

### Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	$I_D$
100V	30mΩ@10V	34A

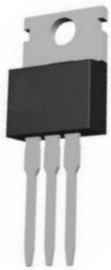
### Feature

- Advanced trench technology
- Fast switching
- Low gate charge and  $R_{DS(ON)}$
- Low reverse transfer capacitance
- Suffix "-Q1" for AEC-Q101

### Application

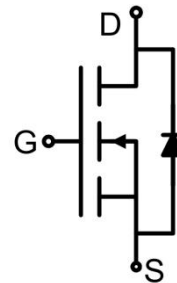
- Power switching application
- Hard switched and high frequency circuits
- Uninterruptible power supply

### Package

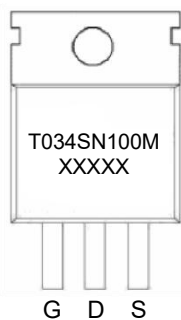


TO-220AB

### Circuit diagram



### Marking



### Absolute maximum ratings( $T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	34	A
Continuous Drain Current ( $T_C=100^{\circ}\text{C}$ )	$I_D(100^{\circ}\text{C})$	21	A
Pulsed Drain Current ( $t_p = 10\mu\text{s}$ )	$I_{DM}$	136	A
Single Pulse Avalanche Energy <sup>1)</sup>	$E_{AS}$	50	mJ
Power Dissipation	$P_D$	83	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	1.5	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature	$T_J$	-55 ~ +150	$^{\circ}\text{C}$
Storage Temperature	$T_{STG}$	-55 ~ +150	$^{\circ}\text{C}$

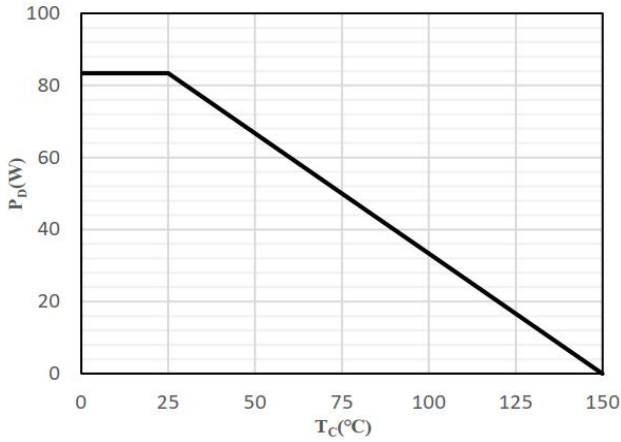
### Electrical characteristics ( $T_A=25^{\circ}\text{C}$ , unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
<b>Static Characteristics</b>						
Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$	100			V
Zero gate voltage drain current	$I_{DSS}$	$V_{DS} = 100\text{V}, V_{GS} = 0\text{V}$			1	$\mu\text{A}$
Gate-body leakage current	$I_{GSS}$	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 1$	$\mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$	1	1.5	3	V
Drain-source on-resistance <sup>2)</sup>	$R_{DS(on)}$	$V_{GS} = 10\text{V}, I_D = 10\text{A}$		23	30	m $\Omega$
<b>Dynamic characteristics<sup>3)</sup></b>						
Input Capacitance	$C_{iss}$	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$		3412		pF
Output Capacitance	$C_{oss}$			87		
Reverse Transfer Capacitance	$C_{rss}$			80		
Total Gate Charge	$Q_g$	$V_{DS} = 50\text{V}, V_{GS} = 10\text{V}, I_D = 15\text{A}$		74		nC
Gate-Source Charge	$Q_{gs}$			10.4		
Gate-Drain Charge	$Q_{gd}$			14.3		
Turn-on delay time	$t_{d(on)}$	$V_{DS} = 50\text{V}, V_{GS} = 10\text{V}, I_D = 15\text{A}$ $R_G = 3\Omega$		10		nS
Turn-on rise time	$t_r$			10		
Turn-off delay time	$t_{d(off)}$			38		
Turn-off fall time	$t_f$			14		
<b>Source-Drain Diode characteristics</b>						
Diode Continuous Current	$I_S$				34	A
Diode Forward voltage <sup>2)</sup>	$V_{SD}$	$V_{GS} = 0\text{V}, I_S = 30\text{A}$			1.5	V
Reverse recover time	$T_{rr}$	$V_{GS} = 0\text{V}, I_F = 10\text{A}$ $di/dt = -100\text{A}/\mu\text{s}$		29		nS
Reverse recovery charge	$Q_{rr}$			28		nC

