



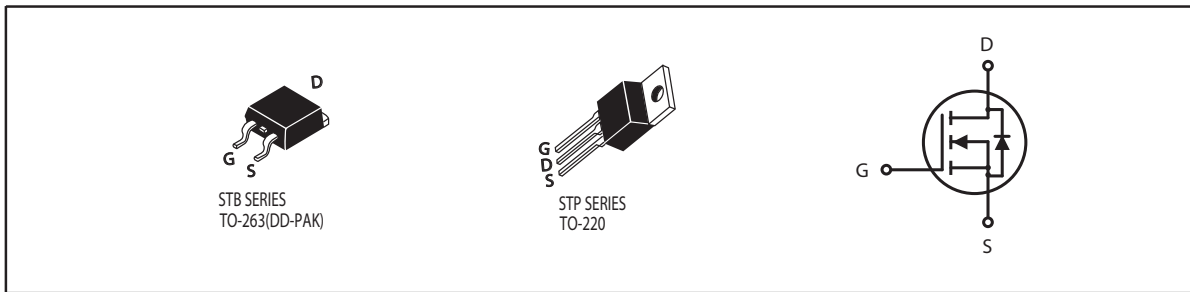
## N-Channel Enhancement Mode Field Effect Transistor

### PRODUCT SUMMARY

V <sub>DSS</sub>	I <sub>D</sub>	R <sub>DS(ON)</sub> (mΩ) Max
40V	80A	4.8 @ V <sub>GS</sub> =10V

### FEATURES

- Super high dense cell design for low R<sub>DS(ON)</sub>.
- Rugged and reliable.
- TO-220 and TO-263 Package.



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)

Symbol	Parameter	Limit	Units
V <sub>DS</sub>	Drain-Source Voltage	40	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current-Continuous <sup>a</sup>	80	A
I <sub>DM</sub>	-Pulsed <sup>b</sup>	264	A
E <sub>AS</sub>	Single Pulse Avalanche Energy <sup>d</sup>	306	mJ
P <sub>D</sub>	Maximum Power Dissipation	62	W
T <sub>J</sub> , T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	°C

### THERMAL CHARACTERISTICS

R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case	1.8	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient	62.5	°C/W

# STB/P8444

Ver 1.0

## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>OFF CHARACTERISTICS</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	40			V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =32V, V <sub>GS</sub> =0V			1	uA
I <sub>GSS</sub>	Gate-Body Leakage Current	V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V			±100	nA
<b>ON CHARACTERISTICS</b>						
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	2	2.8	4	V
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =80A		3.5	4.8	m ohm
g <sub>FS</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =80A		20		S
<b>DYNAMIC CHARACTERISTICS <sup>°</sup></b>						
C <sub>ISS</sub>	Input Capacitance	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V f=1.0MHz		6500		pF
C <sub>OSS</sub>	Output Capacitance			940		pF
C <sub>RSS</sub>	Reverse Transfer Capacitance			500		pF
<b>SWITCHING CHARACTERISTICS <sup>°</sup></b>						
t <sub>D(ON)</sub>	Turn-On Delay Time	V <sub>DD</sub> =20V I <sub>D</sub> =1A V <sub>GS</sub> =10V R <sub>GEN</sub> =6 ohm		185		ns
t <sub>r</sub>	Rise Time			162		ns
t <sub>D(OFF)</sub>	Turn-Off Delay Time			185		ns
t <sub>f</sub>	Fall Time			50		ns
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =20V, I <sub>D</sub> =25A, V <sub>GS</sub> =10V		110		nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =20V, I <sub>D</sub> =25A,		20		nC
Q <sub>gd</sub>	Gate-Drain Charge	V <sub>GS</sub> =10V		26		nC
<b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b>						
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =10A		0.8	1.3	V
<b>Notes</b> a. Maximum wire current carrying capacity is 80A. b. Pulse Test: Pulse Width ≤ 300us, Duty Cycle ≤ 2%. c. Guaranteed by design, not subject to production testing. d. Starting T <sub>J</sub> =25°C, L=0.5mH, R <sub>G</sub> =25Ω, I <sub>AS</sub> =35A, V <sub>DD</sub> = 20V. (See Figure13)						

