

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
150V	6.2mΩ@10V	140A

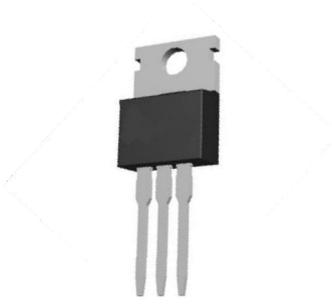
### Feature

- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high  $E_{AS}$
- Excellent package for good heat dissipation

### Application

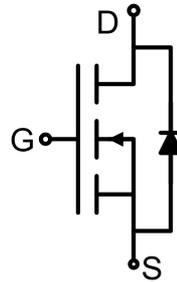
- DC/DC Converter
- Ideal for high-frequency switching and synchronous rectification

### Package



TO-220AB

### Circuit diagram



### Marking



### Absolute maximum ratings (Ta=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	150	V
Gate-Source Voltage	$V_{GS}$	±20	V
Continuous Drain Current	$I_D$	140	A
Drain Current-Continuous( $T_C = 100^\circ\text{C}$ )	$I_D (100^\circ\text{C})$	100	A
Pulsed Drain Current	$I_{DM}$	440	A
Power Dissipation	$P_D$	320	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.47	$^\circ\text{C}/\text{W}$
Single pulse avalanche energy	$E_{AS}$	1296	mJ
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^\circ\text{C}$

### Electrical characteristics ( $T_A=25^\circ\text{C}$ , unless otherwise noted)

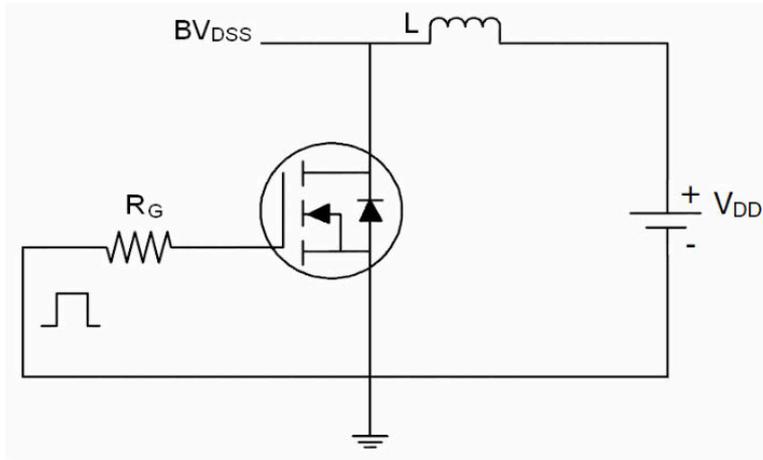
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = 250\mu\text{A}$	150			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 150V, V_{GS} = 0V$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$			±100	nA
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	2		4	V
Drain-source on-resistance <sup>1)</sup>	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 70A$		5.6	6.2	m $\Omega$
Forward transconductance <sup>1)</sup>	$g_{FS}$	$V_{DS} = 10V, I_D = 70A$	70			S
<b>Dynamic characteristics<sup>2)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 75V, V_{GS} = 0V, f = 1\text{MHz}$		5900		pF
Output Capacitance	$C_{oss}$			690		
Reverse Transfer Capacitance	$C_{rss}$			7		
Total Gate Charge	$Q_g$	$V_{DS} = 75V, V_{GS} = 10V, I_D = 70A$		80		nC
Gate-Source Charge	$Q_{gs}$			32		
Gate-Drain Charge	$Q_{gd}$			13		
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 75V, V_{GS} = 10V, I_D = 70A, R_{GEN} = 4.7\Omega$		26		nS
Turn-on rise time	$t_r$			36		
Turn-off delay time	$t_{d(off)}$			47		
Turn-off fall time	$t_f$			15		
<b>Source-Drain Diode characteristics</b>						
Diode Forward Current <sup>1)</sup>	$I_S$				140	A
Diode Forward voltage	$V_{DS}$	$V_{GS} = 0V, I_F = I_S$			1.2	V
Reverse Recovery Time	$t_{rr}$	$T_J = 25^\circ\text{C}, I_F = I_S, di/dt = 100A/\mu\text{s}^{1)}$		140		nS
Reverse Recovery Charge	$Q_{rr}$			498		nC