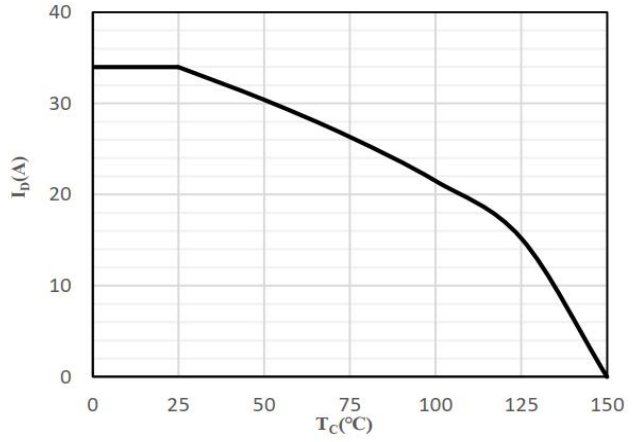
Notes:

- 1) The EAS data shows Max. rating. The test condition is  $V_{DD} = 50\text{V}, V_{GS} = 10\text{V}, L = 0.5\text{mH}$ .
- 2) The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
- 3) Guaranteed by design, not subject to production.

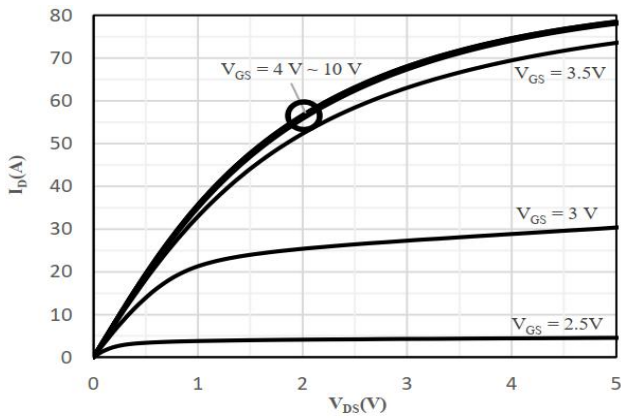
## Typical Characteristics



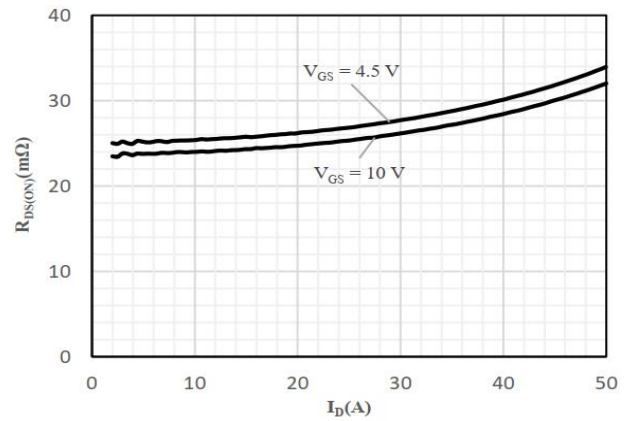
**Fig 1 Power Dissipation**



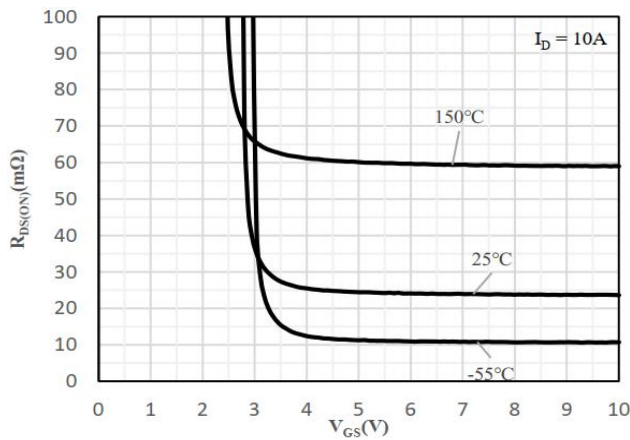
**Fig 2 Drain Current**



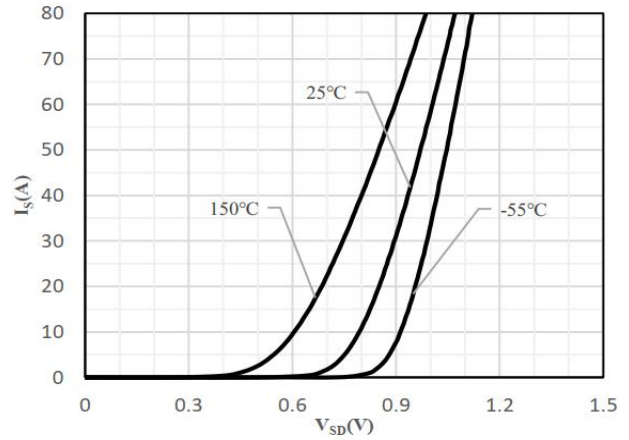
**Fig 3 Typical Output Characteristics**



