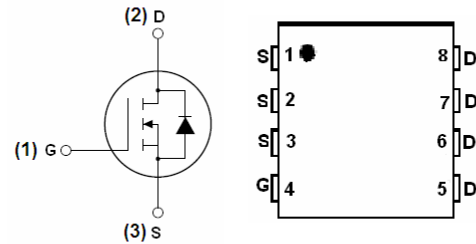
N-Channel Enhancement Mode Power MOSFET

- **Features**

V_{DS}	$R_{DS(ON)TYP}$	I_D
30V	2.7 mΩ@10V	60A
	4.3mΩ@4.5V	

- **Pin Configurations**



- **General Description**

HG60N30QA uses advanced trench technology and desgin to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

- **Absolute Maximum Ratings** @T_A=25℃ unless otherwise noted

Parameter		Symbol	Ratings	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Drain Current (Continuous) *AC	T_A=25°C	I_D	60	A
	T_A=100°C		38	
Drain Current (Pulse) *B		I_{DM}	120	A
Single Pulse Avalanche Energy2		EAS	115	mJ
Single Pulse Avalanche Current2		IAS	48	A
Power Dissipation	T_A=25°C	P_D	50	W
	Derate above 25°C		0.77	W/°C
Operating Temperature/ Storage Temperature		T_J/T_{STG}	-55~150	℃

- **Thermal Characteristics**

Symbol	Parameter	Typ	Max	Unit
RθJA	Thermal Resistance Junction to ambient	--	66	℃/W
RθJC	Thermal Resistance Junction to Case	--	2.5	℃/W

Electrical Characteristics

$T_A = 25°C$ unless otherwise noted

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D= 250 μ A	30	--	--	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C , ID=1mA	--	0.04	--	V/°C
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 30 V, V_{GS} = 0V, T_J=25°C	--	--	1	μ A
		V_{DS} = 24 V, V_{GS} = 0V , T_J=125°C	--	--	10	μ A
Gate Threshold Voltage	$V_{GS(TH)}$	V_{GS} = V_{DS}, I_{DS}= 250 μ A	1.2	1.7	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		--	4	--	mV/°C
Gate Leakage Current	I_{GSS}	V_{GS}= ±20V, V_{DS}=0V	--	--	±100	nA
Drain-Source On-state Resistance	$R_{DS(on)}$	V_{GS} = 10V, I_D = 20A	--	2.7	3.5	mΩ
		V_{GS} = 4.5V, I_D = 10A	--	4.3	5.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}= 10V, I_D= 20A	22	50	--	S
Diode Forward Voltage	V_{SD}	I_{SD}= 10A , V_{GS}=0V	--	--	1.1	V
Diode Forward Current	I_S		--	--	30	A
Single Pulse Avalanche Energy	EAS	V_{DD}=25V, L=0.1mH, I_{AS}=25A	31	115	--	mJ
Switching						
Total Gate Charge	Q_g	V_{DS}=15V,I_D=20A, V_{GS}=10V	--	45	--	nC
Gate-Source Charge	Q_{gs}		--	5.7	--	nC
Gate-Drain Charge	Q_{gd}		--	7	--	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=15V, I_D=15A, V_{GS}=10V,R_{GEN}=3.3Ω	--	16	--	ns
Turn-on Rise Time	t_r		--	10	--	ns
Turn-off Delay Time	$t_{d(off)}$		--	46	--	ns
Turn-Off Fall Time	t_f		--	18	--	ns
Dynamic						
Input Capacitance	C_{iss}	V_{DS}=15V,V_{GS}=0V, f=1.0MHz	--	2340	--	pF
Output Capacitance	C_{oss}		--	580	--	pF
Reverse Transfer Capacitance	C_{rss}		--	220	--	pF
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	--	1.5	--	Ω

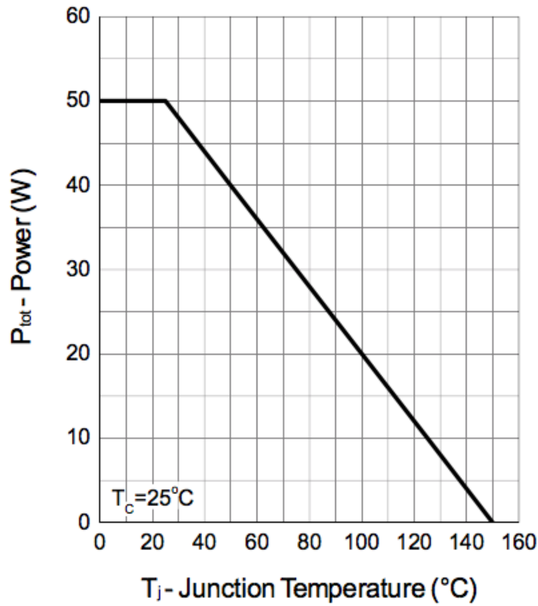
- **Drain-Source Diode Characteristics**