Notes:

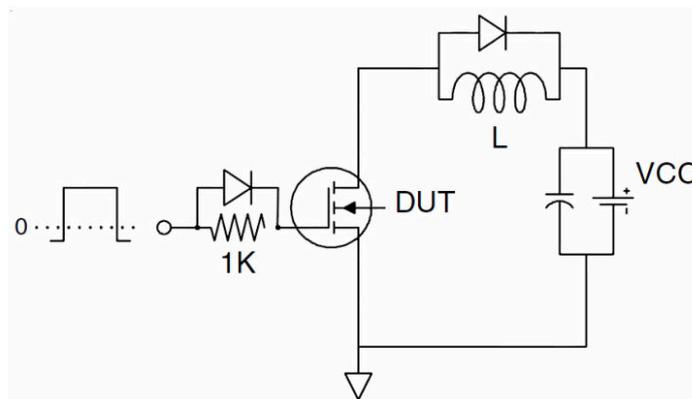
- 1) Pulse Test: Pulse Width < 300 $\mu\text{s}$ , Duty Cycle  $\leq 2\%$ .
- 2) Guaranteed by design, not subject to production testing.

## Test Circuit

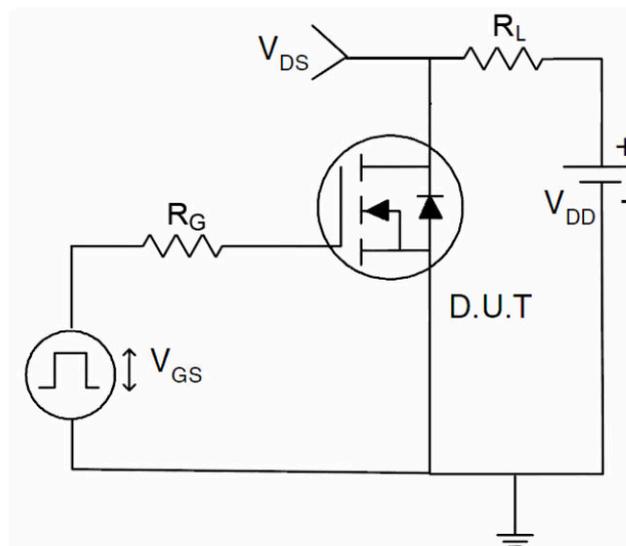
### 1) $E_{AS}$ test Circuit



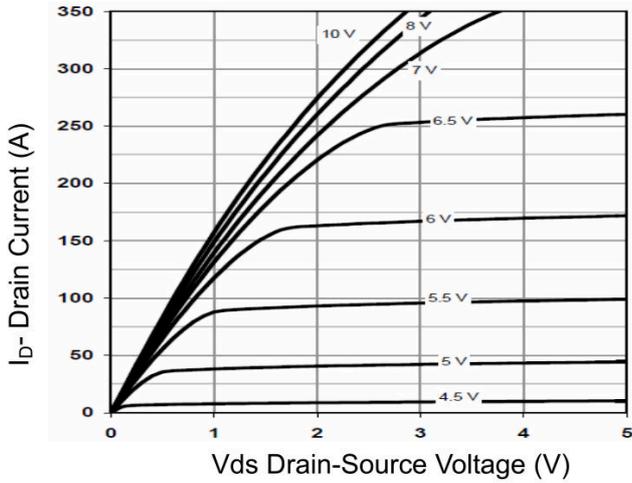
### 2) Gate charge test Circuit



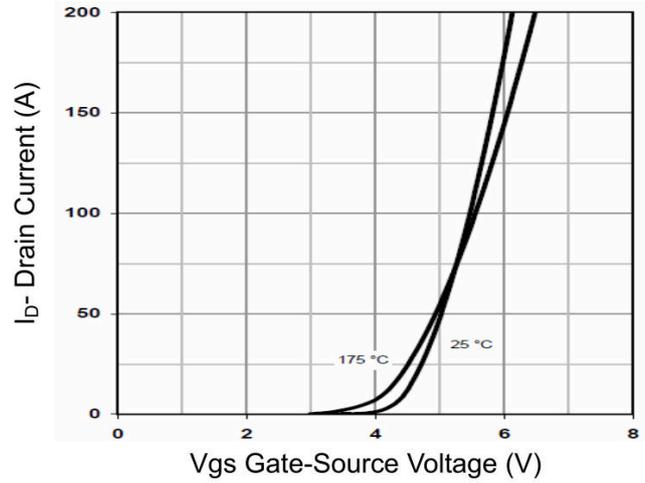
