N-Channel Enhancement Mode Power MOSFET

Description

The G60N10T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

- V_{DS} 100V
- I_D (at V_{GS} = 10V)   60A
- $R_{DS(ON)}$ (at V_{GS} = 10V)   <   17mΩ
- $R_{DS(ON)}$ (at V_{GS} = 4.5V)   <   19mΩ
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters
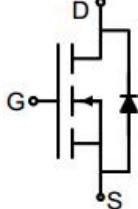
Schematic diagram

TO-220

Ordering Information

Device	Package	Marking	Packaging
G60N10T	TO-220	G60N10	50pcs/Tube

Absolute Maximum Ratings T_C = 25ºC, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	100	V
Continuous Drain Current	I_D	60	A
Pulsed Drain Current (note1)	I_{DM}	240	A
Gate-Source Voltage	V_{GS}	±20	V
Power Dissipation	P_D	132	W
Single pulse avalanche energy （note2）	E_{AS}	100	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	ºC

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient	R_{thJA}	40	ºC/W
Maximum Junction-to-Case	R_{thJC}	0.94	ºC/W

Specifications T_J = 25ºC, unless otherwise noted

Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D = 250μA	100	--	--	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 100V, V_{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I_{GSS}	V_{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	0.8	1.7	2.5	V
Drain-Source On-Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	14	17	mΩ
		V_{GS} = 4.5V, I_D = 20A	--	15	19	
Forward Transconductance	g_{FS}	V_{GS} = 5V, I_D = 20A	--	32	--	S
Dynamic Parameters						
Input Capacitance	C_{iss}	V_{GS} = 0V, V_{DS} = 50V, f = 1.0MHz	--	5986	--	pF
Output Capacitance	C_{oss}		--	176	--	
Reverse Transfer Capacitance	C_{rss}		--	164	--	
Total Gate Charge	Q_g	V_{DD} = 50V, I_D = 20A, V_{GS} = 10V	--	146	--	nC
Gate-Source Charge	Q_{gs}		--	29	--	
Gate-Drain Charge	Q_{gd}		--	57	--	
Turn-on Delay Time	$t_{d(on)}$	V_{DD} = 50V, I_D = 20A, R_G = 2.5Ω	--	17	--	ns
Turn-on Rise Time	t_r		--	13	--	
Turn-off Delay Time	$t_{d(off)}$		--	55	--	
Turn-off Fall Time	t_f		--	16	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I_S	T_C = 25ºC	--	--	60	A
Body Diode Voltage	V_{SD}	T_J = 25ºC, I_{SD} = 20A, V_{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q_{rr}	I_F = 20A, V_{GS} = 0V di/dt=100A/us	--	58	--	nC
Reverse Recovery Time	T_{rr}		--	35	--	ns

Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : Tj=25℃ ,VDD=50V,VGS=10V,L=0.5mH,Rg=25Ω