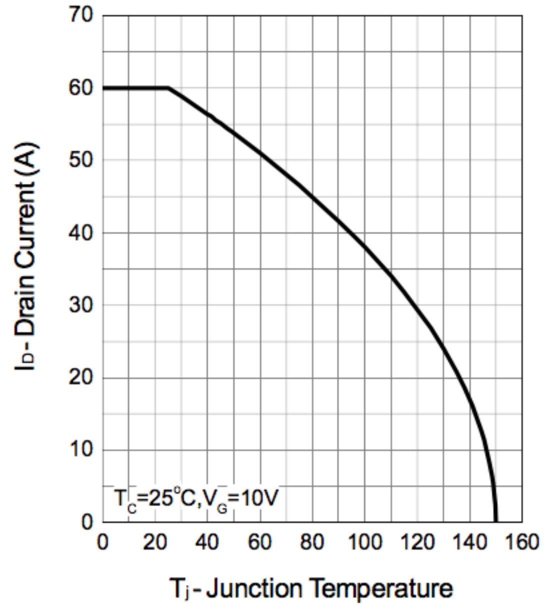
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Continuous Source Current	I_S	V_G=V_D=0V , Force Current	--	30	--	A
Pulsed Source Current3	I_{SM}		--	--	120	A
Diode Forward Voltage3	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25°C	--	--	1.1	V
Reverse Recovery Time	t_{rr}	V_{GS}=30V,I_S=1A , di/dt=100A/μs T_J=25°C	--	27.5	--	ns
Reverse Recovery Charge	Q_{rr}		--	17	--	nC

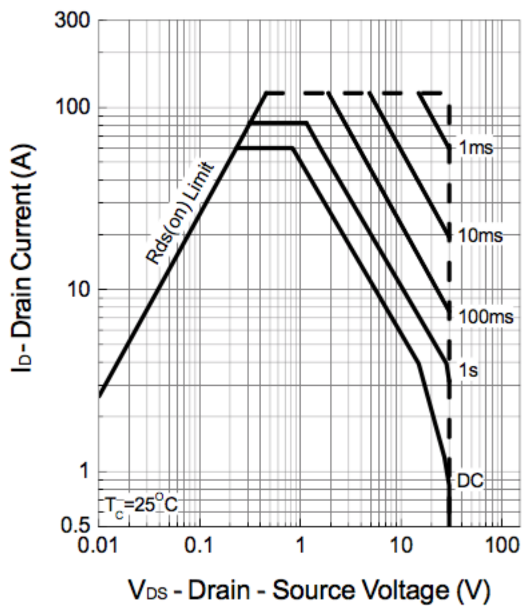
Note :

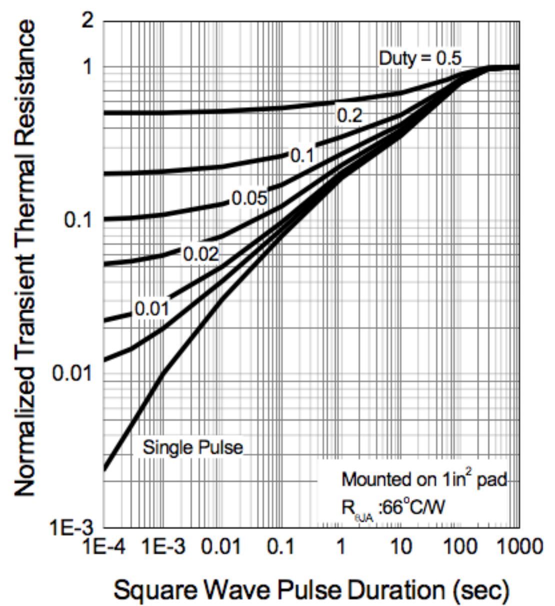
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V,V_{GS}=10V,L=0.1mH,I_{AS}=50A.,R_G=25Ω,Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristics









