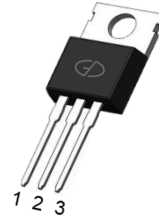


## N-Channel 60V (D-S) Power MOSFET

### Features

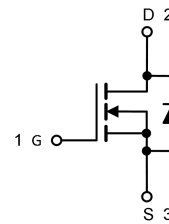
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM  $R_{ds(on)} \cdot Q_g$
- Halogen Free, Pb-Free
- RoHS Compliant



TO-220AB

### Applications

- DC/DC
- Motors, lamps
- Power switching



### Absolute Maximum Ratings ( $T_J=25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain Source Voltage	$V_{DS}$	60	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current, Continuous $V_{GS}=10\text{V}$ (Note 1)	$I_D$	80	A
Drain Current, Pulsed (Note 2)	$I_{DM}$	320	A
Single Avalanche Energy @ $L=0.5\text{mH}$	$E_{AS}$	191	mJ
Power Dissipation, $T_C=25^\circ\text{C}$ (Note 3)	TO220	92	W
	TO220F	38	
Operating Junction/ Storage Temperature Range	$T_J / T_{STG}$	-55 to +150	$^\circ\text{C}$

Note 1: Calculated continuous current based on maximum allowable junction temperature.

Note 2: Repetitive rating; pulse width limited by max. junction temperature.

### Thermal Characteristics

Parameter	Symbol	TO220	TO220F	Unit
Thermal Resistance Junction to Case (Note 3)	$R_{\theta JC}$	1.36	3.3	$^\circ\text{C/W}$

Note 3: The power dissipation  $P_D$  is based on max. junction temperature, using junction-to-case thermal resistance.

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

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Drain Source Breakdown Voltage	V <sub>(BR)DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	60	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	--	--	1	uA
Gate Threshold Voltage	V <sub>GS(TH)</sub>	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250uA	2	--	4	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	--	--	±100	nA
Drain-Source On-state Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	--	6	8	mΩ
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =15V, V <sub>DS</sub> =30V, I <sub>D</sub> =30A	--	72	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	16	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	23	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =30A, R <sub>GEN</sub> =3Ω	--	17	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	28	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	39	--	
Turn-off Fall Time	t <sub>f</sub>		--	12	--	
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz	--	3951	--	pF
Output Capacitance	C <sub>oss</sub>		--	203	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	180	--	

### Reverse Diode Characteristics (T<sub>J</sub> =25°C unless otherwise noted)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current (Body Diode)	I <sub>S</sub>	T <sub>C</sub> =25°C	--	--	80	A
Forward Current, Continuous	I <sub>SM</sub>		--	--	320	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =30A, V <sub>GS</sub> =0V	--	0.88	1.3	V
Reverse Recovery Time	T <sub>rr</sub>	I <sub>S</sub> =30A, di/dt = 100 A/μs	--	31.4	--	ns
Reverse Recovery Charge	Q <sub>rr</sub>		--	31.1	--	nC

## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Fig.1 - Output Characteristics