Mar,26,2008

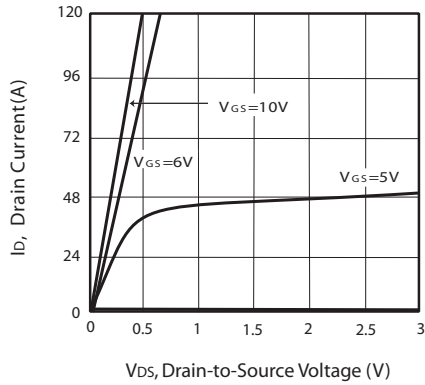


Figure 1. Output Characteristics

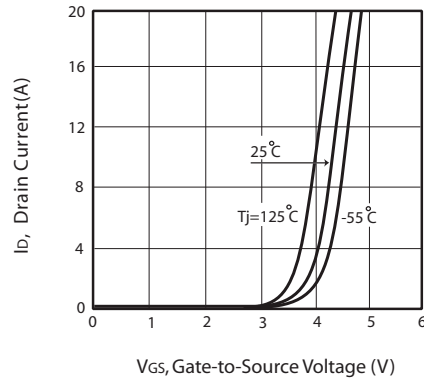


Figure 2. Transfer Characteristics

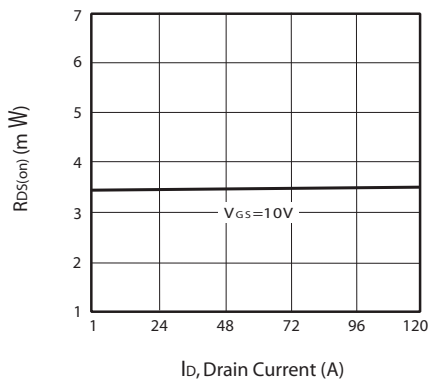


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

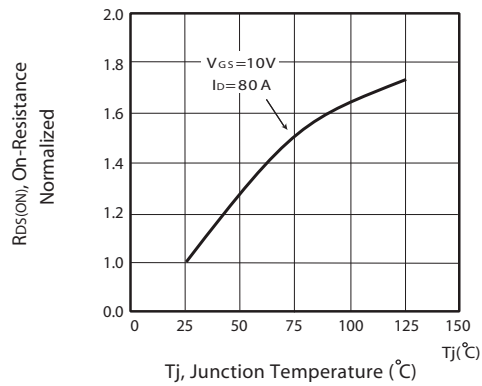


Figure 4. On-Resistance Variation with Drain Current and Temperature

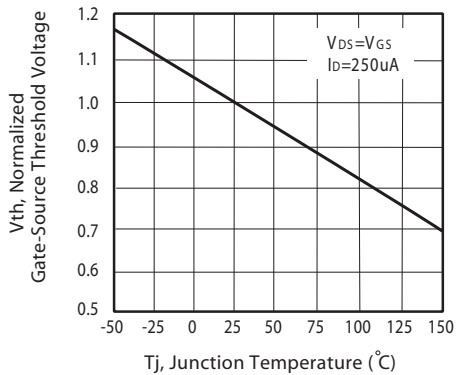


Figure 5. Gate Threshold Variation with Temperature

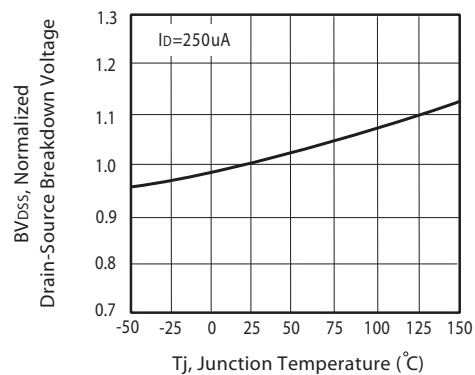


Figure 6. Breakdown Voltage Variation with Temperature

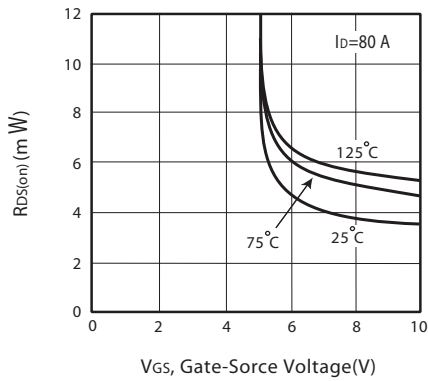