**Fig 4 On-Resistance vs. Drain Current and Gate Voltage**

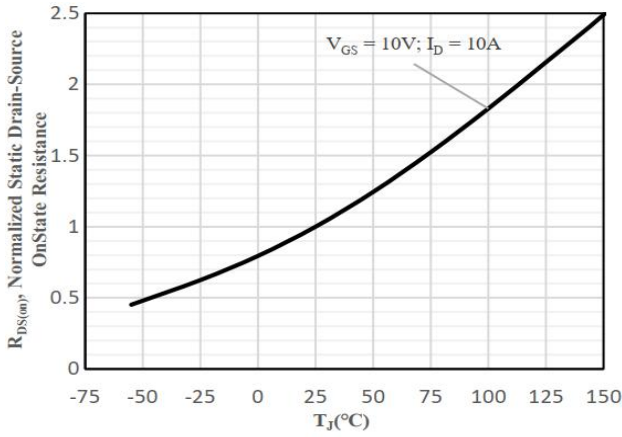


**Fig 5 On-Resistance vs. Gate-Source Voltage**

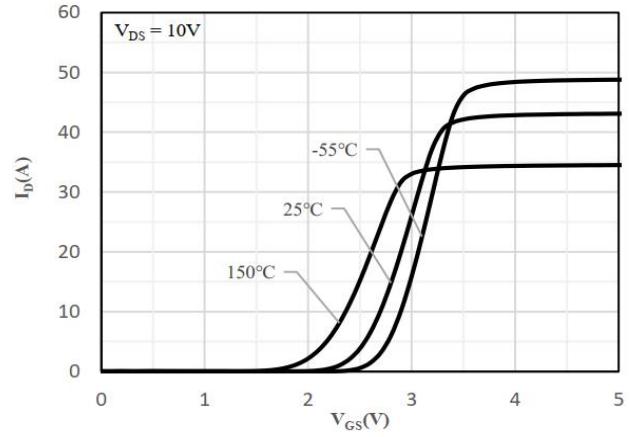


**Fig 6 Body-Diode Characteristics**

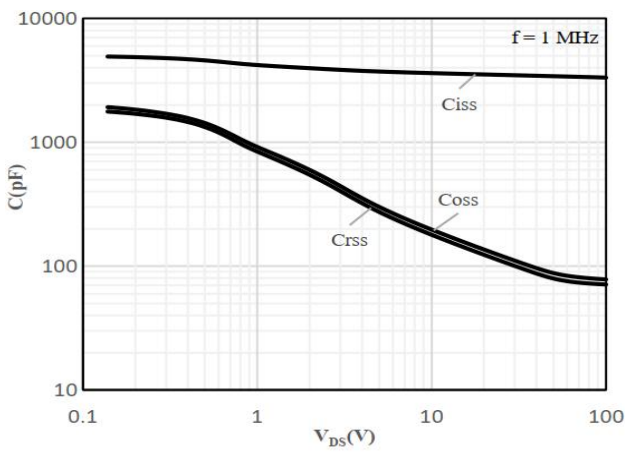
## Typical Characteristics



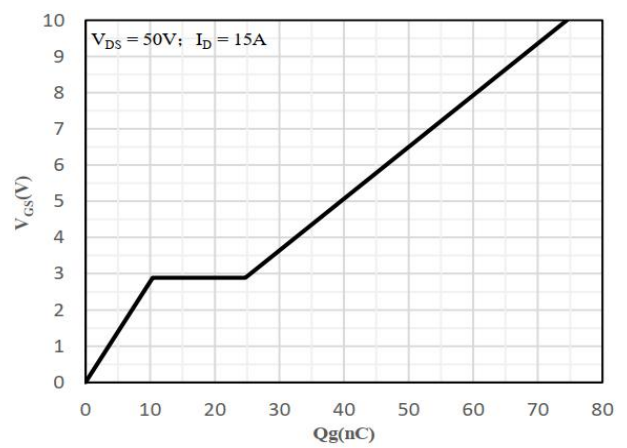
**Fig 7 Normalized On-Resistance vs. Junction Temperature**



