

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
40V	2.8mΩ@10V	180A
	3.8mΩ@4.5V	

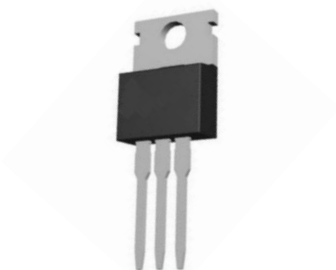
Feature

- Fast Switching
- Low Gate Charge and RDS(on)

Application

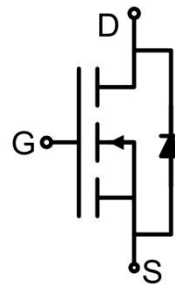
- Power switching application
- DC-DC Converter
- Power Management

Package

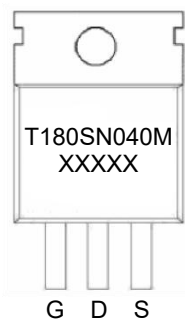


TO-220AB

Circuit diagram



Marking



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

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_C = 25^\circ\text{C}$)	I_D	180	A
Continuous Drain Current ($T_C = 100^\circ\text{C}$)	$I_D(100^\circ\text{C})$	120	A
Pulsed Drain Current	I_{DM}	720	A
Power Dissipation ($T_C = 25^\circ\text{C}$)	P_D	246	W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	0.51	$^\circ\text{C/W}$
Single pulse avalanche energy ¹⁾	E_{AS}	841	mJ
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{STG}	-55 ~ +150	$^\circ\text{C}$

Electrical characteristics (Ta=25°C, unless otherwise noted)

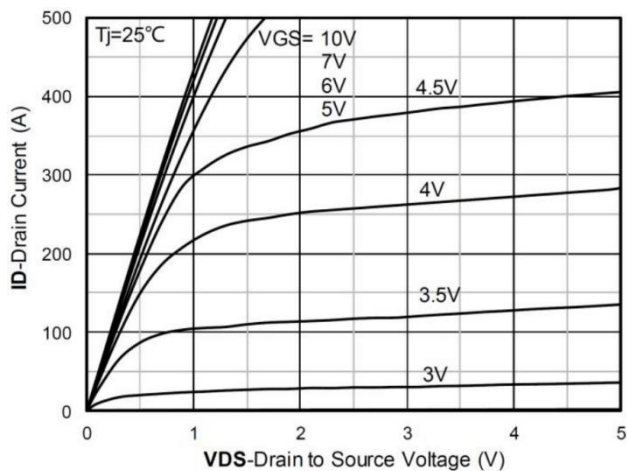
Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D =250μA	40			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =32V,V _{GS} =0V,T _J =25°C			1	μA
Gate-body leakage current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		1.8	2.8	mΩ
		V _{GS} =4.5V, I _D =10A		2.8	3.8	
Dynamic characteristics ²⁾						
Input Capacitance	C _{iss}	V _{DS} =20V, V _{GS} =0V, f =1MHz		10800		pF
Output Capacitance	C _{oss}			1940		
Reverse Transfer Capacitance	C _{rss}			760		
Total Gate Charge	Q _g	V _{DS} =20V, V _{GS} =10V, I _D =30A		147		nC
Gate-Source Charge	Q _{gs}			50		
Gate-Drain Charge	Q _{gd}			31		
Turn-on delay time	t _{d(on)}	V _{DD} =20V, V _{GS} =10V, I _D =30A, R _G =2.7Ω		26		nS
Turn-on rise time	t _r			30		
Turn-off delay time	t _{d(off)}			59		
Turn-off fall time	t _f			19		
Source-Drain Diode characteristics						
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =1A,T _J =25°C			1.2	V
Diode Continuous Current	I _S				180	A
Reverse recover time	T _{rr}	I _{SD} =30A,di/dt=100A/us, T _J =25°C		23		nS
Reverse recovery charge	Q _{rr}			29		nC

Notes:

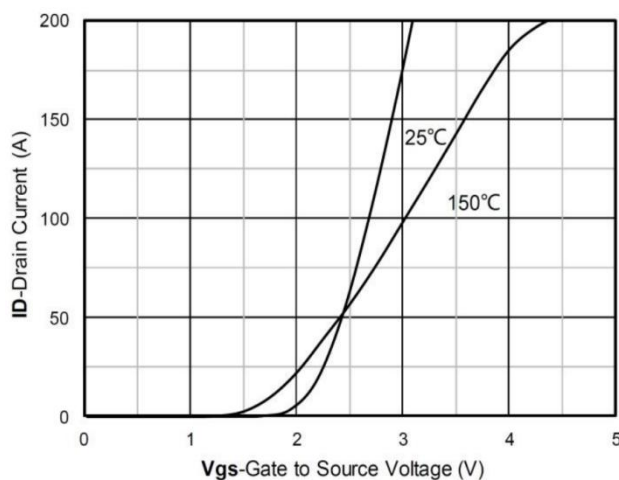
1) The EAS test condition is $V_{DD} = 20V, V_{GS} = 10V, L = 0.5mH, R_G = 25\Omega$

2) Guaranteed by design, not subject to production testing.

