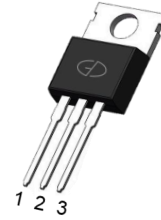


## N-Channel 40V (D-S) Power MOSFET

### Features

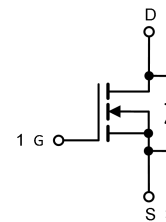
- 100% Avalanche Tested
- Extremely Low Losses with Low FOM  $R_{ds(on)} \cdot Q_g$
- Halogen Free, Pb-Free
- RoHS Compliant



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	$V_{DS}$	40	V
Gate Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current, Continuous $V_{GS}=10\text{V}$ (Note 1)	$I_D$	$T_C=25^\circ\text{C}$	172
		$T_C=100^\circ\text{C}$	122
Drain Current, Pulsed (Note 2)	$I_{DM}$	688	A
Single Avalanche Energy @ $L=0.5\text{mH}$	$E_{AS}$	719	mJ
Power Dissipation (Note 3)	$P_D$	119	W
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	Max	Unit
Thermal Resistance Junction to Case (Note 3)	$R_{\theta JC}$	1.05	$^\circ\text{C/W}$

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	40	--	--	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> =40V, 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> =40A	--	2.1	2.4	mΩ
Total Gate Charge	Q <sub>g</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, I <sub>D</sub> =20A	--	140	--	nC
Gate-Source Charge	Q <sub>gs</sub>		--	26	--	
Gate-Drain Charge	Q <sub>gd</sub>		--	35	--	
Turn-on Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> =10V, V <sub>DS</sub> =20V, R <sub>L</sub> =1Ω, R <sub>G</sub> =3.6Ω	--	30	--	ns
Turn-on Rise Time	t <sub>r</sub>		--	32	--	
Turn-off Delay Time	t <sub>d(off)</sub>		--	70	--	
Turn-off Fall Time	t <sub>f</sub>		--	25	--	
Input Capacitance	C <sub>iss</sub>	V <sub>GS</sub> =0V, V <sub>DS</sub> =40V, f=1MHz	--	10587	--	pF
Output Capacitance	C <sub>oss</sub>		--	647	--	
Reverse Transfer Capacitance	C <sub>rss</sub>		--	603	--	

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	--	--	172	A
Pulsed Source Current	I <sub>SM</sub>		--	--	688	
Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> =40A, V <sub>GS</sub> =0V	--	--	1.2	V
Reverse Recovery Time	T <sub>rr</sub>	I <sub>F</sub> =20A, di/dt = 100 A/μs	--	50	--	ns
Reverse Recovery Charge	Q <sub>rr</sub>		--	75	--	nC