3. Identical low side and high side switch with identical R_G

Gate Charge Test Circuit
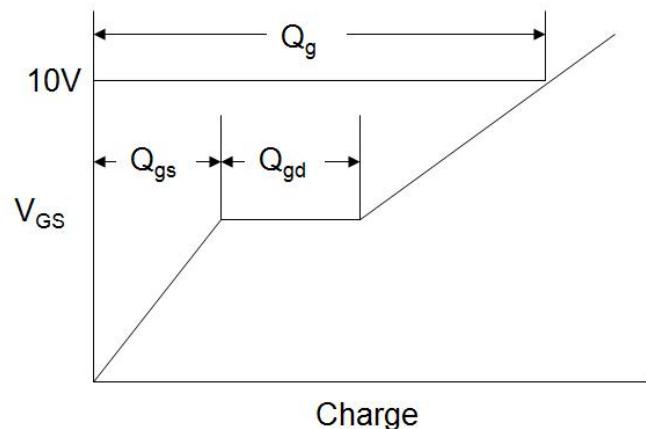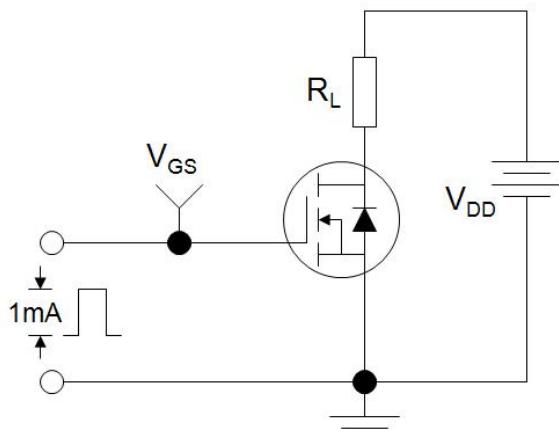
Switch Time Test Circuit
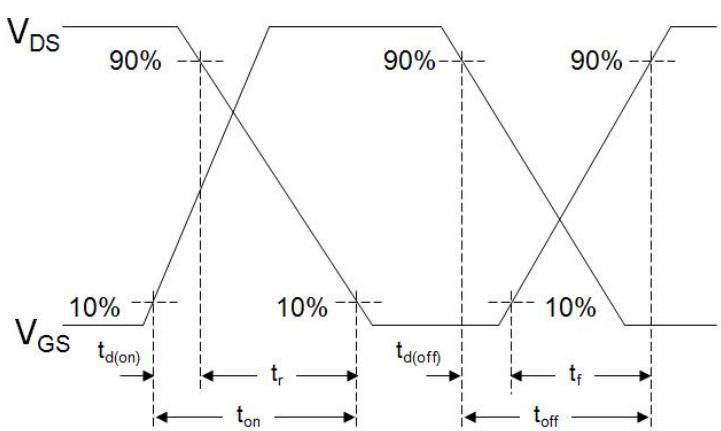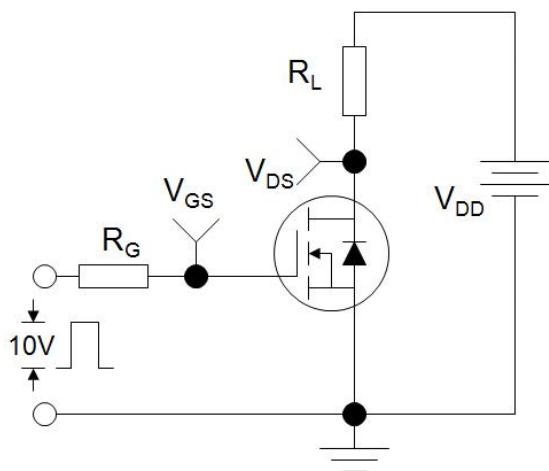
EAS Test Circuit
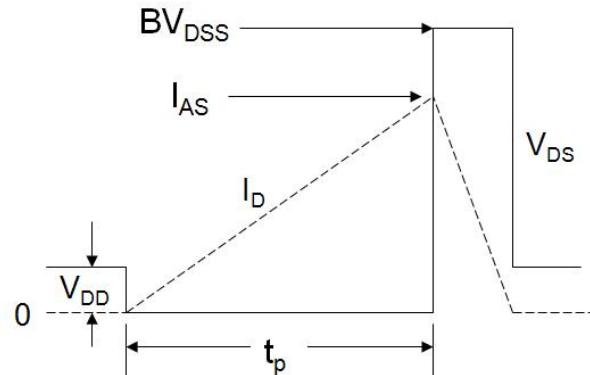
Typical Characteristics T_J = 25°C, unless otherwise noted