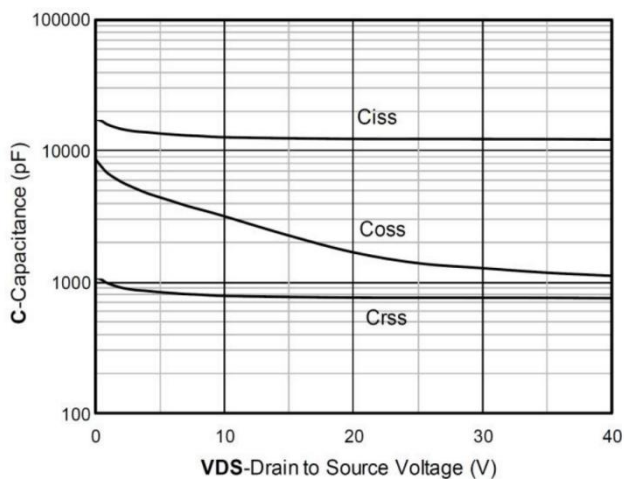
Typical Characteristics



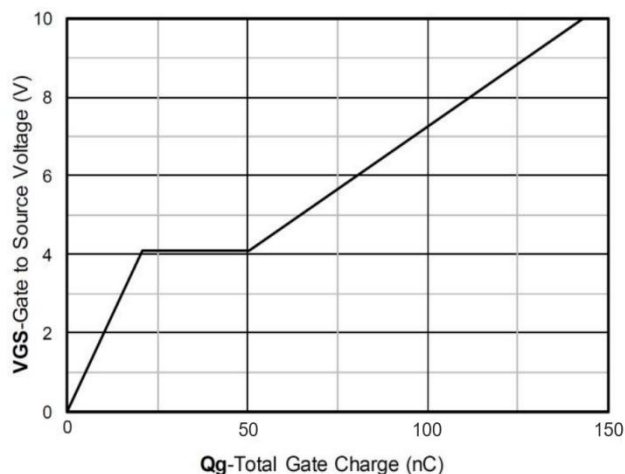
Output Characteristics



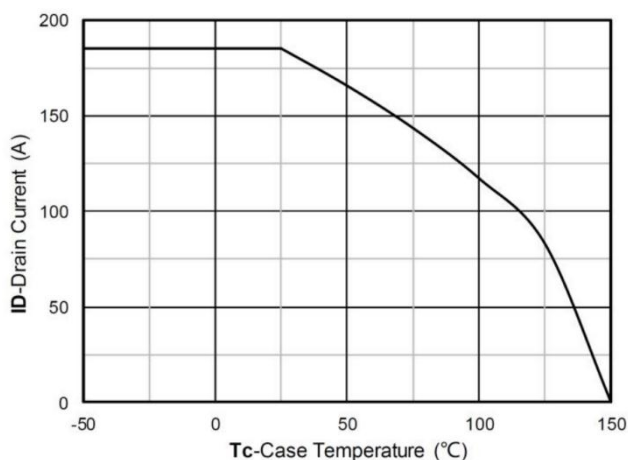
Transfer Characteristics



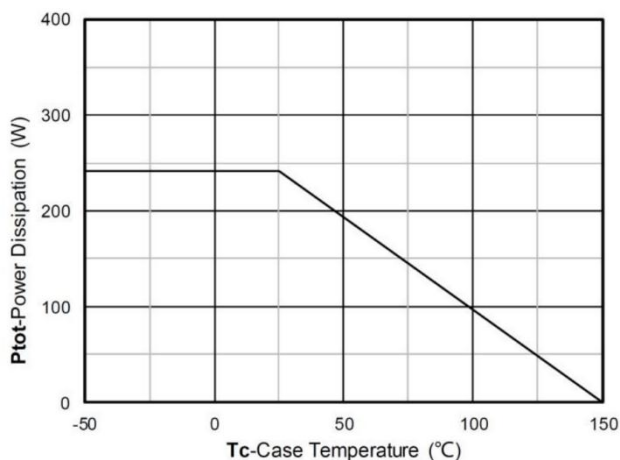
Capacitance Characteristics



Gate Charge

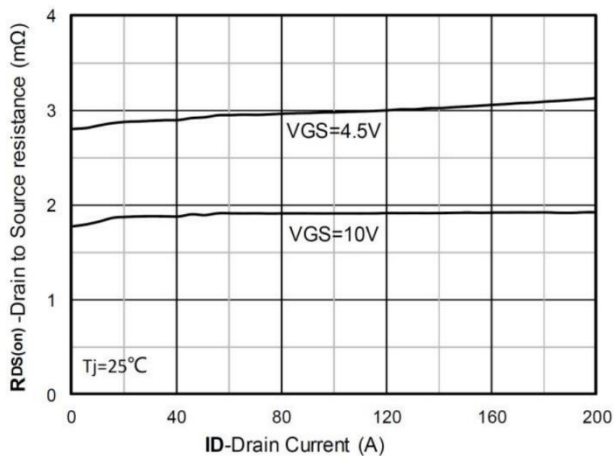