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

Fig.1 - Output Characteristics

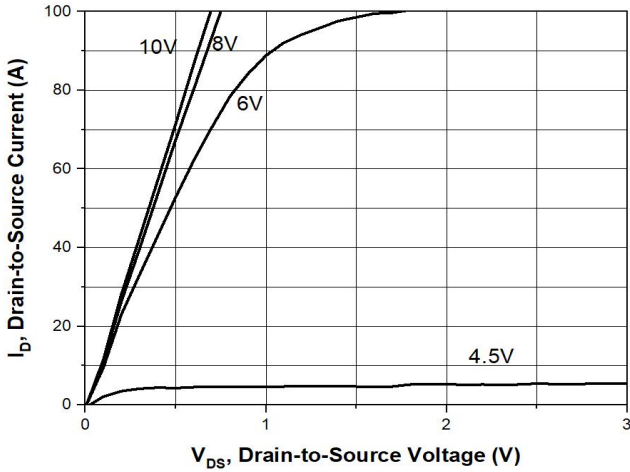


Fig.2 - Drain-to-Source Breakdown Voltage vs. Junction Temperature

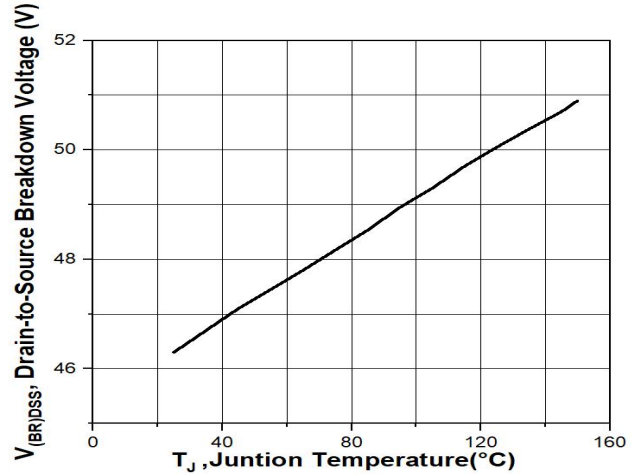


Fig.3 - RDS(on) vs. Junction Temperature

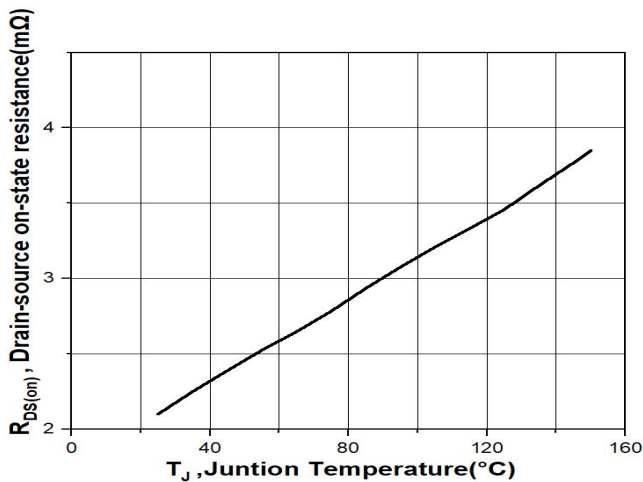


Fig.4 - Vth vs. Junction Temperature

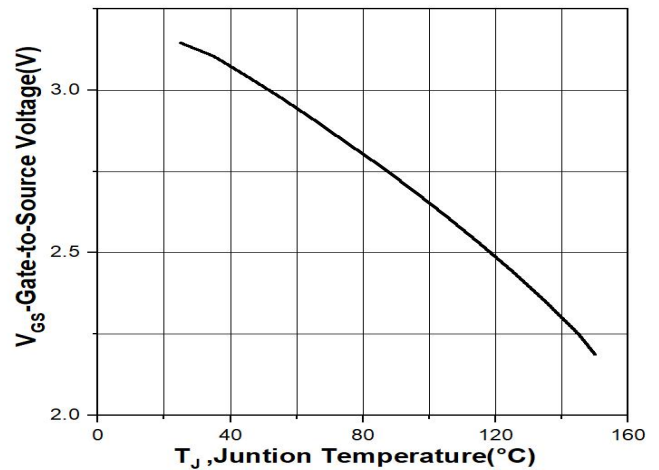


Fig.5 - Gate Charge

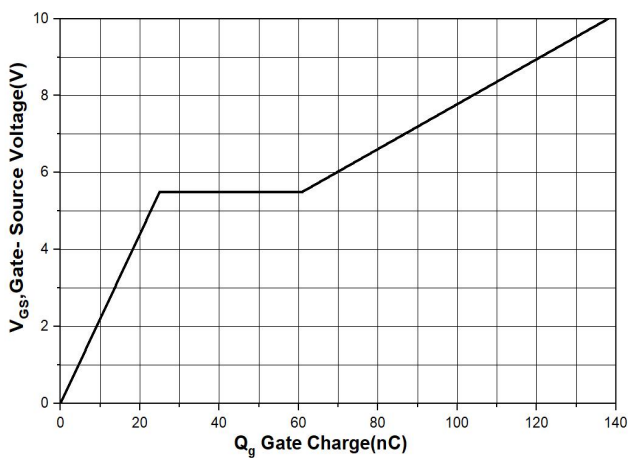
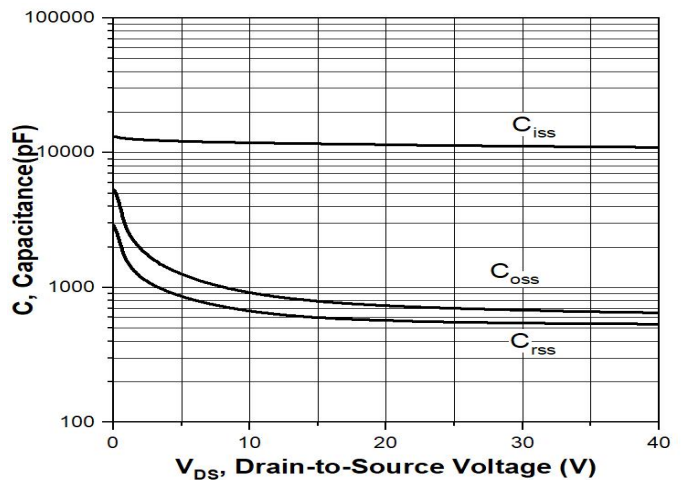