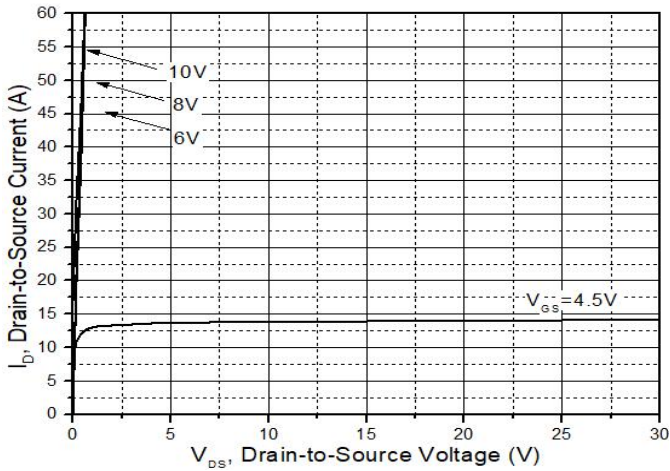


Fig.2 - Transfer Characteristics

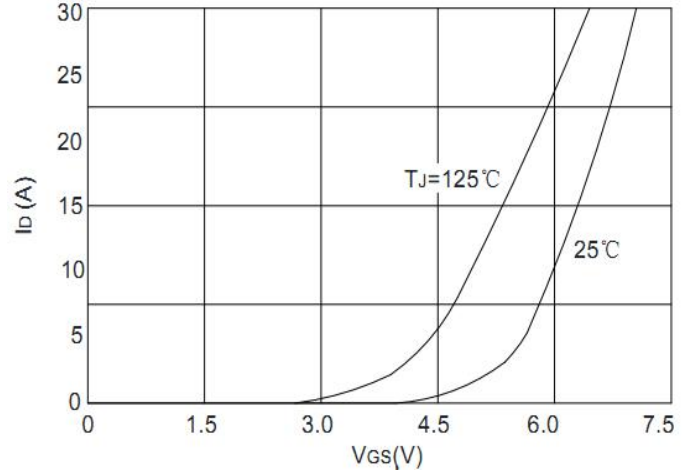


Fig.3 - Normalized VGS(th) vs. Junction Temperature

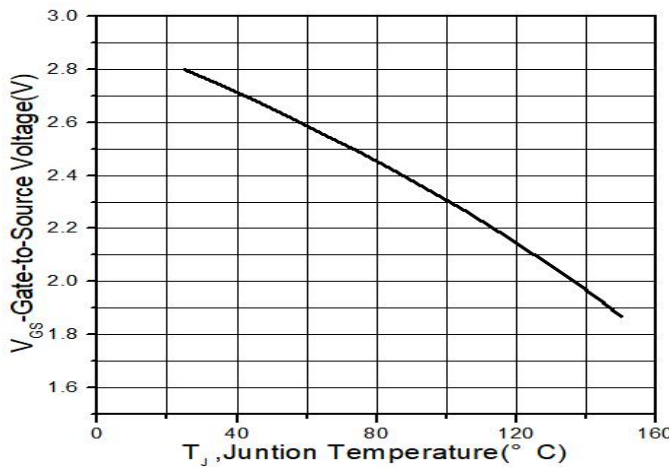


Fig.4 - Body Diode Characteristics

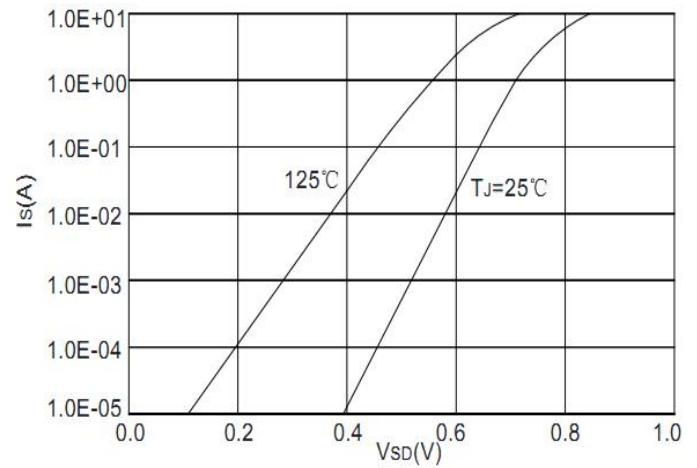


Fig.5 - Gate Charge

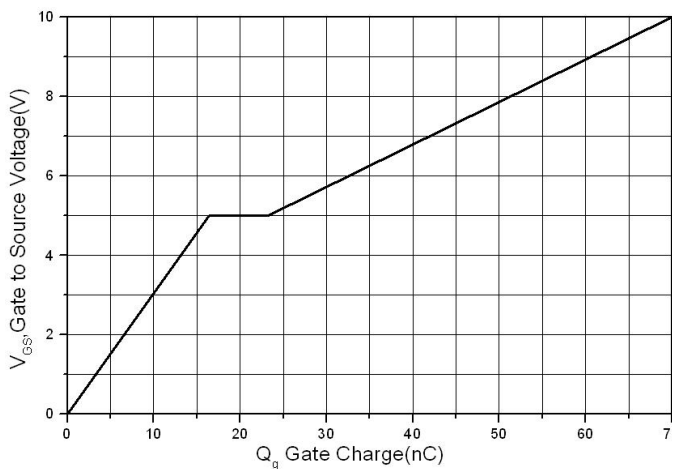
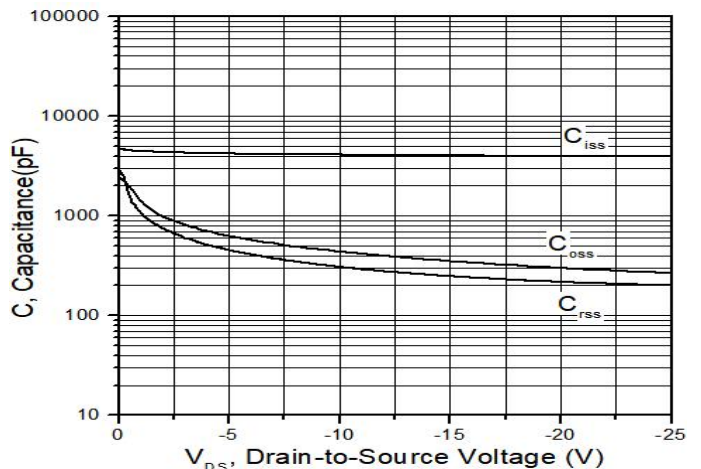