**Figure 1. Output Characteristics**
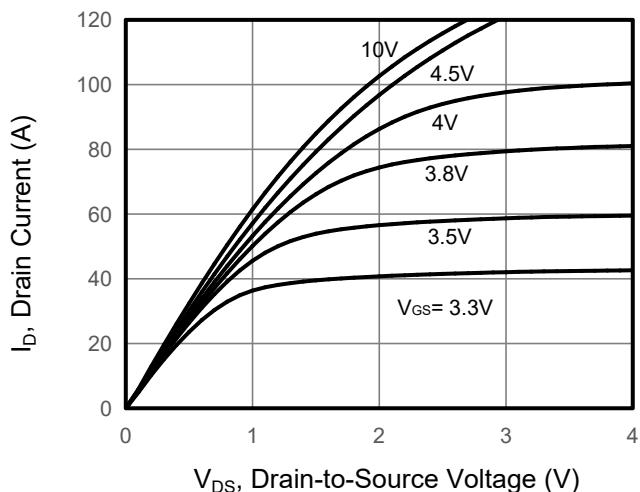
**Figure 2. Transfer Characteristics**
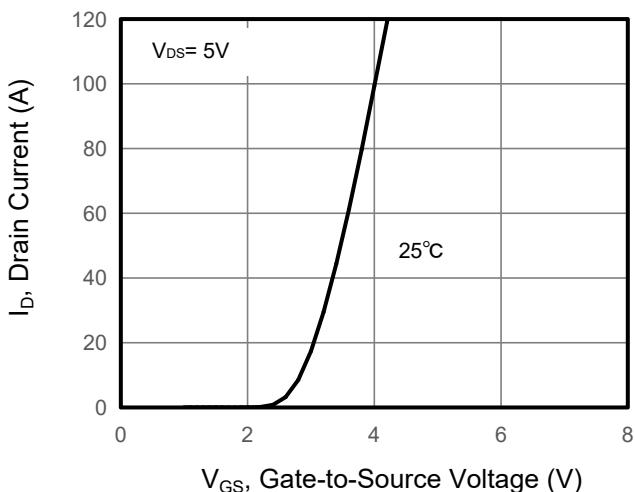

Figure 3. Drain Source On Resistance
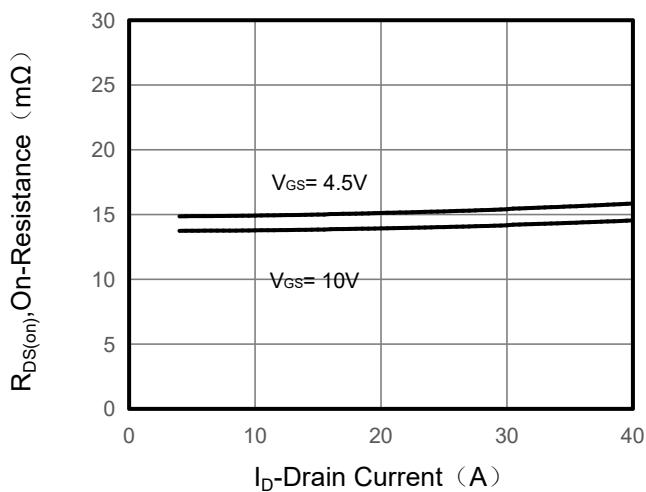
Figure 4. Gate Charge
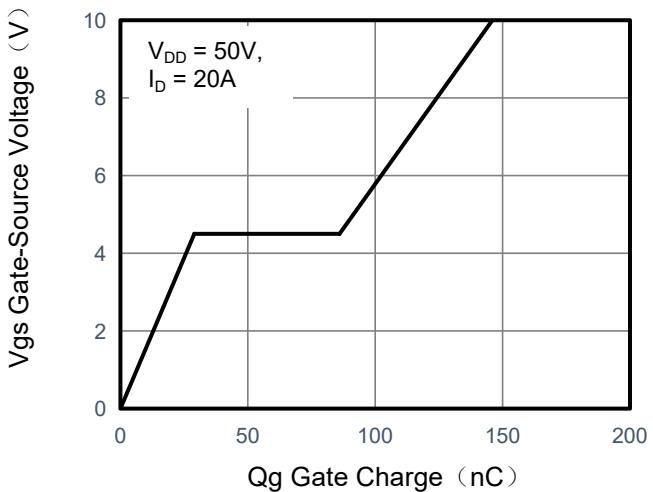
**Figure 5. Capacitance**
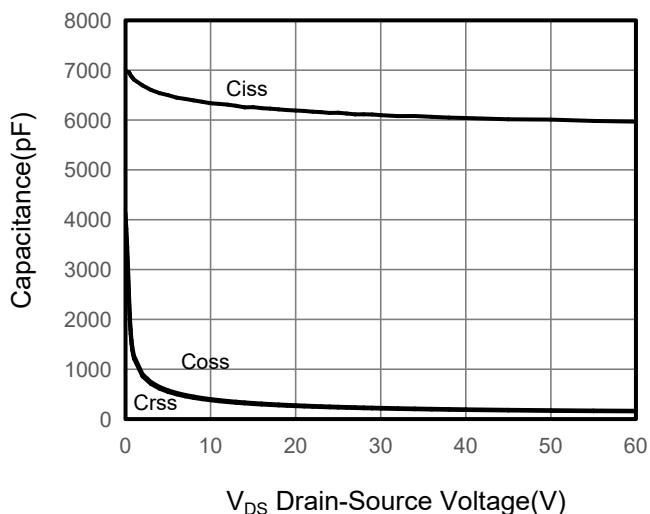
Figure 6. Source-Drain Diode Forward