Current dissipation

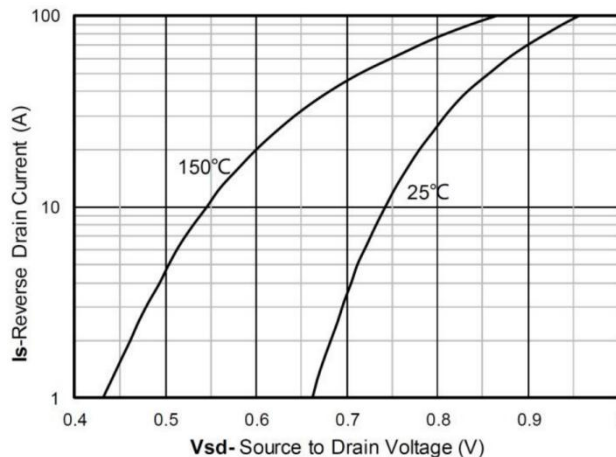


Power dissipation

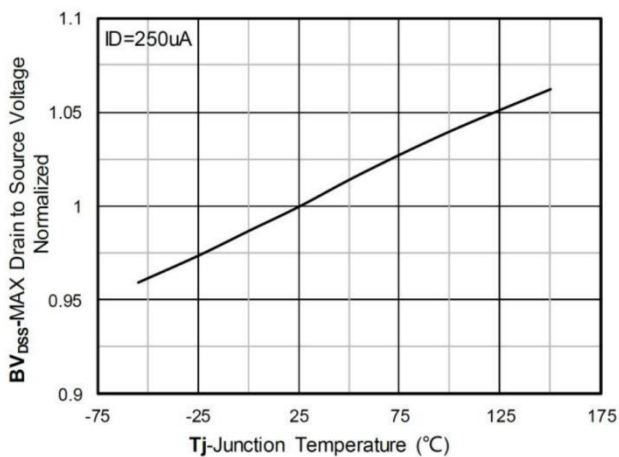
Typical Characteristics



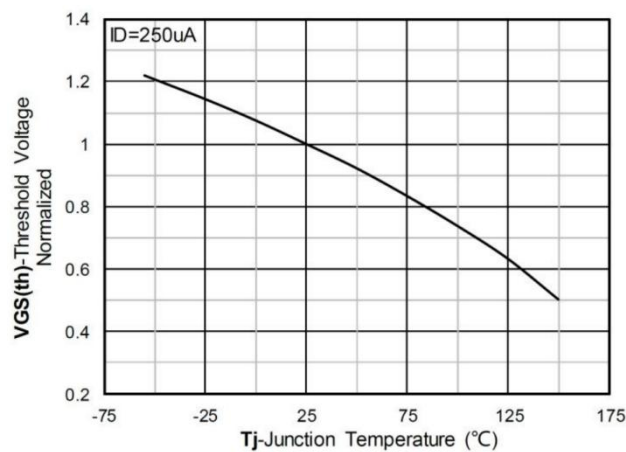
RDS(on) VS Drain Current



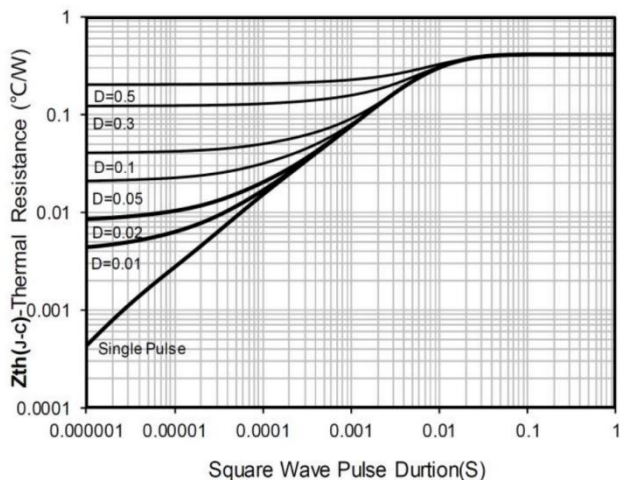
Forward characteristics of reverse diode