Fig.6 - Capacitance



## Typical Characteristics Curves ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

Fig.7 - Drain-to-Source Breakdown Voltage vs. Temperature

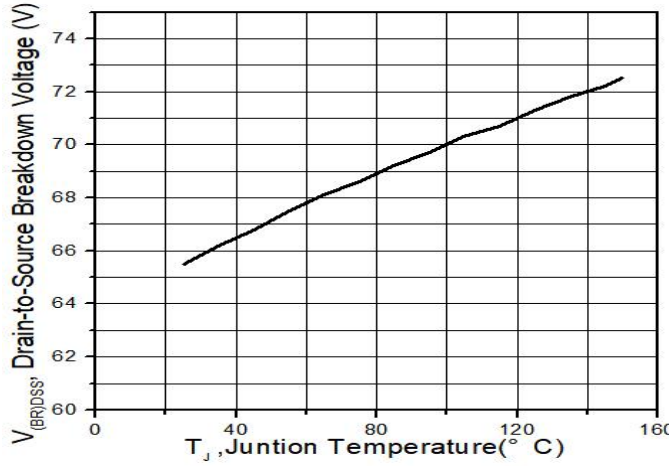


Fig.8 - Normalized On-Resistance vs. Junction Temperature

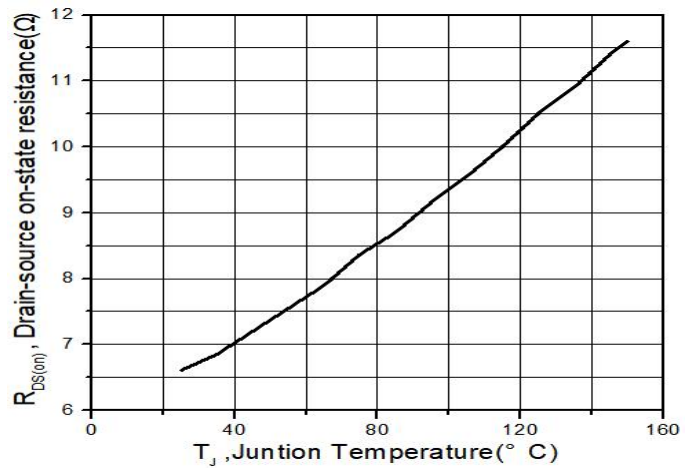


Fig.9 -Safe Operating Area

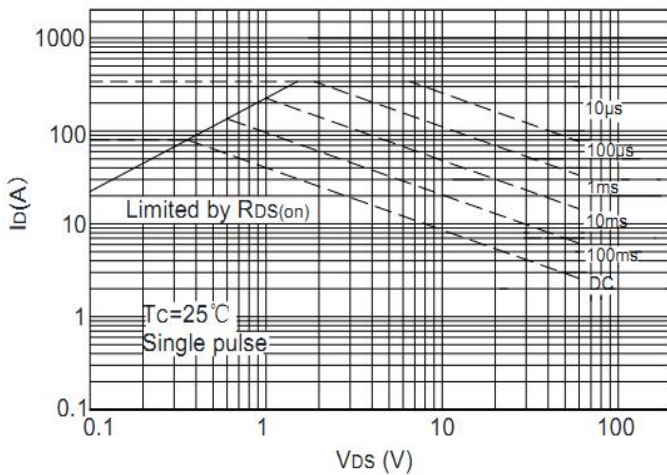


Fig.10 -Drain Current vs. Case Temperature

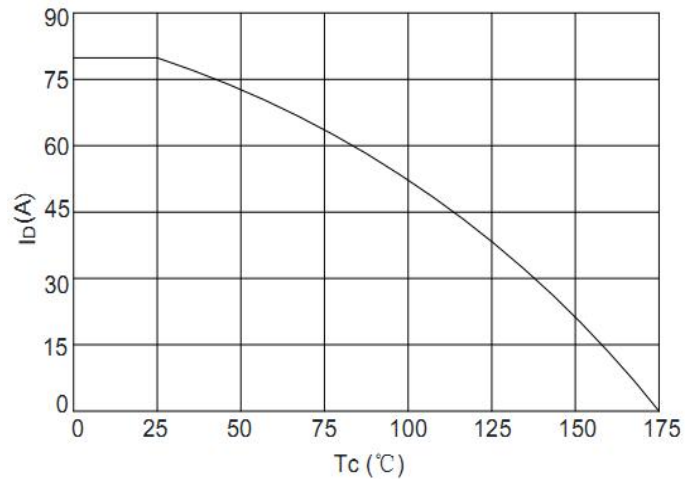
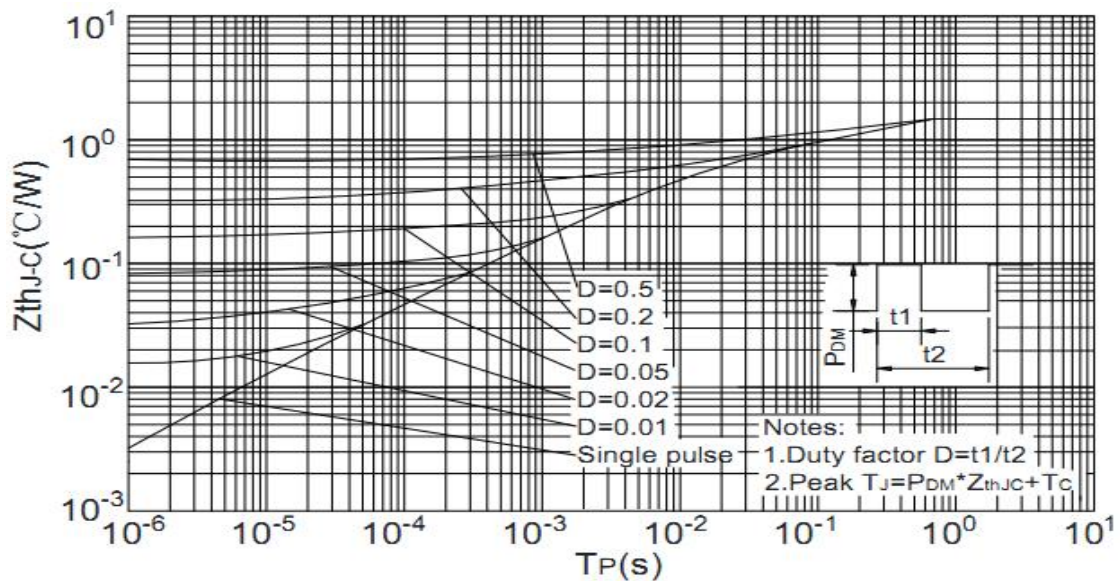
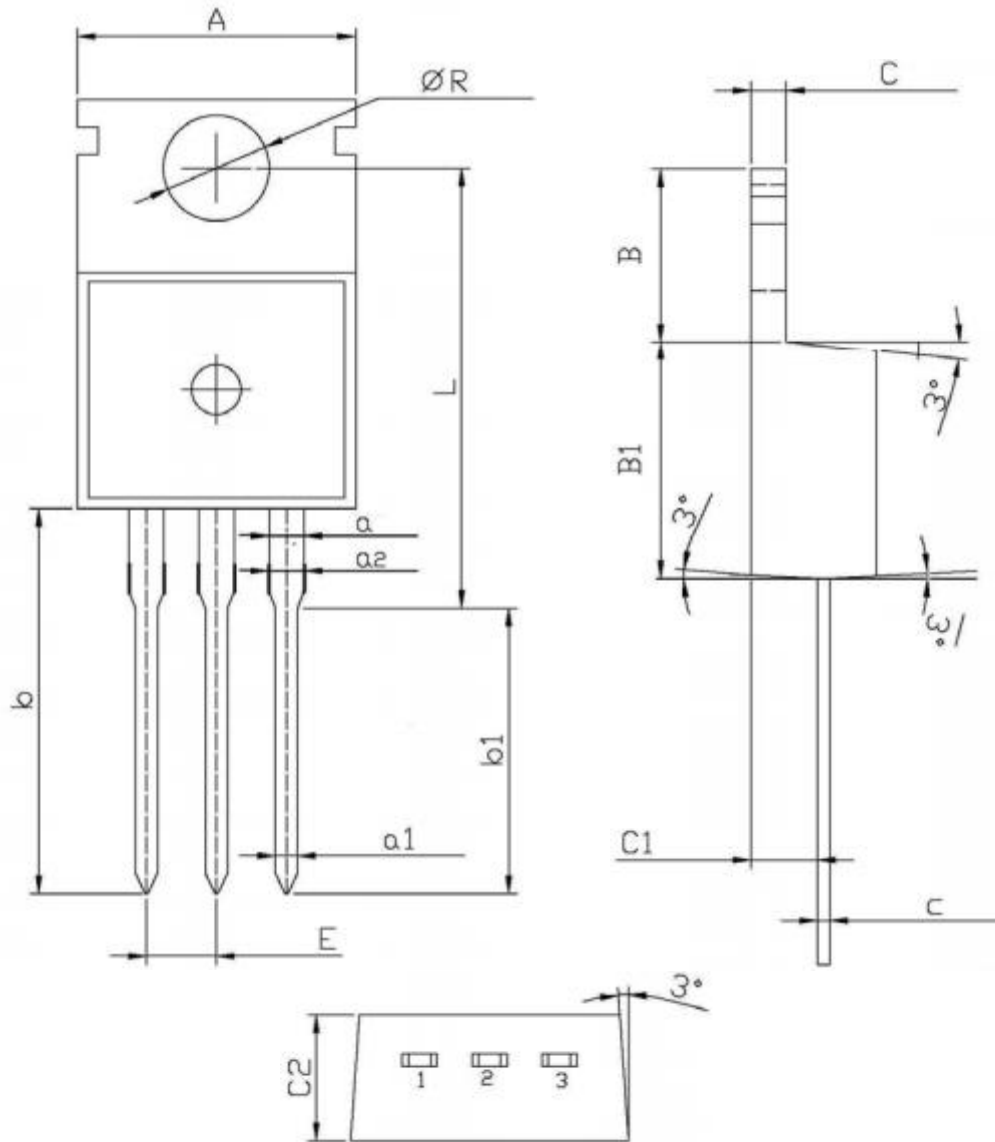