GOFORD

Typical Characteristics $T_J = 25^oC$, unless otherwise noted

### Figure 7. Drain-Source On-Resistance

$V_{GS} = 10V$, $I_D = 20A$

$V_{GS} = 4.5V$, $I_D = 20A$

$R_{DS(on)}$, (Normalized)

T_J, Junction Temperature (ºC)
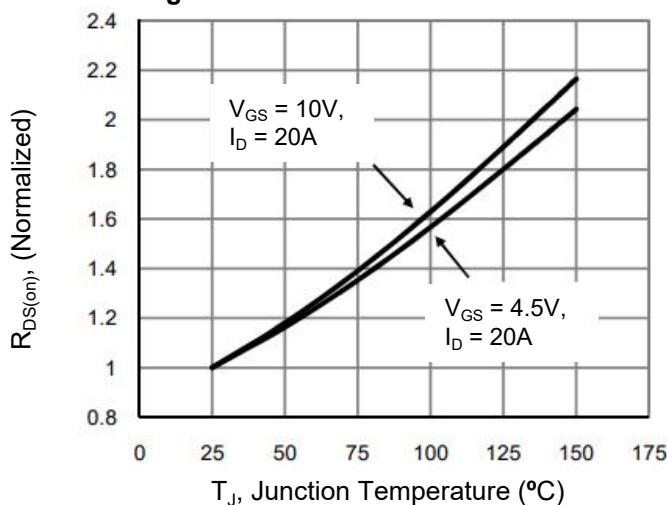
Figure 8. Safe Operation Area

$R_{DS(ON)}$ limited

$10\mu s$

$100\mu s$

$1ms$

$10ms$

DC

$T_{J(Max)} = 150^\circ C$

$T_C = 25^\circ C$

I_D, Drain Current(A)