Figure 7. On-Resistance vs. Gate-Source Voltage

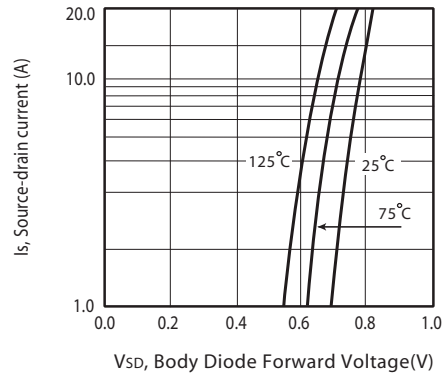


Figure 8. Body Diode Forward Voltage Variation with Source Current

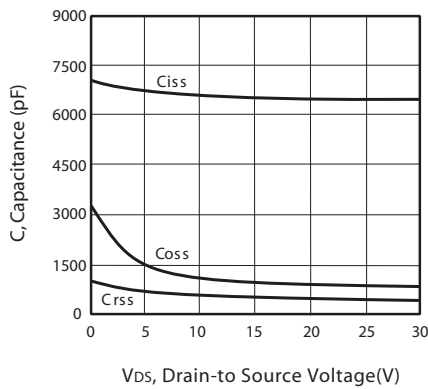


Figure 9. Capacitance

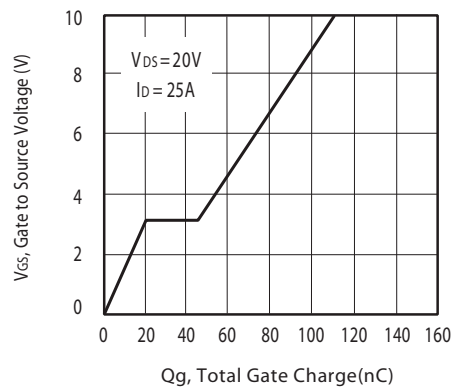


Figure 10. Gate Charge

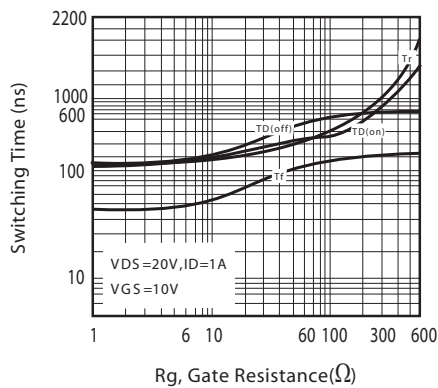


Figure 11. Switching Characteristics

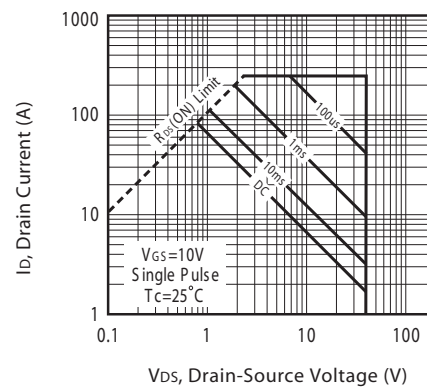
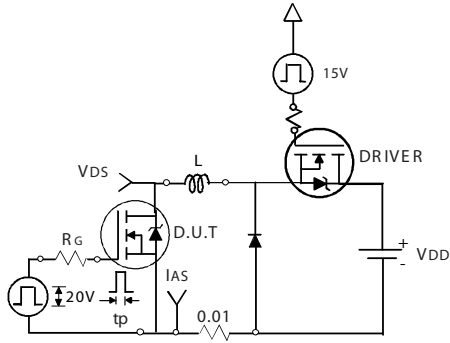
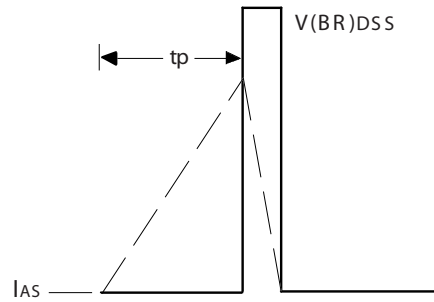


Figure 12. Maximum Safe Operating Area



Unclamped Inductive Test Circuit

Figure 13a.



