

HRP30N10C

100V N-Channel SGT MOSFET

Features

- SGT LV MOSFET technology
- Excellent Qg*Ron product (FOM)
- Extremely low on-resistance (Ron)

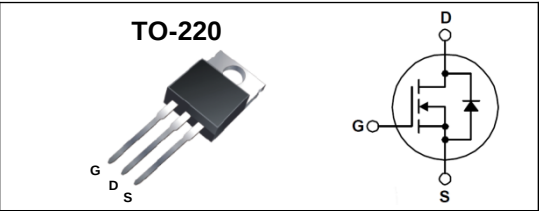
Application

- Power management
- Motor drive and control
- UPS

Key Parameters

Parameter	Value	Unit
BV_{DSS}	100	V
I_D	180	A
$R_{DS(on), max}$	3.0	mΩ

Package & Internal Circuit



Absolute Maximum Ratings

$T_C=25^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage	100	V
I_D	Drain Current - Continuous ($T_C = 25^{\circ}\text{C}$)	180	A
	Drain Current - Continuous ($T_C = 100^{\circ}\text{C}$)	135	A
I_{DM}	Drain Current - Pulsed (Note 1)	720	A
V_{GS}	Gate-Source Voltage	± 20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	784	mJ
P_D	Power Dissipation ($T_C = 25^{\circ}\text{C}$)	250	W
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150	$^{\circ}\text{C}$

Thermal Resistance Characteristics

Symbol	Parameter	Value(Max)	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.5	$^{\circ}\text{C/W}$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62.5	$^{\circ}\text{C/W}$

Electrical Characteristics $T_J=25\text{ }^{\circ}\text{C}$ unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
On Characteristics						
V _{GS}	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D = 250 μA	2.0	-	4.0	V
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} = 10 V, I _D = 50 A	-	2.6	3.0	mΩ
Off Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} = 0 V, I _D = 250 μA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 100 V, V _{GS} = 0	-	-	1	μA
I _{GSS}	Gate-Body Leakage Current	V _{GS} = ±20 V, V _{DS} = 0 V	-	-	±100	nA
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} = 50 V, V _{GS} = 0 V, f = 1.0 MHz	-	9000	-	pF
C _{oss}	Output Capacitance		-	2800	-	pF
C _{rss}	Reverse Transfer Capacitance		-	417	-	pF
Switching Characteristics						
t _{d(on)}	Turn-On Time	V _{DD} = 50 V, V _{GS} = 10V, I _D = 50 A, R _G =1.6 Ω (Note 3,4)	-	30	-	ns
t _r	Turn-On Rise Time		-	40	-	ns
t _{d(off)}	Turn-Off Delay Time		-	80	-	ns
t _f	Turn-Off Fall Time		-	35	-	ns
Q _g	Total Gate Charge	V _{DS} = 50 V, I _D = 100 A, V _{GS} = 10 V (Note 3,4)	-	145	-	nC
Q _{gs}	Gate-Source Charge		-	41	-	nC
Q _{gd}	Gate-Drain Charge		-	29	-	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain-Source Diode Forward Current		-	-	180	A
I _{SM}	Maximum Pulsed Drain-Source Diode Forward Current		-	-	720	A
V _{SD}	Drain-Source Diode Forward Voltage	V _{GS} = 0 V, I _S = 30 A	-	-	1.2	V
trr	Reverse Recovery Time	I _S = 50 A, di _F /dt = 100 A/μs	-	80	-	ns
Qrr	Reverse Recovery Charge		-	195	-	nC

Notes :

1. Repetitive Rating : Pulse width limited by maximum junction temperature
2. The EAS data shows Max. rating. The test condition is $V_{DD} = 50\text{ V}$, $V_{GS} = 10\text{ V}$, $L=0.5\text{ mH}$
3. Pulse Test : Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
4. Essentially Independent of Operating Temperature