Fig.6 - Capacitance



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

Fig.7 - Transfer Characteristics

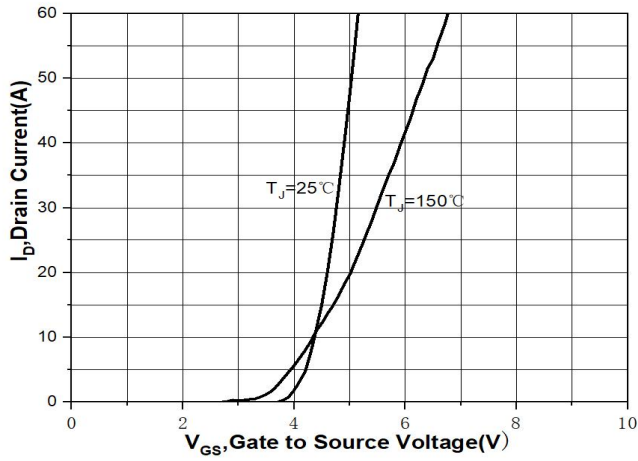
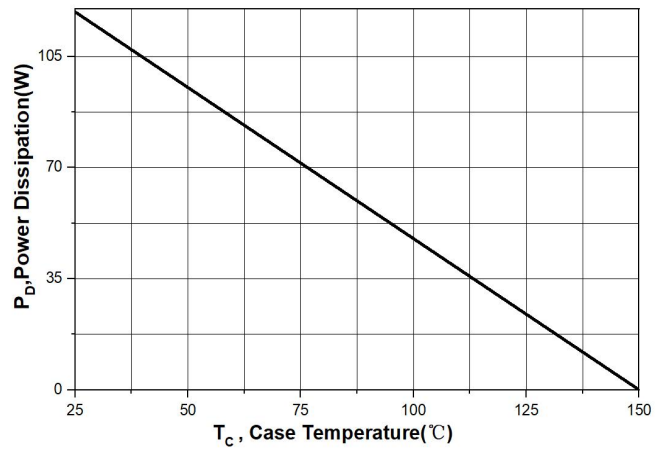
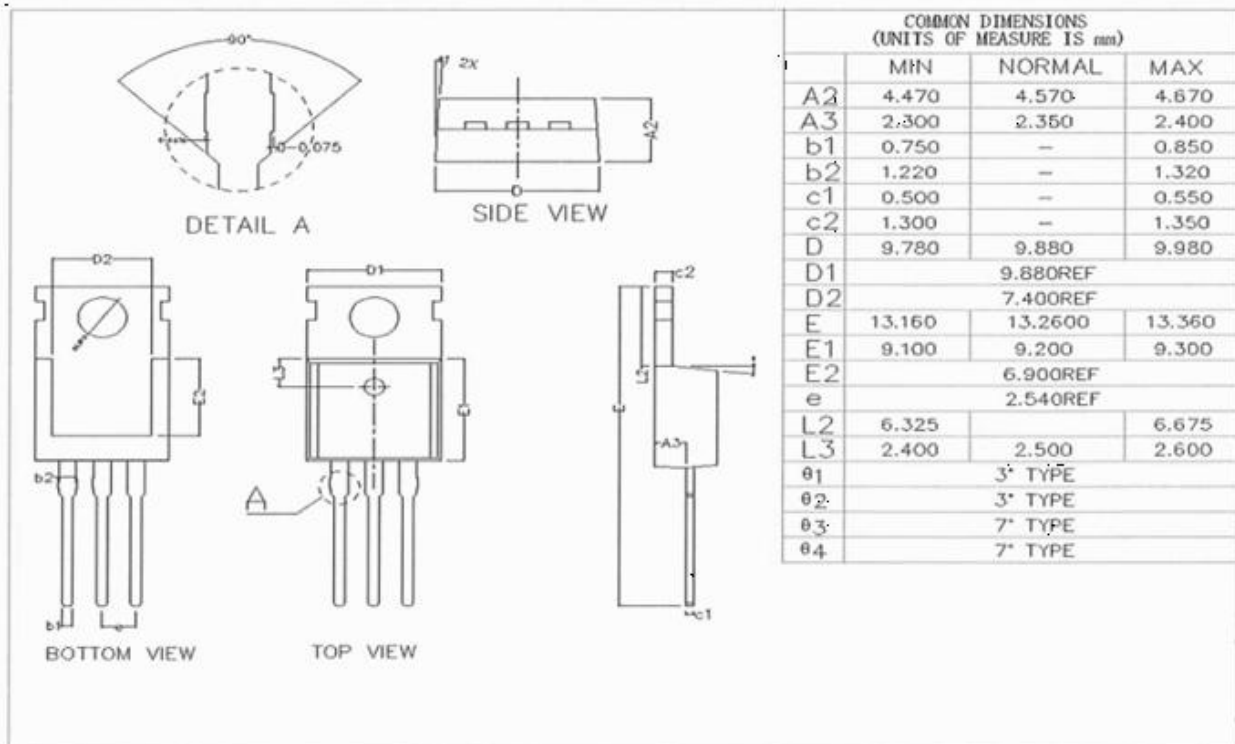


Fig.8 - Power Dissipation

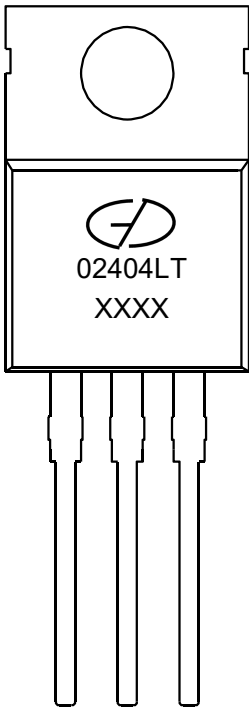


**Package Outline Dimensions** (Unit: millimeters)


**TO-220AB**



## Marking Outline



Part Name: GMN02404LT

1. Logo Mark: 
2. P/N Mark: 02404LT
3. Date Code: XXXX

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