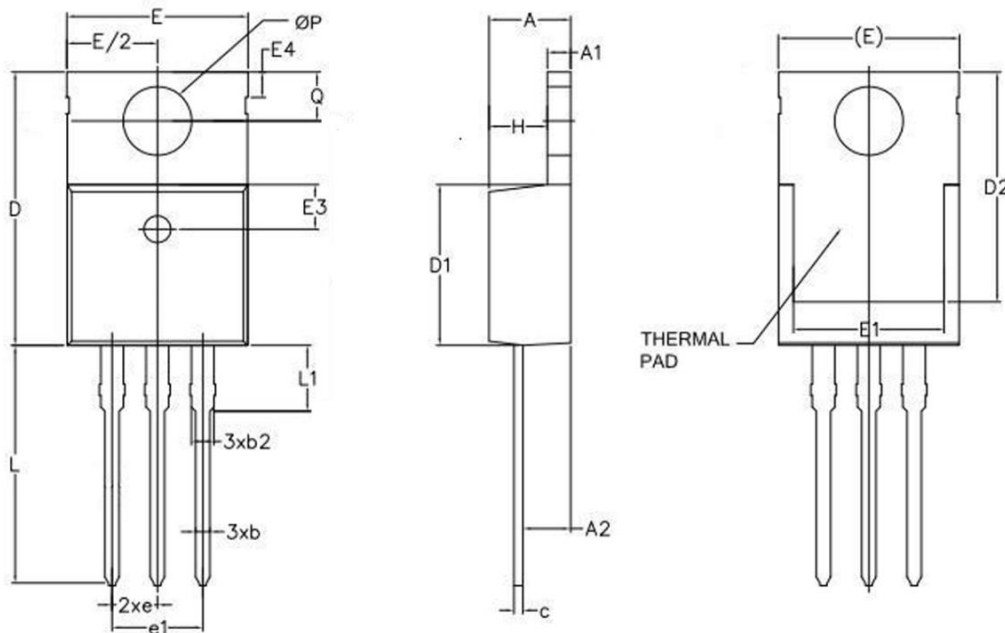


### TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.200	4.600	0.165	0.181
A1	2.250	2.550	0.089	0.100
b	0.700	0.910	0.028	0.036
b1	1.170	1.370	0.046	0.054
c	0.330	0.650	0.013	0.026
c1	1.200	1.400	0.047	0.055
D	8.950	9.750	0.352	0.384
E	9.740	10.040	0.352	0.384
E1	9.910	10.250	0.390	0.404
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
H	7.900	8.100	0.311	0.319
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
Φ	3.400	3.800	0.134	0.150

### TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.470	4.670	0.176	0.184
A1	1.200	1.400	0.047	0.055
A2	2.350	2.900	0.093	0.114
b	0.710	0.910	0.028	0.036
b2	1.220	1.360	0.048	0.054
c	0.470	0.600	0.019	0.024
D	14.700	15.800	0.579	0.622
D1	8.900	9.470	0.350	0.373
D2	11.750	13.600	0.463	0.535
E	9.700	10.370	0.382	0.408
E1	7.000	8.890	0.276	0.350
E3	2.400	2.600	0.094	0.102
E4	1.270	1.570	0.050	0.062
e	2.540 BSC.		0.100 BSC.	
e1	5.080 BSC.		0.200 BSC.	
H	3.000	3.400	0.118	0.134
L	12.900	14.800	0.508	0.583
L1	2.540	3.840	0.100	0.151
ΦP	3.600	3.900	0.142	0.154
Q	4.600	4.900	0.181	0.193