Typical Characteristics

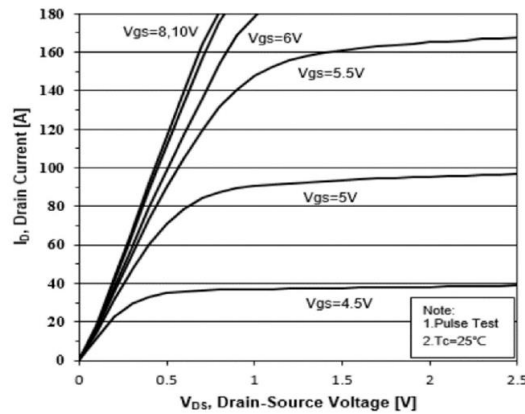


Figure 1. Output Characteristics

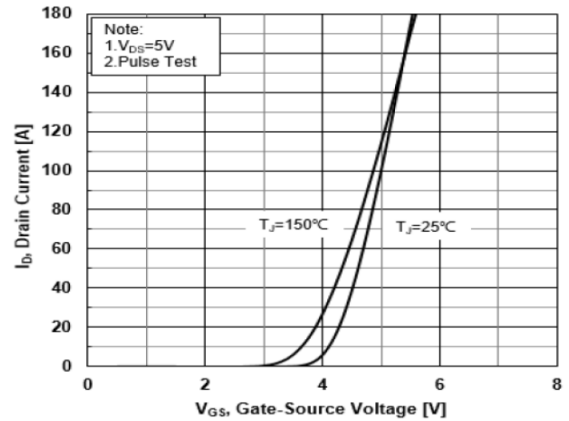


Figure 2. Transfer Characteristics

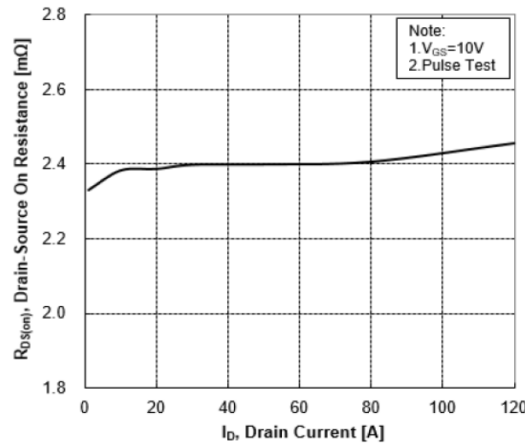


Figure 3. Rdson VS Drain current

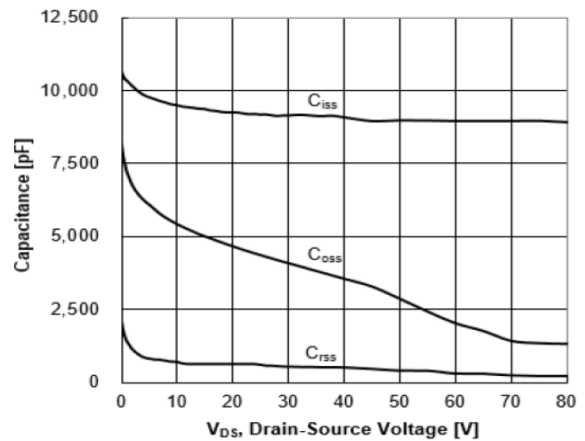


Figure 4. Capacitance Characteristics

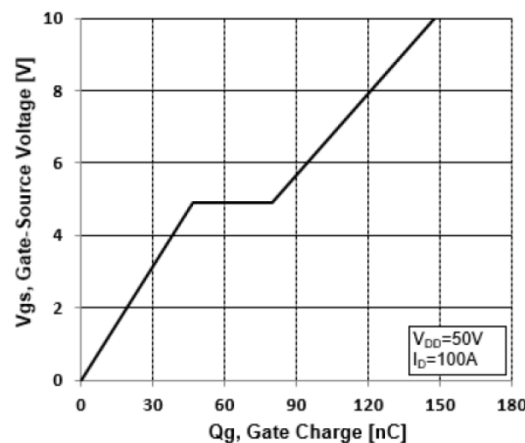


Figure 4. Gate Charge Characteristics