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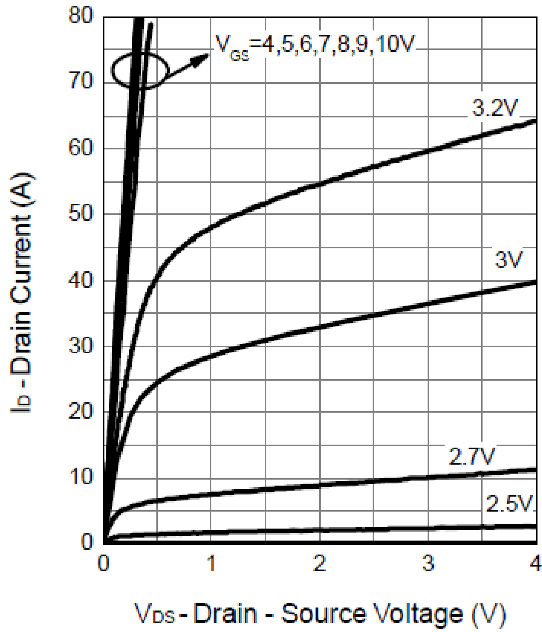

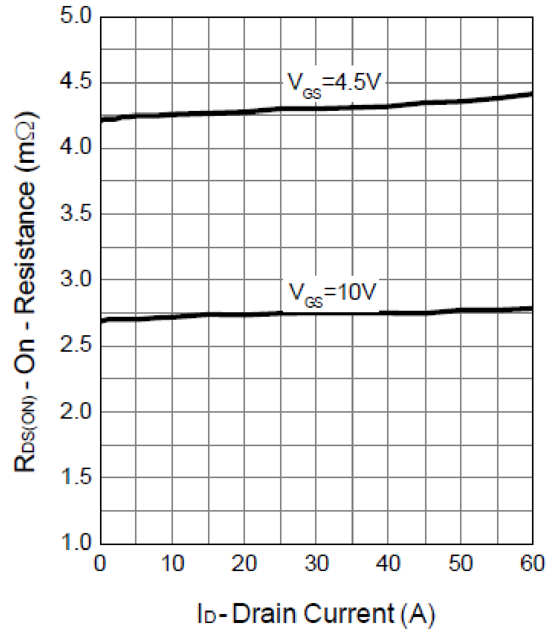

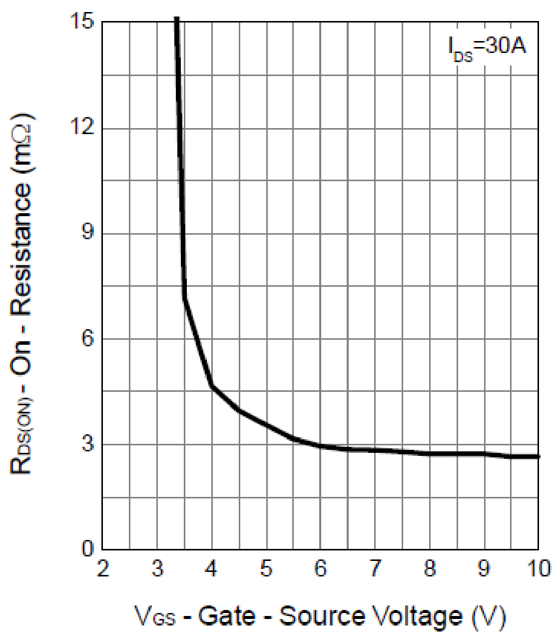

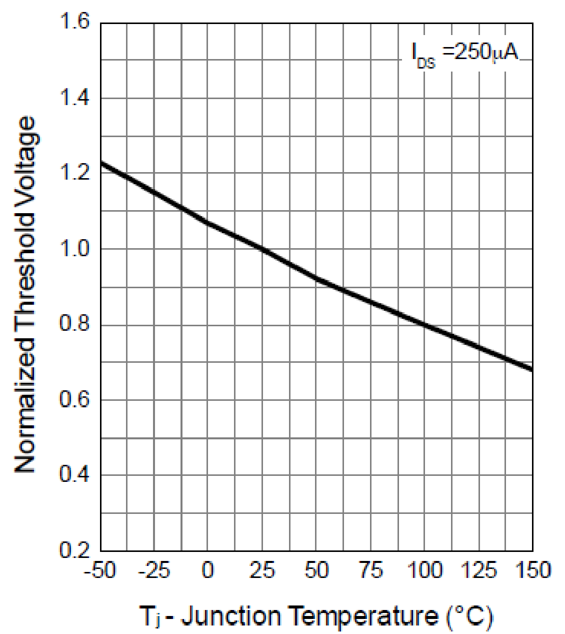

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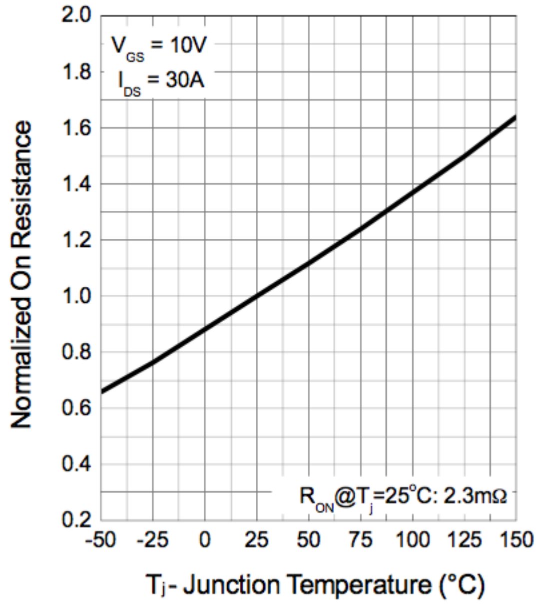

