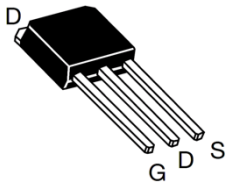
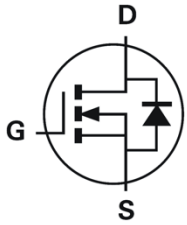
SG30N05I

30V N-Channel Power MOSFET

	TO-251	
V_{DSS} , 30V $R_{DS(ON)}$, 11.5mΩ (max.) @ V_{GS}=10V $R_{DS(ON)}$, 17mΩ (max.) @ V_{GS}=4.5V I_D , 40A		

Description

The SG30N05I uses advanced Trench technology and designs to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in PWM, load switching and general purpose applications.

Features

- Low On-Resistance
- Low Input Capacitance
- Low Miller Charge
- Low Input/Output Leakage

Applications

- Motor / Body Load Control
- Automotive Systems
- Load Switch
- DC-DC converters and Off-line UPS

Ordering Information

Ordering Code	RoHS Status	Package	Package Code	Packing	Quantity
SG30N05I	Halogen-Free	TO-251	I	Box (Tube)	6,750 (75)

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Parameter		Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Drain Current-Continuous	T_C=25°C	I_D	40	A
	T_C=70°C		33.6	A
Drain Current-Pulsed [Note 1]		I_{DM}	120	A
Drain Current-Continuous	T_A=25°C	I_D	10.7	A
	T_A=70°C		8.6	A
Avalanche Current, L=0.1mH		I_{AS}	15	A
Avalanche Energy, L=0.1mH		E_{AS}	11.25	mJ
Maximum Power Dissipation	T_C=25°C	P_D	30.4	W
	T_C=70°C		19.5	W
	T_A=25°C		2	W
	T_A=70°C		1.3	W
Storage Temperature Range		T_{STG}	-55 to +150	°C
Operating Junction Temperature Range		T_J	-55 to +150	°C

Thermal Resistance Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Maximum Junction-to-Ambient [Note 2]	$R_{\theta JA}$	Steady State	-	-	62	°C/W
Maximum Junction-to-Case	$R_{\theta JC}$	Steady State	-	-	4.1	°C/W

Electrical Characteristics (T_J=25°C unless otherwise noted)

OFF CHARACTERISTICS						
Parameter	***Symbol***	***Conditions***	***Min.***	***Typ.***	***Max.***	***Unit***
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_{DS}=250μA	30	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=24V, V_{GS}=0V	-	-	1	μA
Gate-Body Leakage	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA

ON CHARACTERISTICS						
Parameter	***Symbol***	***Conditions***	***Min.***	***Typ.***	***Max.***	***Unit***
Gate Threshold Voltage	$V_{GS(TH)}$	V_{DS}=V_{GS}, I_{DS}=250μA	1.2	-	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_{DS}=10A	-	9	11.5	mΩ
		V_{GS}=4.5V, I_{DS}=8A	-	13	17	mΩ

DYNAMIC CHARACTERISTICS						
Parameter	***Symbol***	***Conditions***	***Min.***	***Typ.***	***Max.***	***Unit***
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, f=1MHz	-	580	-	pF
Output Capacitance	C_{oss}		-	95	-	
Reverse Transfer Capacitance	C_{rss}		-	60	-	

SWITCHING CHARACTERISTICS						
Parameter	***Symbol***	***Conditions***	***Min.***	***Typ.***	***Max.***	***Unit***
Turn-On Delay Time	$T_{d(on)}$	V_{DD}=15V, I_D=10A, V_{GEN}=4.5V, Rg=3Ω	-	15	-	ns
Rise Time	t_r		-	12	-	
Turn-Off Delay Time	$T_{d(off)}$		-	14	-	
Fall Time	t_f		-	10	-	
Total Gate Charge at 10V	Q_g	V_{DS}=15V, I_{DS}=10A, V_{GS}=4.5V	-	8	-	nC
Gate to Source Gate Charge	Q_{gs}		-	3	-	
Gate to Drain “Miller” Charge	Q_{gd}		-	4.5	-	