V_{DS}, Drain-Source Voltage(V)
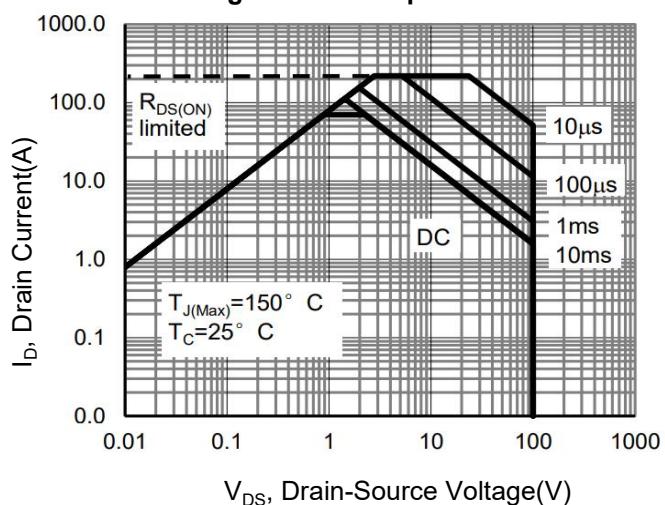
Figure 9. Normalized Maximum Transient Thermal Impedance

$D = T_{on}/T$

$T_{J,PK} = T_C + P_{DM} \cdot Z_{\theta JC} \cdot R_{\theta JC}$

$R_{\theta JC} = 0.94^\circ C/W$

In descending order
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

Single Pulse

P_n

T_{on}

T

Z_{thJC}, Thermal Impedance (ºC/W)