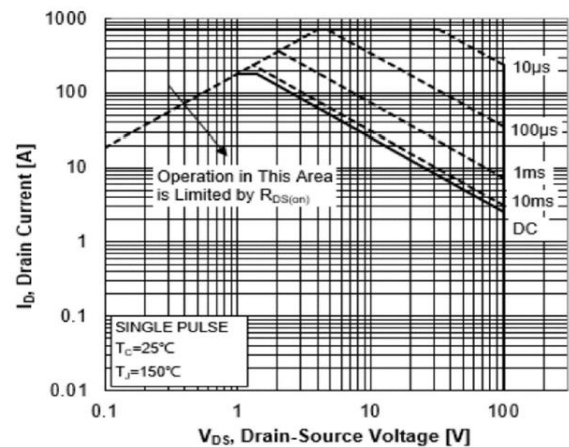


Figure 6. Safe Operating Area

Typical Characteristics

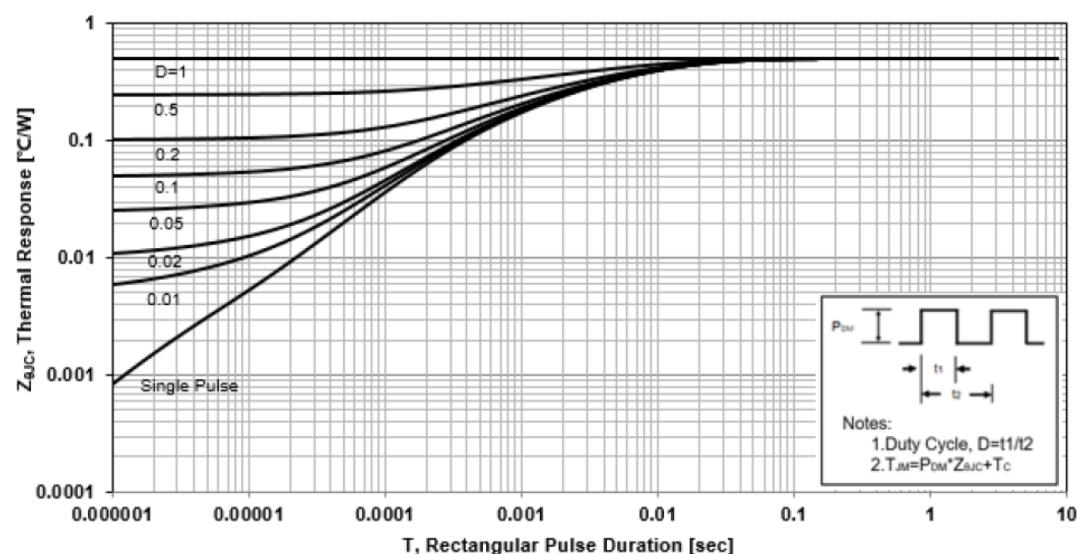


Figure 7. Max Transient Thermal Impedance

Fig 8. Gate Charge Test Circuit & Waveform

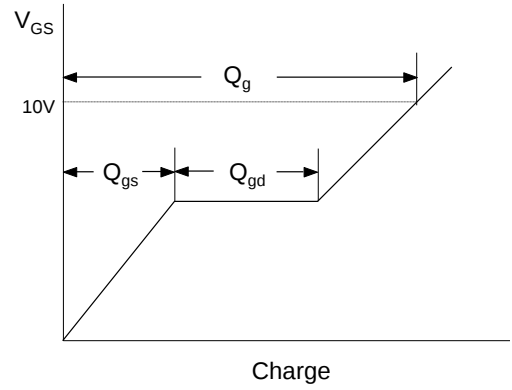
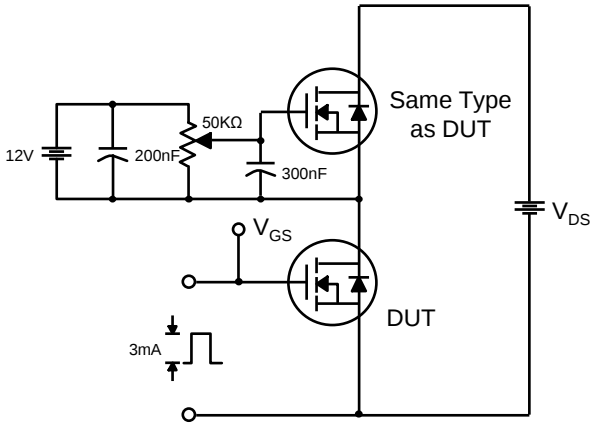


Fig 9. Resistive Switching Test Circuit & Waveforms

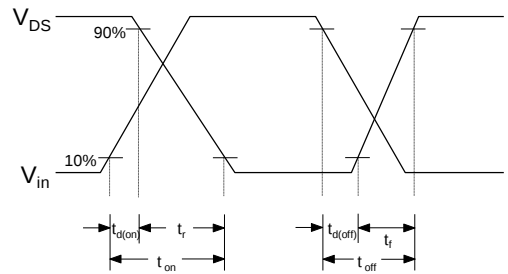
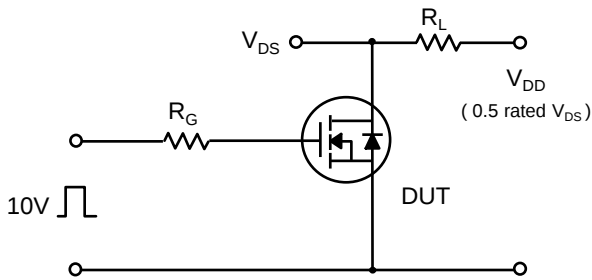