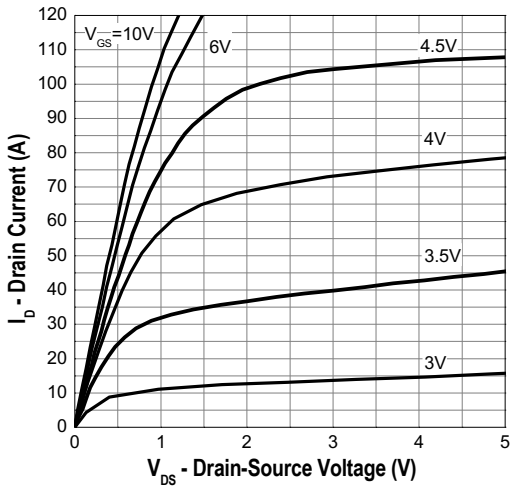
DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
Parameter	***Symbol***	***Conditions***	***Min.***	***Typ.***	***Max.***	***Unit***
Drain-Source Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=10A	-	-	1.3	V
Body Diode Reverse Recovery Time	t_{rr}	I_F=10A, dI/dt=100A/μs	-	14	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	11	-	nC

Notes:

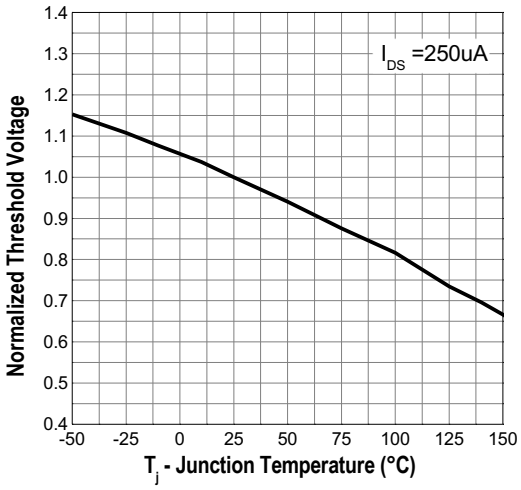
1. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
2. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design. $R_{\theta JA}$ shown below for single device operation on FR-4 in still air.