### 3) Switch Time Test Circuit



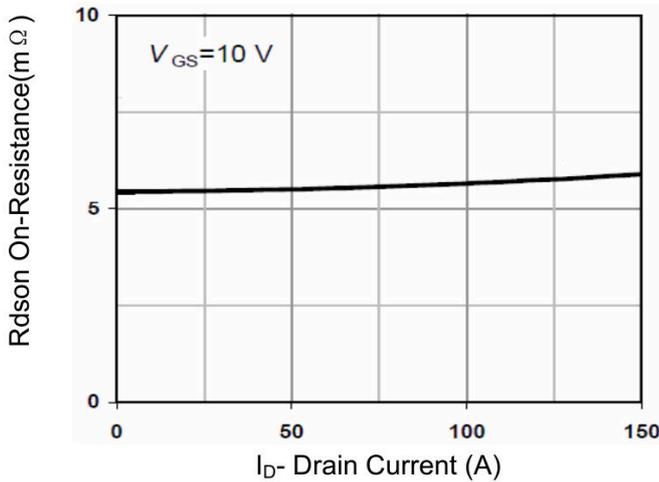
## Typical Characteristics



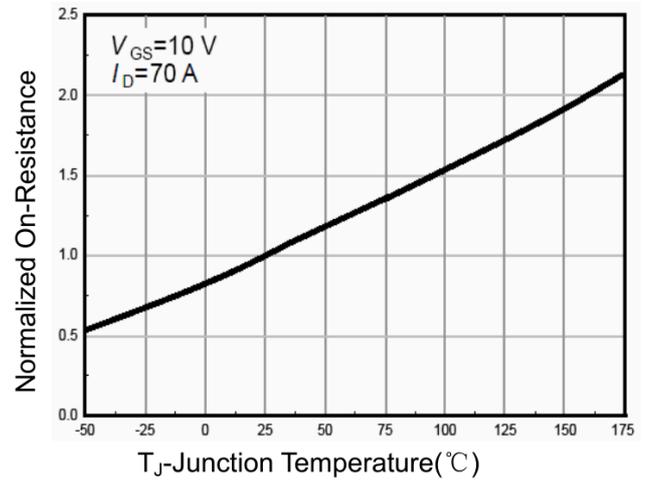
**Figure 1 Output Characteristics**



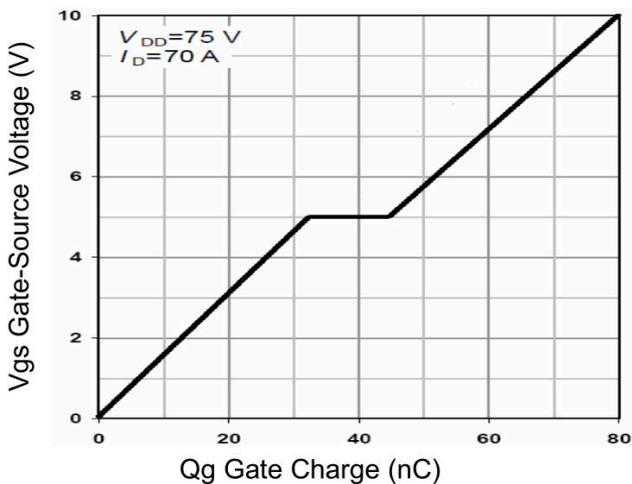
**Figure 2 Transfer Characteristics**



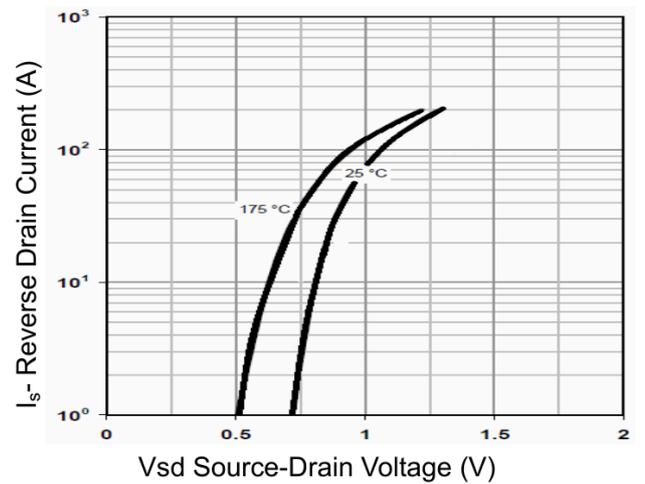