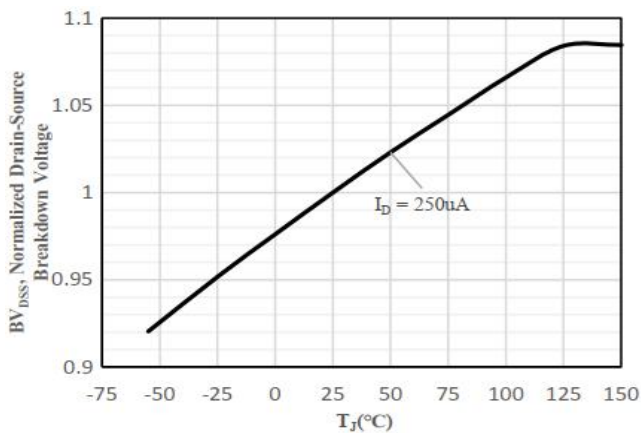
**Fig 8 Transfer Characteristics**



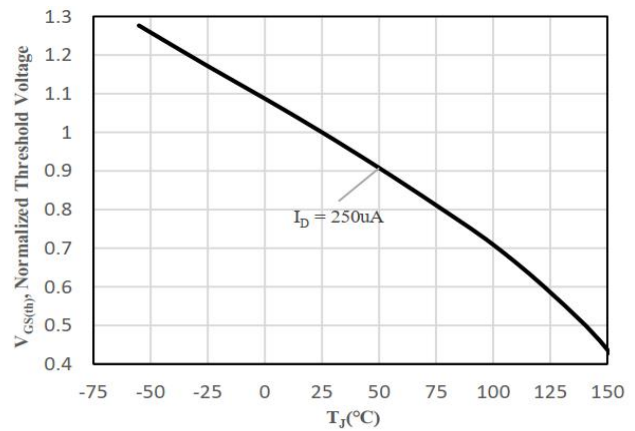
**Fig 9 Capacitance Characteristics**



**Fig 10 Gate-Charge Characteristics**

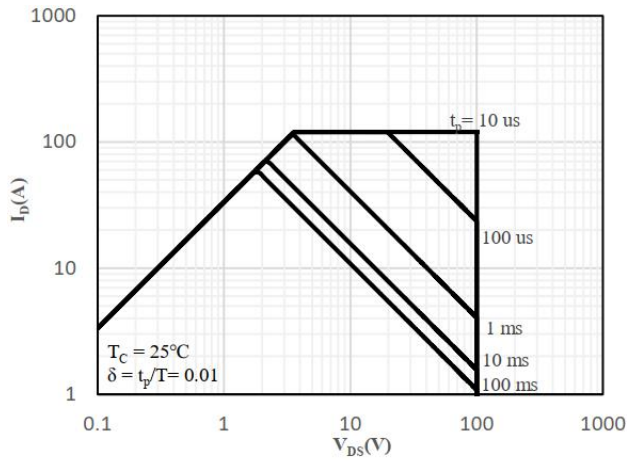


**Fig 11 Normalized Breakdown Voltage vs. Junction Temperature**

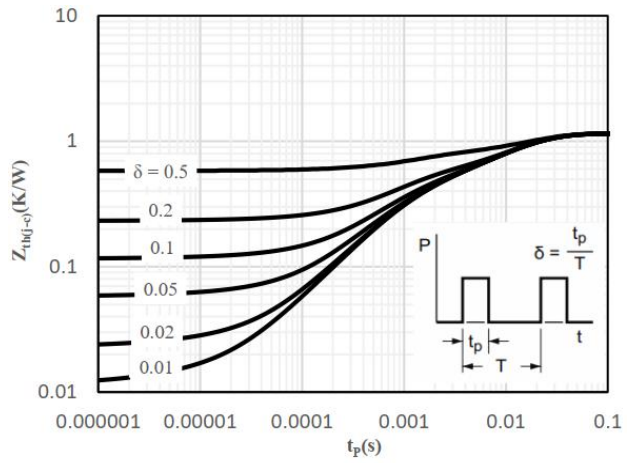


**Fig 12 Normalized  $V_{GS(th)}$  vs. Junction Temperature**

## Typical Characteristics

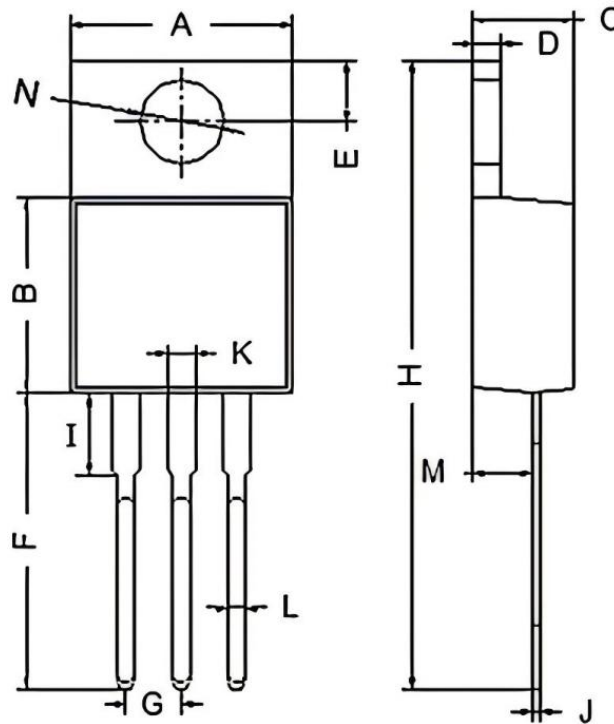


**Fig 13 Safe Operation Area**



**Fig 14 Maximum transient thermal impedance**

**TO-220AB Package Information**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	9.800	10.300	0.386	0.406
B	8.700	9.100	0.343	0.358
C	4.370	4.770	0.172	0.188
D	1.070	1.470	0.042	0.058
E	2.640	2.840	0.104	0.112
F	13.140	13.740	0.517	0.541
G	2.440	2.640	0.096	0.104
H	28.030	28.830	1.104	1.135
I	3.500	4.000	0.138	0.157
J	0.280	0.480	0.011	0.019
K	1.220	1.320	0.048	0.052
L	0.710	0.910	0.028	0.036
M	2.400	2.600	0.094	0.102
N	3.760	3.960	0.148	0.156