Fig.11 -Normalized Maximum Transient Thermal Impedance



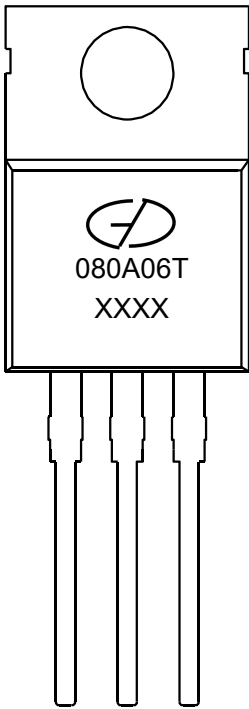
**Package Outline Dimensions** (Unit: millimeters)

**TO-220AB**



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	9.8	10.2	C	1.2	1.4
R	3.56	3.64	B	6.3	6.7
L	15.7	16.1	B1	9.0	9.4
b	12.6	13.6	C1	2.2	2.6
b1	9.6	10.6	a1	0.7	0.9
a	1.22	1.32	c	0.4	0.6
E	2.34	2.74	C2	4.3	4.7
Q2	1.25	1.45			

## Marking Outline



Part Name: GMN080A06T

1. Logo Mark: 
2. P/N Mark: 080A06T
3. Date Code: XXXX

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