Fig 10. Unclamped Inductive Switching Test Circuit & Waveforms

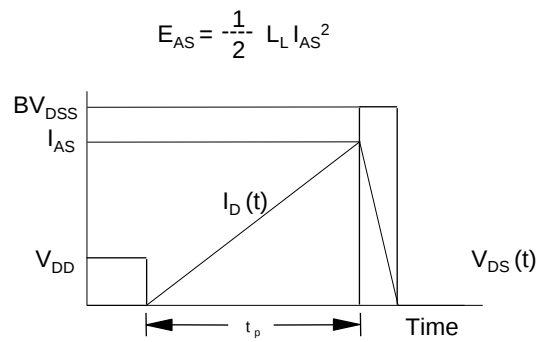
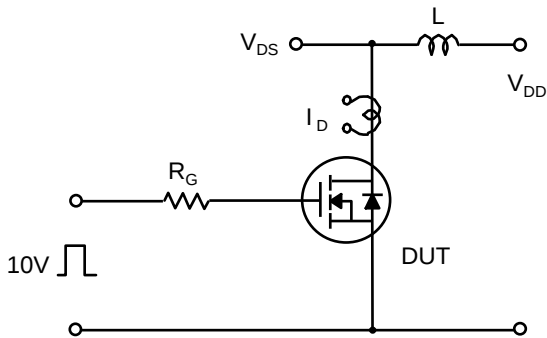
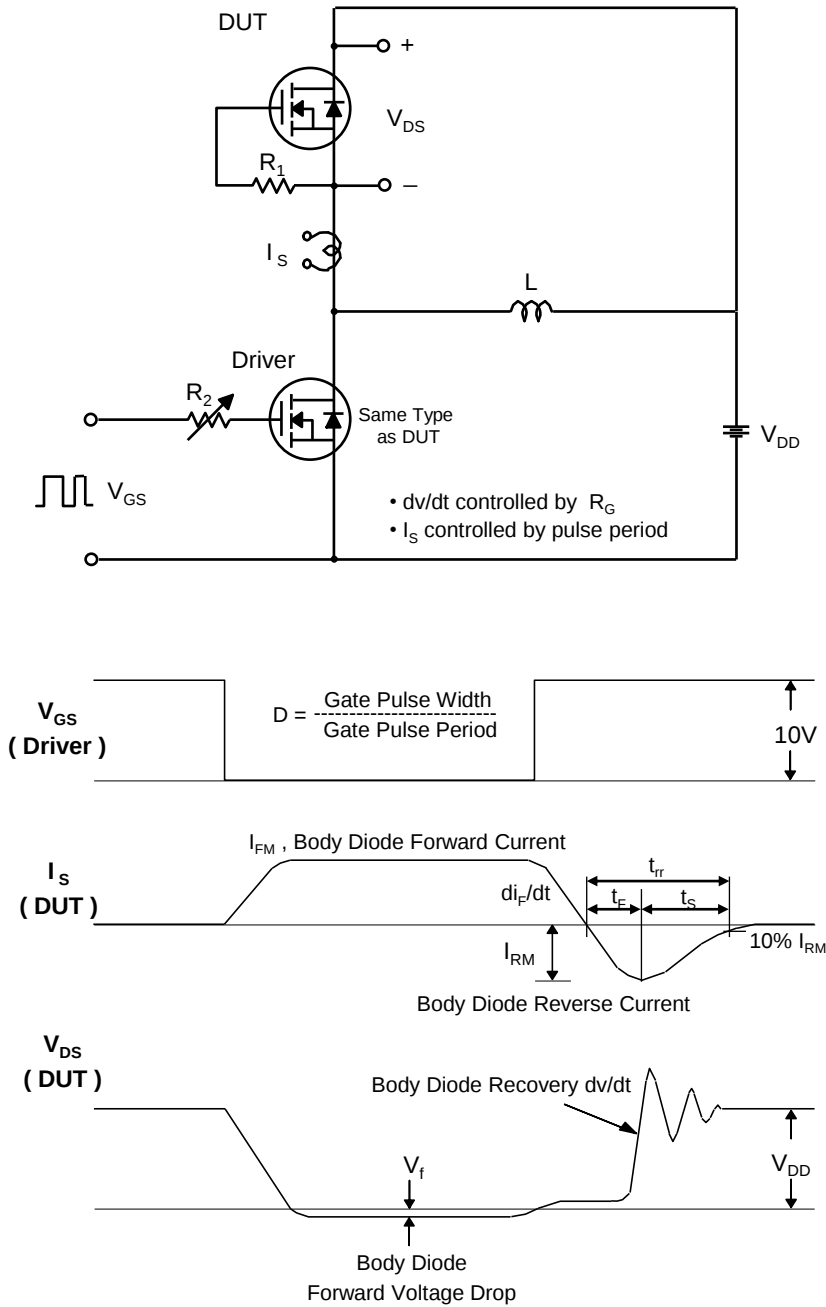
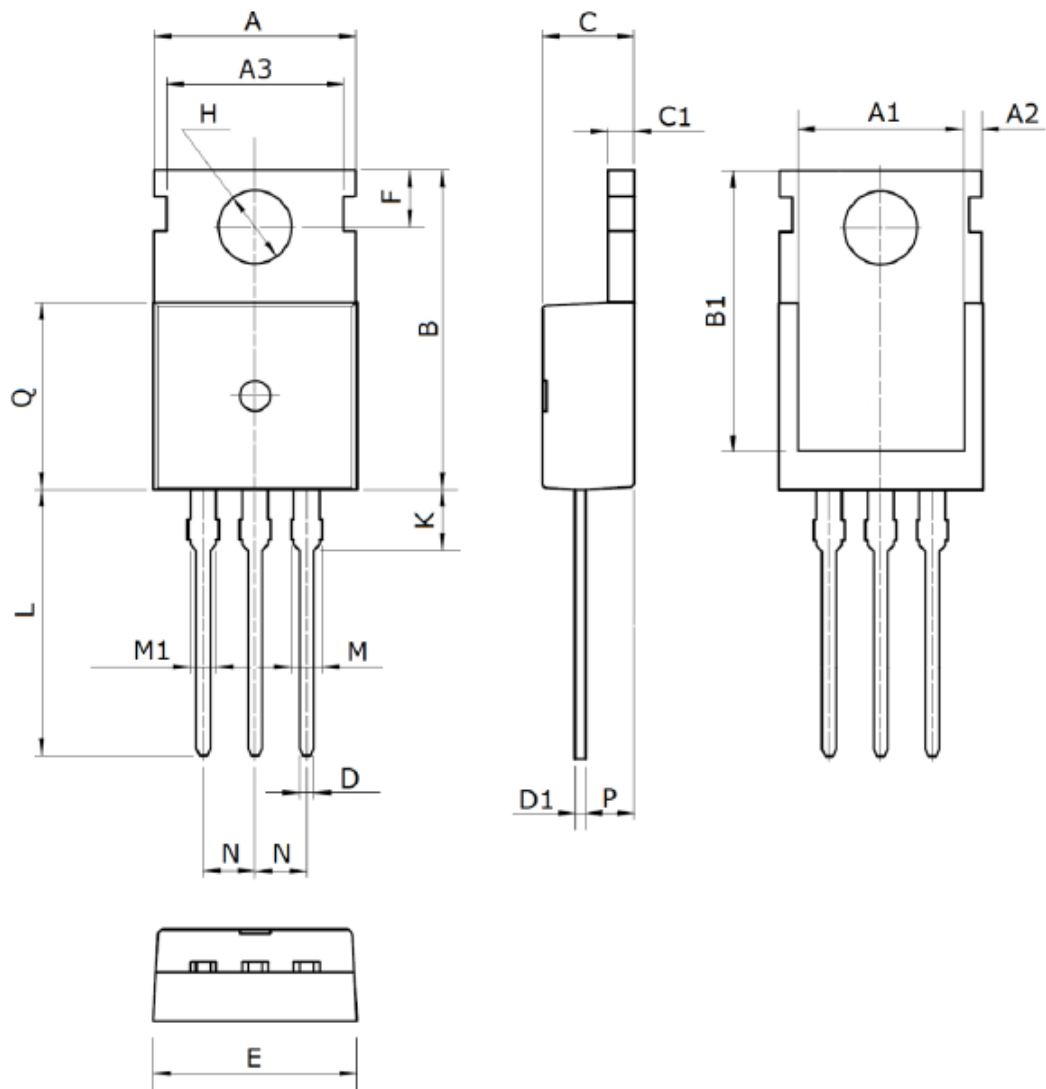


Fig 11. Peak Diode Recovery dv/dt Test Circuit & Waveforms



Package Dimension

TO-220



Symbol	Dimensions (mm)	Symbol	Dimensions (mm)	Symbol	Dimensions (mm)
A	10.0±0.3	C1	1.3±0.2	L	13.2±0.4
A1	8.0±0.2	D	0.8±0.2	M	1.38±0.1
A2	0.94±0.1	D1	0.5±0.1	M1	1.28±0.1
A3	8.7±0.1	E	10.0±0.3	N	2.54(typ)
B	15.6±0.4	F	2.8±0.1	P	2.4±0.3
B1	13.2±0.2	H	3.6±0.1	Q	9.15±0.25
C	4.5±0.2	K	3.1±0.2		