**Figure 3 Rdson- Drain Current**



**Figure 4 Rdson-Junction Temperature**

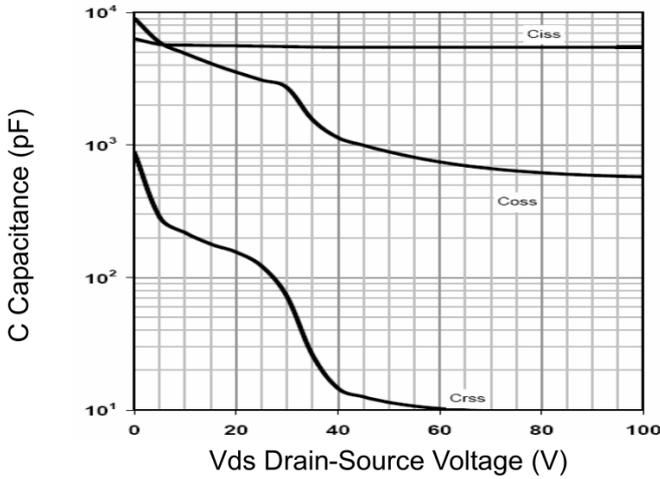


**Figure 5 Gate Charge**

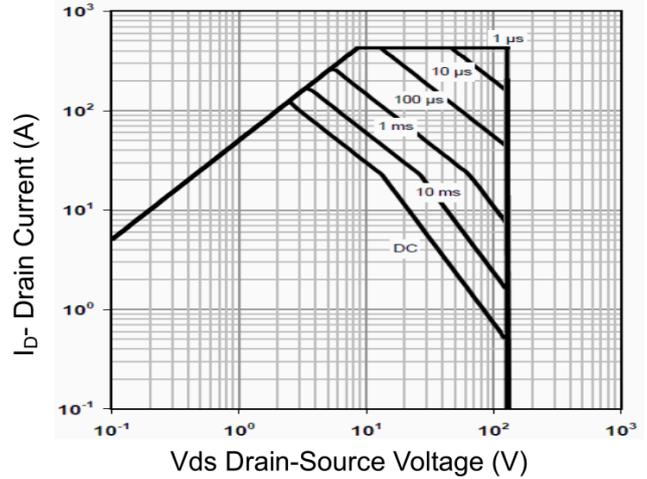


**Figure 6 Source- Drain Diode Forward**

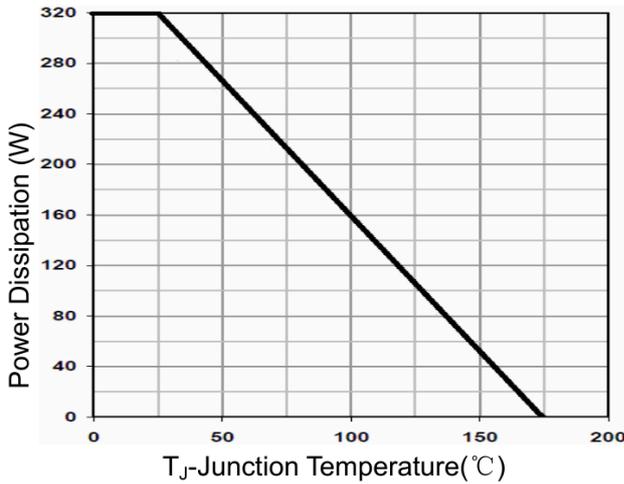
## Typical Characteristics



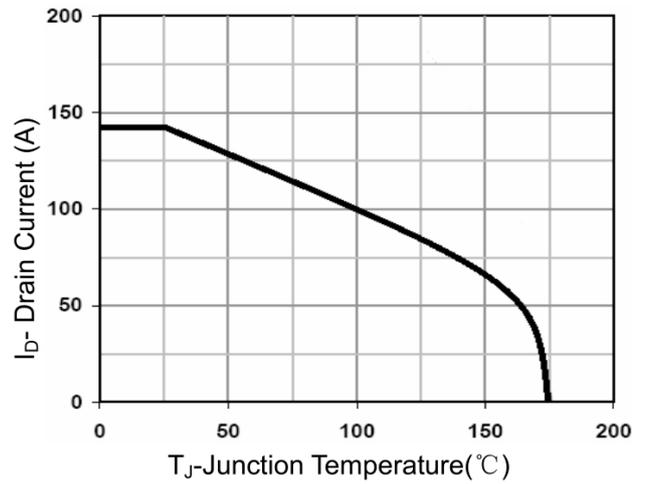
**Figure 7 Capacitance vs Vds**



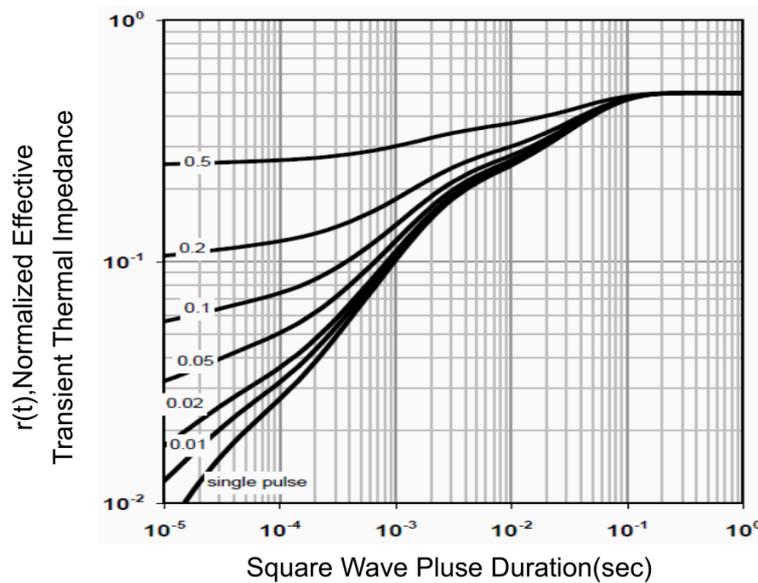