Typical Operating Characteristics

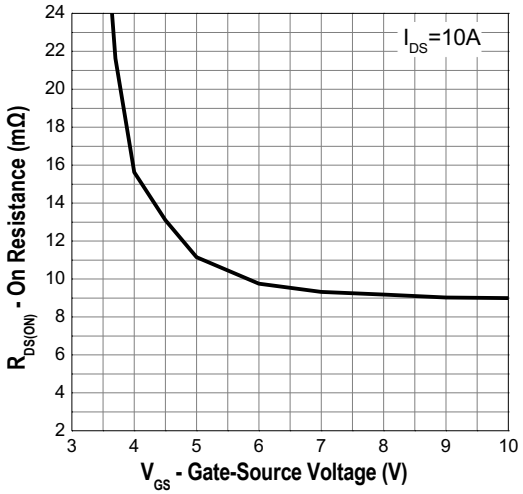
Output Characteristics



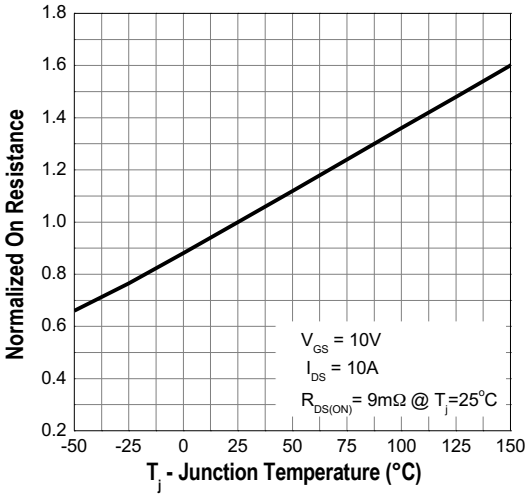
Gate Threshold Voltage



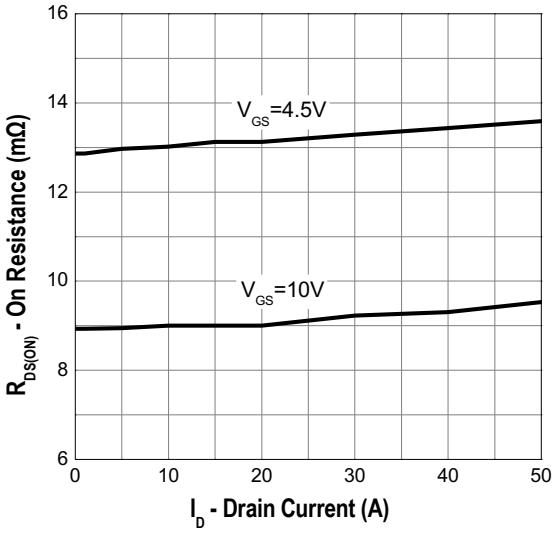
Gate-Source On Resistance



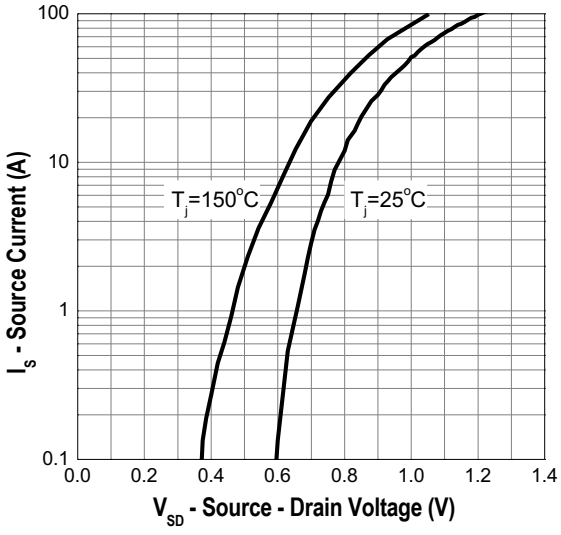
Drain-Source On Resistance



Drain-Source On Resistance

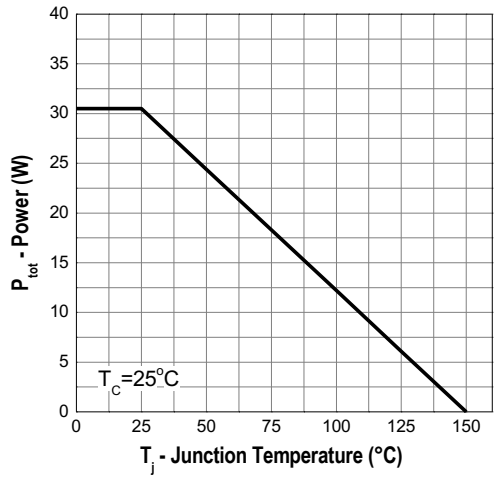


Source-Drain Diode Forward

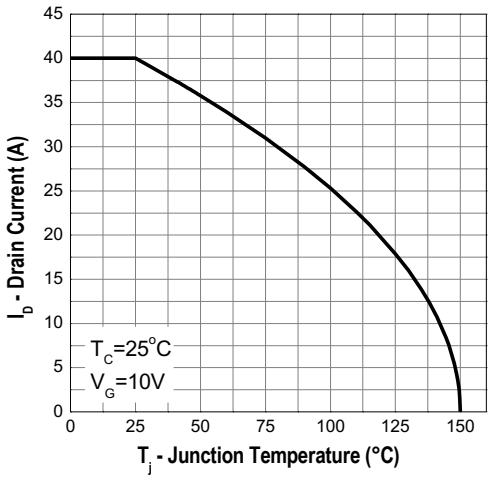


Typical Operating Characteristics (Cont.)