Pulse Width (s)
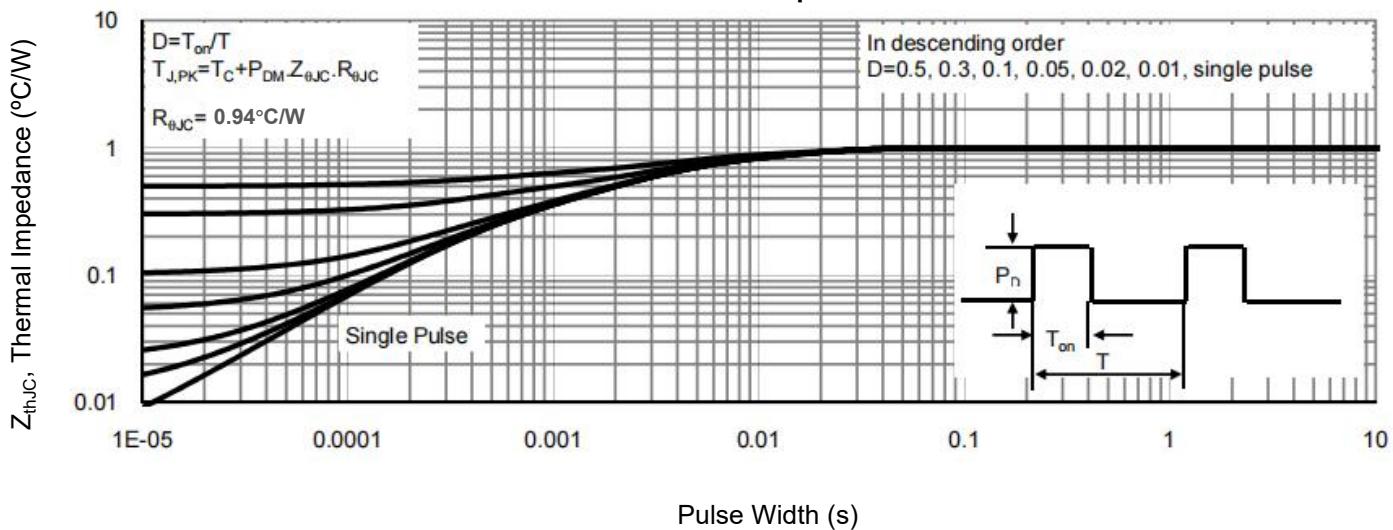
TO-220 Package Information
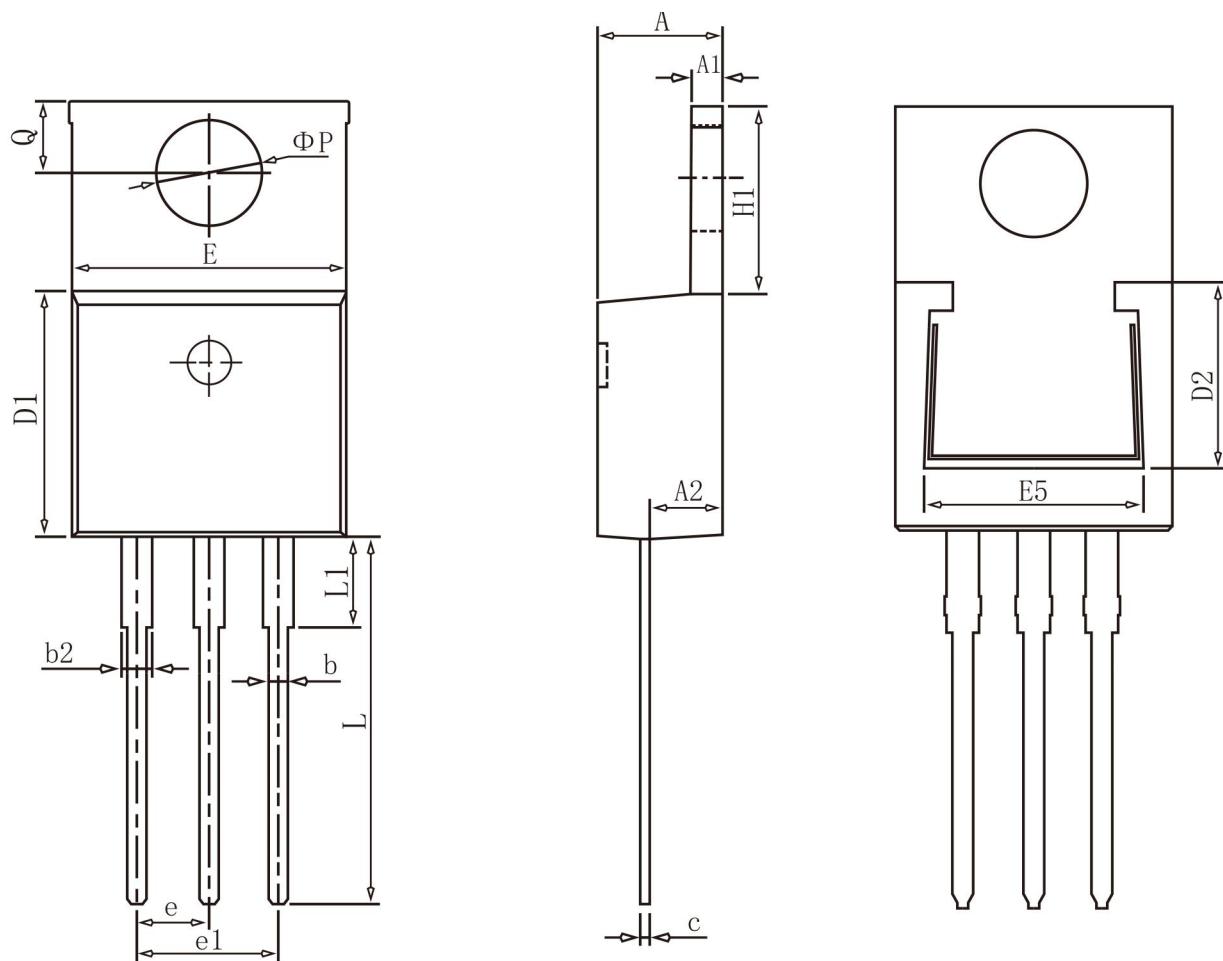
COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
b	0.75	0.81	0.96
b2	1.22	1.27	1.47
c	0.30	0.38	0.48
D1	8.50	8.70	8.90
D2	5.20	–	–
E	9.86	10.16	10.36
E5	7.06	–	–
e	2.54BSC		
e1	5.08BSC		
H1	6.10	6.30	6.50
L	13.10	13.40	13.70
L1	–	3.75	4.10
ΦP	3.70	3.84	3.99
Q	2.54	2.74	2.94