**Figure 8 Safe Operation Area**



**Figure 9 Power De-rating**

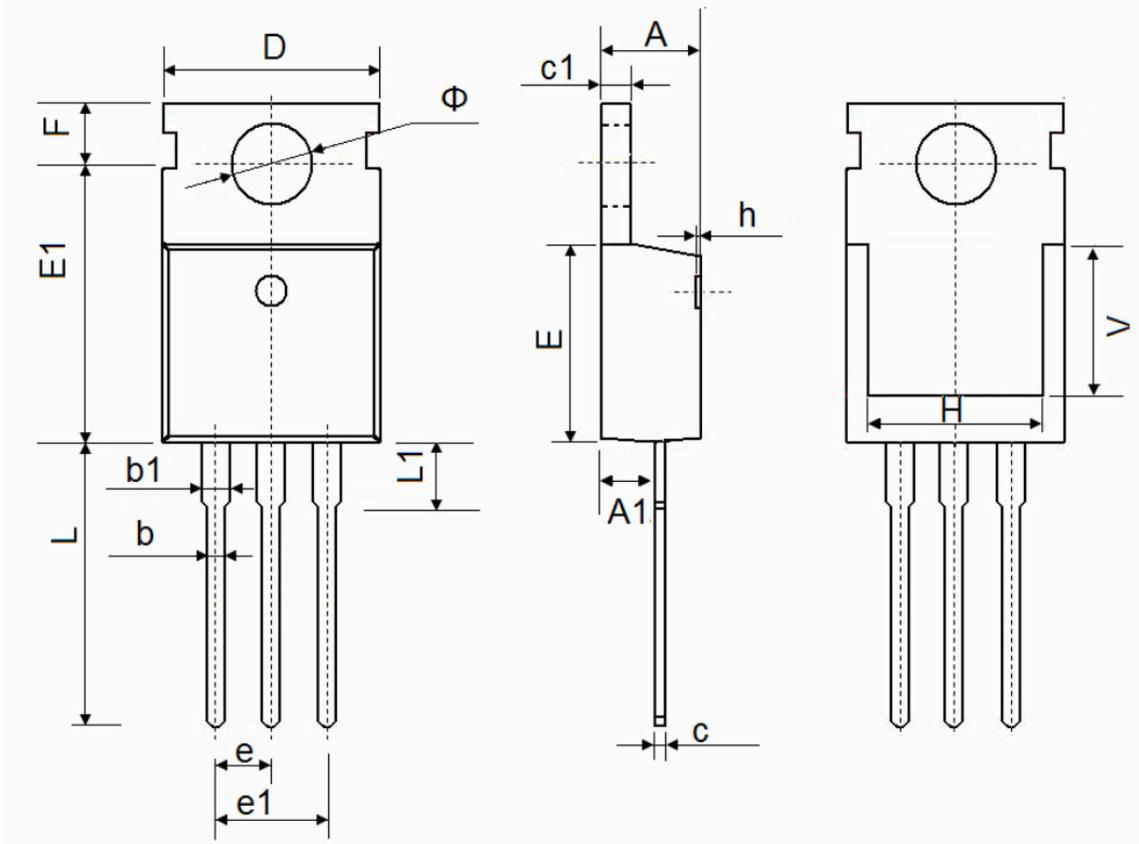


**Figure 10 Current De-rating**



**Figure 11 Normalized Maximum Transient Thermal Impedance**

### TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	4.400	4.600	0.173	0.181
A1	2.250	2.550	0.089	0.100
b	0.710	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	9.910	10.250	0.390	0.404
E	8.9500	9.750	0.352	0.384
E1	12.650	12.950	0.498	0.510
e	2.540 TYP.		0.100 TYP.	
e1	4.980	5.180	0.196	0.204
F	2.650	2.950	0.104	0.116
H	7.900	8.100	0.311	0.319
h	0.000	0.300	0.000	0.012
L	12.900	13.400	0.508	0.528
L1	2.850	3.250	0.112	0.128
V	7.500 REF.		0.295 REF.	
Φ	3.400	3.800	0.134	0.150