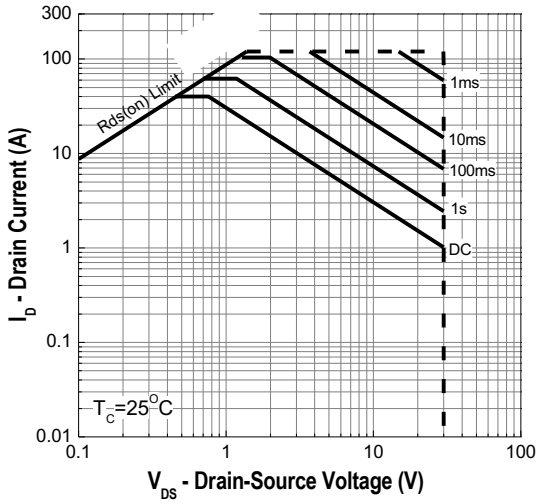
Power Dissipation



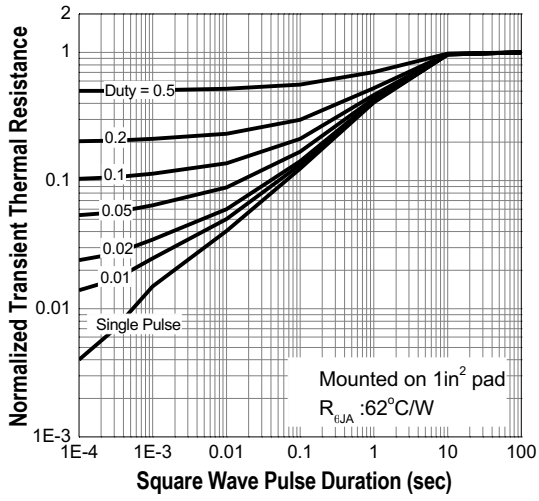
Drain Current



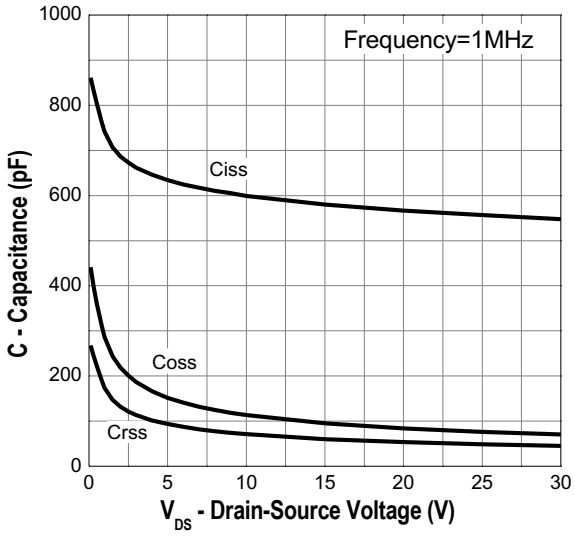
Safe Operation Area



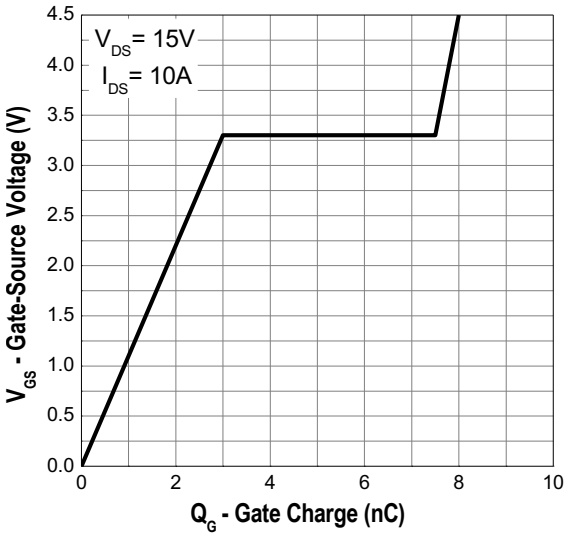
Transient Thermal Impedance



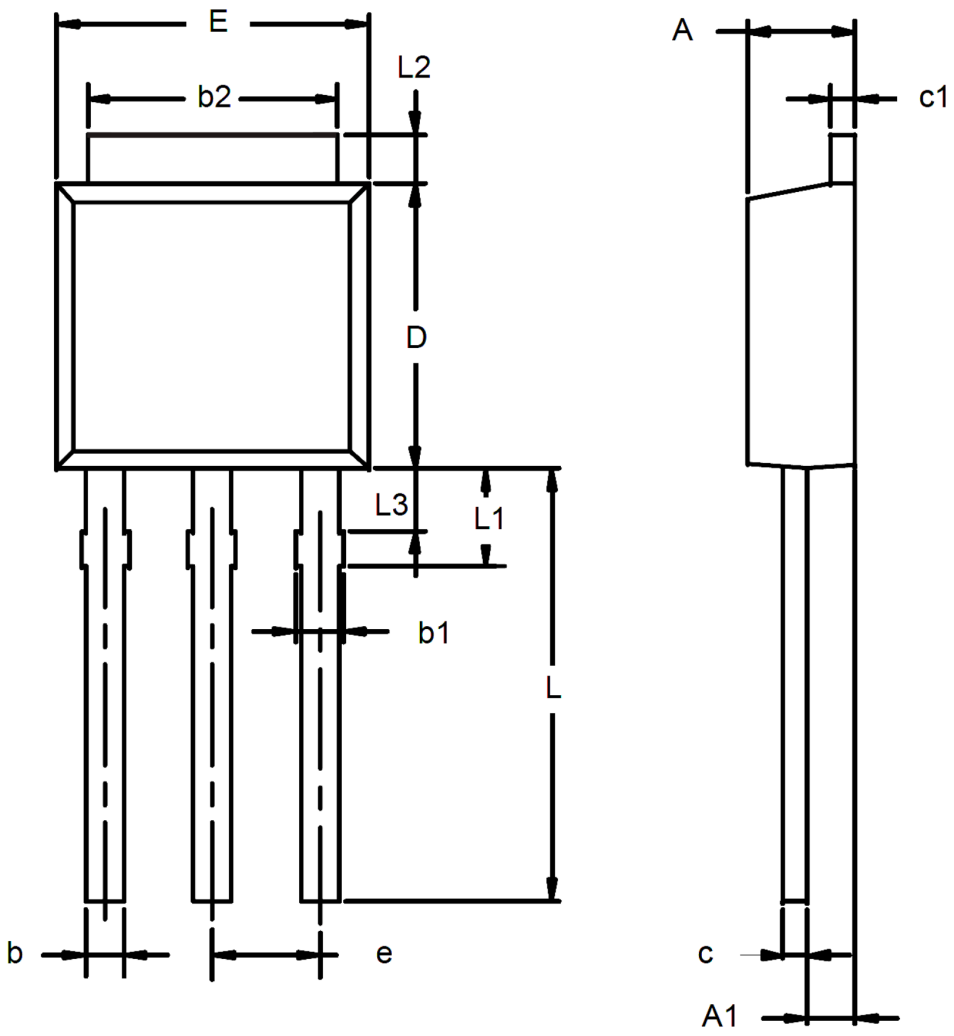
Capacitance



Gate Charge



Package Dimension



Dimensions						
Symbols	*Millimeters*			*Inches*		
	Min.	*Typ.*	*Max.*	*Min.*	*Typ.*	*Max.*
A	2.21	-	2.38	0.087	-	0.094
A1	0.89	-	1.14	0.035	-	0.045
b	0.71	-	0.89	0.028	-	0.035
b1	0.76	-	1.14	0.030	-	0.045
b2	5.23	-	5.43	0.206	-	0.214
c	0.46	-	0.58	0.018	-	0.023
c1	0.46	-	0.58	0.018	-	0.023
D	5.97	-	6.22	0.235	-	0.245
E	6.48	-	6.73	0.255	-	0.265
e	2.28 BSC			0.090 BSC		
L	8.89	-	9.53	0.350	-	0.375
L1	1.91	-	2.28	0.075	-	0.090
L2	0.89	-	1.27	0.035	-	0.050
L3	1.15	-	1.52	0.045	-	0.060

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