Unclamped Inductive Waveforms

Figure 13b.

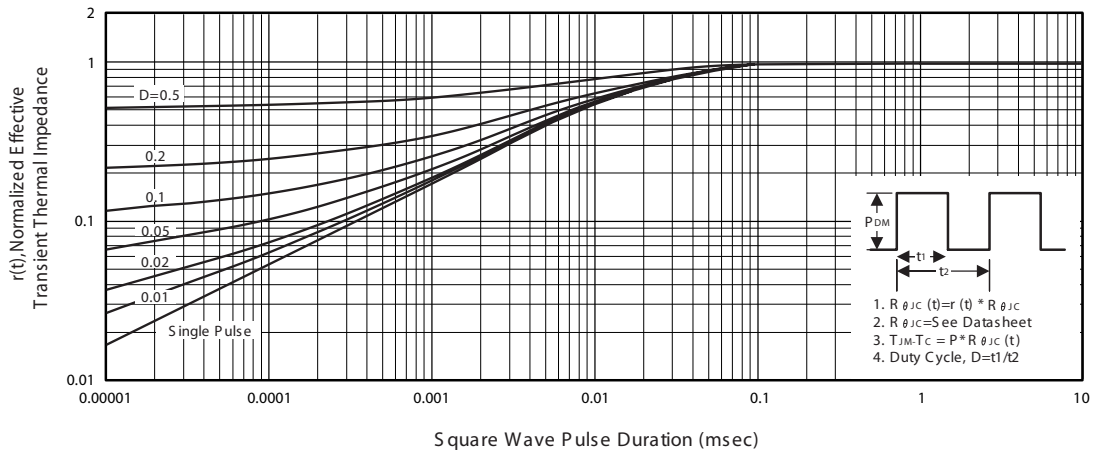
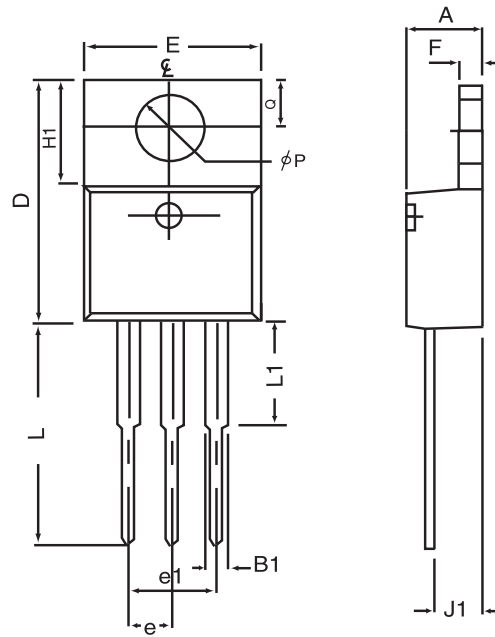


Figure 14. Normalized Thermal Transient Impedance Curve

## PACKAGE OUTLINE DIMENSIONS

### TO-220



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.32	4.80	0.170	0.189
B1	1.27	1.65	0.050	0.630
D	14.6	16.00	0.575	0.610
E	9.70	10.41	0.382	0.410
e	2.34	2.74	0.092	0.108
e1	4.68	5.48	0.184	0.216
F	1.14	1.40	0.045	0.055
H1	5.97	6.73	0.235	0.265
J1	2.20	2.79	0.087	0.110
L	12.88	14.22	0.507	0.560
L1	3.00	6.35	0.120	0.250
$\phi P$	3.50	3.94	0.138	0.155
Q	2.54	3.05	0.100	0.120