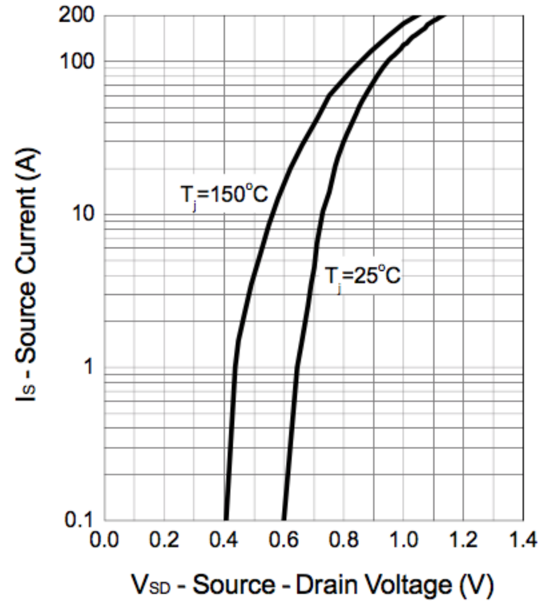

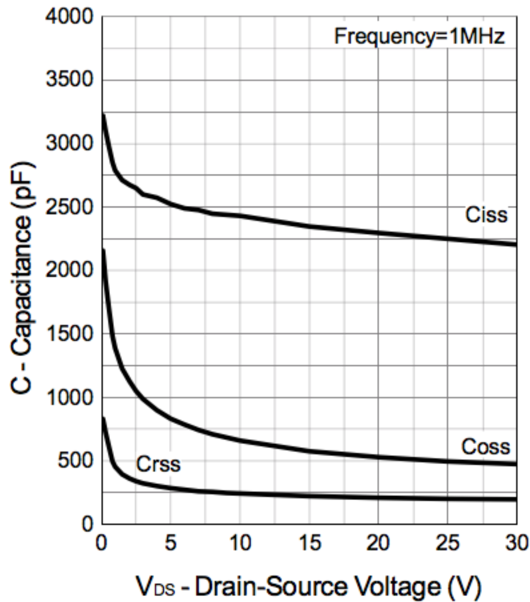

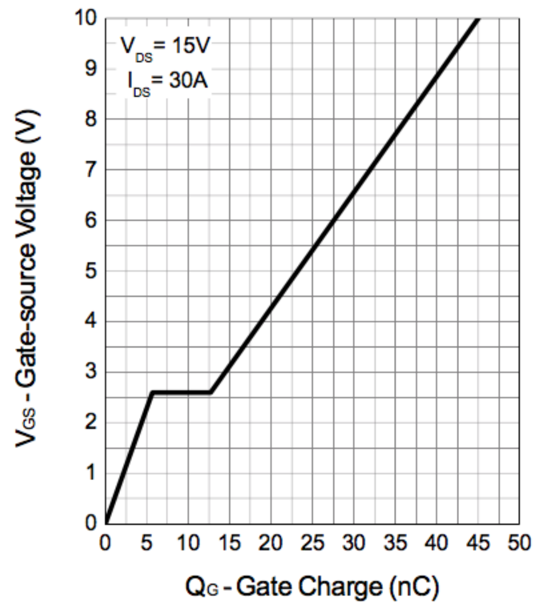

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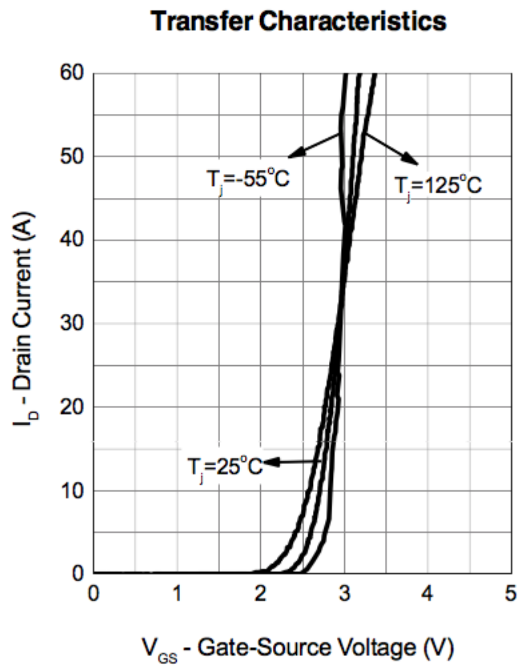
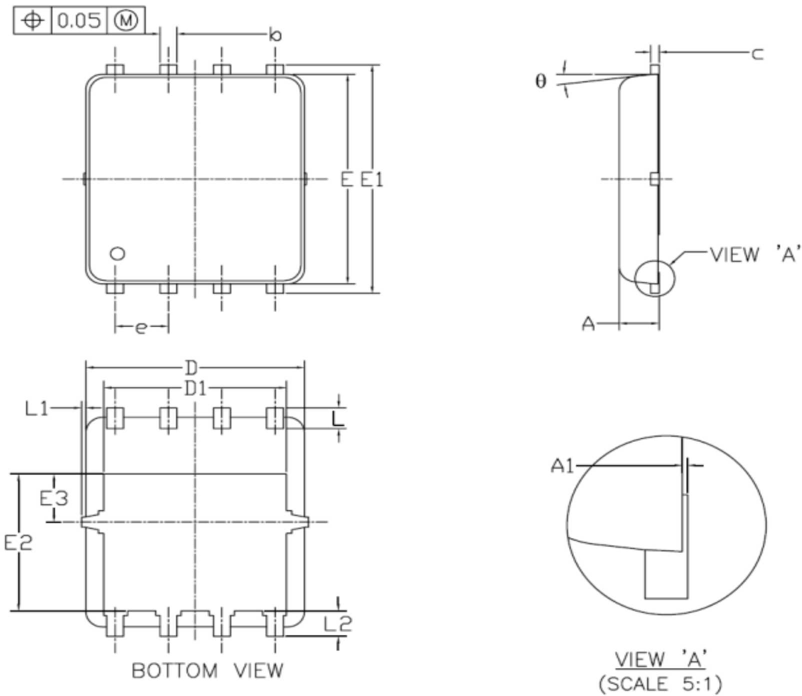
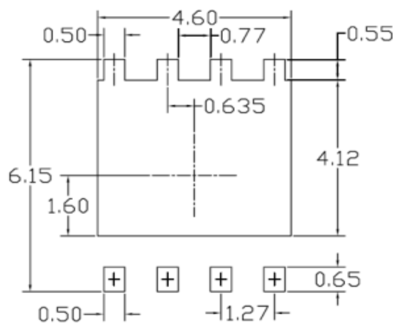


Package Information



RECOMMENDED LAND PATTERN



SYMBOLS	DIMENSIONS IN MILLIMETERS			DIMENSIONS IN INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.85	0.95	1.00	0.033	0.037	0.039
A1	0.00	——	0.05	0.000	——	0.002
b	0.30	0.40	0.50	0.012	0.016	0.020
c	0.15	0.20	0.25	0.006	0.008	0.010
D	5.20 BSC			0.205 BSC		
D1	4.35 BSC			0.171 BSC		
E	5.55 BSC			0.219 BSC		
E1	6.05 BSC			0.238 BSC		
E2	3.625 BSC			0.143 BSC		
E3	1.275 BSC			0.050 BSC		
e	1.27 BSC			0.050 BSC		
L	0.45	0.55	0.65	0.018	0.022	0.026
L1	0	——	0.15	0	——	0.006
L2	0.68 REF			0.027 REF		
θ	0°	——	10°	0°	——	10°

UNIT: mm

NOTE

1. PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS.
   MOLD FLASH AT THE NON-LEAD SIDES SHOULD BE LESS THAN 6 MILS EACH.
2. CONTROLLING DIMENSION IS MILLIMETER.
   CONVERTED INCH DIMENSIONS ARE NOT NECESSARILY EXACT.