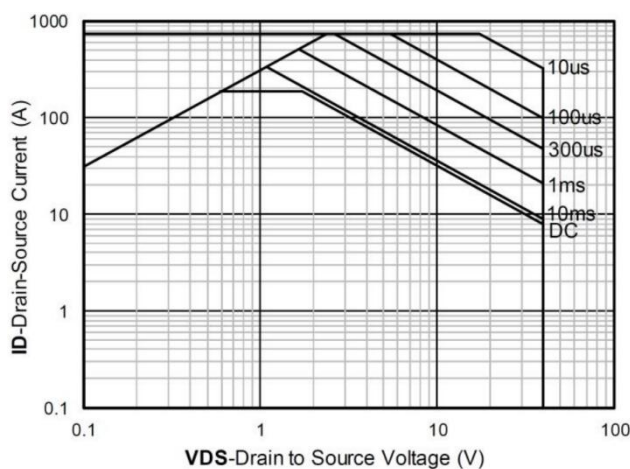
Normalized breakdown voltage



Normalized Threshold voltage

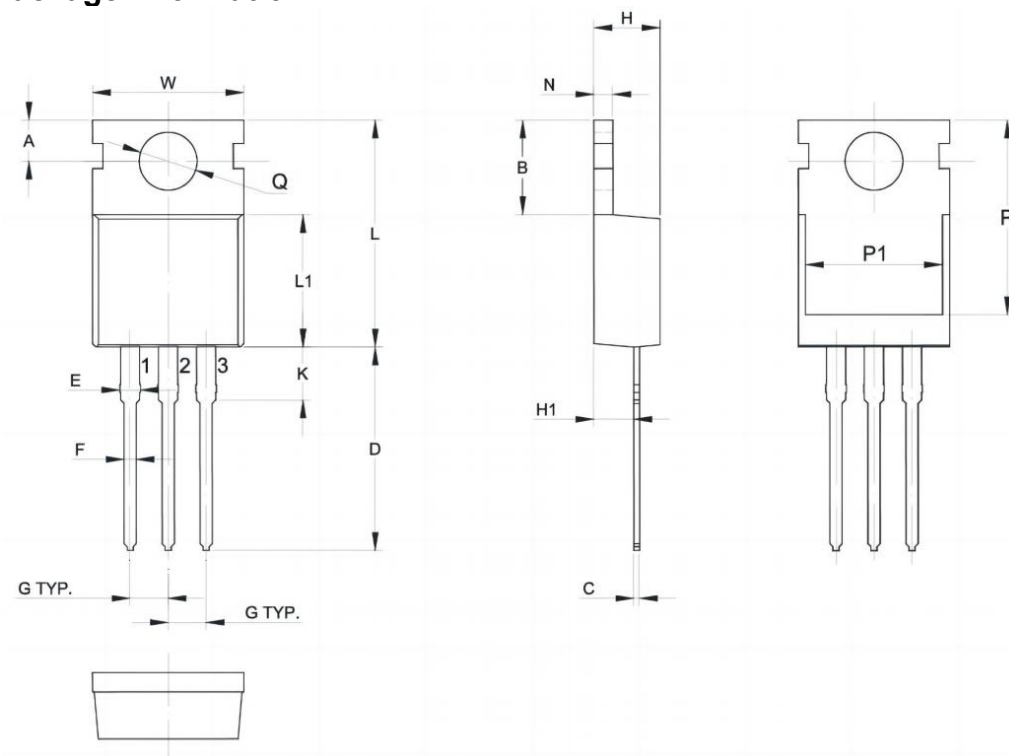


Maximum Transient Thermal Impedance



Safe Operation Area

TO-220AB Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.700	2.900	0.106	0.114
B	6.400	6.800	0.252	0.268
C	0.300	0.700	0.012	0.028
D	11.000	15.000	0.433	0.591
E	1.100	1.500	0.043	0.059
F	0.700	0.900	0.028	0.035
G	2.540 TYP.		0.100 TYP.	
W	9.800	10.200	0.386	0.402
H	4.300	4.700	0.169	0.185
H1	2.200	2.500	0.087	0.098
K	2.700	3.100	0.106	0.122
L	14.800	16.800	0.583	0.661
L1	9.000	9.400	0.354	0.370
N	1.200	1.400	0.047	0.055
P	12.700	13.300	0.500	0.524
P1	7.600	8.200	0.299	0.323
Q	3.500	3.700	0.138	0.146