

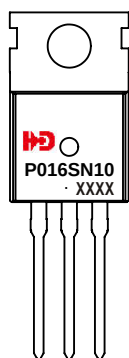
TO-220-3L Plastic-Encapsulate MOSFETS

100V N-Channel Power SGT MOSFET

FEATURE

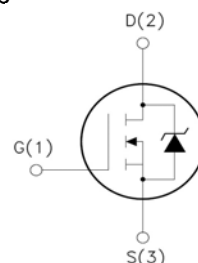
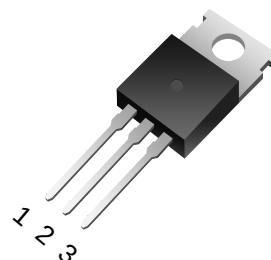
- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge :Qg= 56nC (Typ.).
- BVDSS=100V, I_D=57A
- R_{DS(on)} : 16mΩ (Max) @V_G=10V
- 100% Avalanche Tested

MARKING



P016SN10 Device code.
Solid dot = Green molding compound device,
if none, the normal device.
XXXX = Code.

TO-220-3L



1. Gate (G)
2. Drain (D)
3. Source (S)

Absolute Maximum Ratings* (T_C=25°C Unless otherwise noted)

Symbol	PARAMETER		Value	Unit
V _{DSS}	Drain-Source Voltage		100	V
I _D	Drain Current	T _C =25°C	57	A
		T _C =100°C	40	
V _{GS(TH)}	Gate Threshold Voltage		±20	V
E _{AS}	Single Pulse Avalanche Energy (note1)		580	mJ
I _{AR}	Avalanche Current (note2)		57	A
P _D	Power Dissipation (T _C =25°C)		170	W
T _j	Junction Temperature(MAX)		150	°C
T _{stg}	Storage Temperature		-55~+150	°C
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds		300	°C

Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
R _{θJC}	Thermal Resistance, Junction to Case	-	0.88	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	-	65	°C/W
R _{θCS}	Thermal Resistance, Case to Sink	-	110	°C/W

ELECTRICAL CHARACTERISTICS (T_a=25°C unless otherwise specified)

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

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} =0V I _D =250μA	100	110	-	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
Gate-Body Leakage Current	I _{GSS}	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	2	3	4	V
Drain-Source On-State Resistance	R _{DS(ON)}	V _{GS} =10V, I _D =28A	-	12	16	mΩ
Forward Transconductance	g _{FS}	V _{DS} =25V, I _D =28A	32	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C _{ISS}	V _{DS} =25V, V _{GS} =0V, F=1.0MHz	-	4400	-	PF
Output Capacitance	C _{OSS}		-	320	-	PF
Reverse Transfer Capacitance	C _{RSS}		-	240	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	t _{d(on)}	V _{DD} =50V, I _D =28A V _{GS} =10V, R _{GEN} =2.5Ω	-	12	-	nS
Turn-on Rise Time	t _r		-	55	-	nS
Turn-Off Delay Time	t _{d(off)}		-	45	-	nS
Turn-Off Fall Time	t _f		-	47	-	nS
Total Gate Charge	Q _g	V _{DS} =80V, I _D =28A, V _{GS} =10V	-	95	-	nC
Gate-Source Charge	Q _{gs}		-	18	-	nC
Gate-Drain Charge	Q _{gd}		-	25	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V _{SD}	V _{GS} =0V, I _S =28A	-	0.85	1.2	V
Diode Forward Current ^(Note 2)	I _S		-	-	57	A
Reverse Recovery Time	t _{rr}	T _J = 25°C, I _F = 28A di/dt = 100A/μs ^(Note3)	-	36	-	nS
Reverse Recovery Charge	Q _{rr}		-	56	-	nC
Forward Turn-On Time	t _{on}	Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD)				

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production
5. EAS condition: T_J=25°C, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25Ω

Typical Electrical and Thermal Characteristics (Curves)

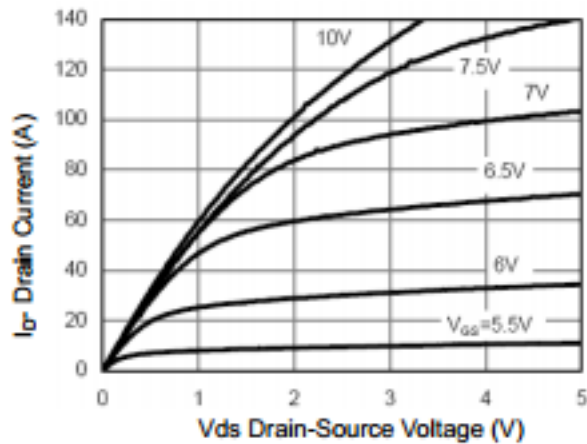


Figure 1 Output Characteristics

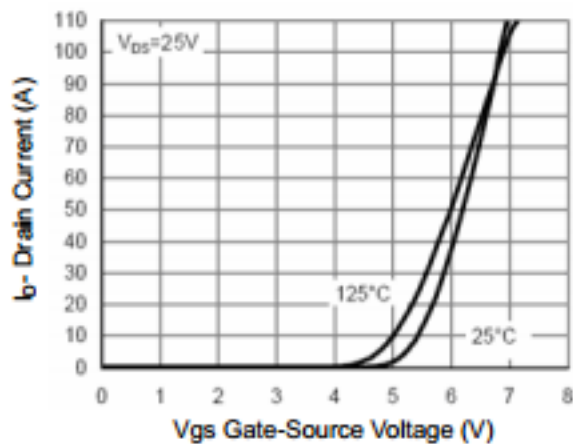


Figure 2 Transfer Characteristics

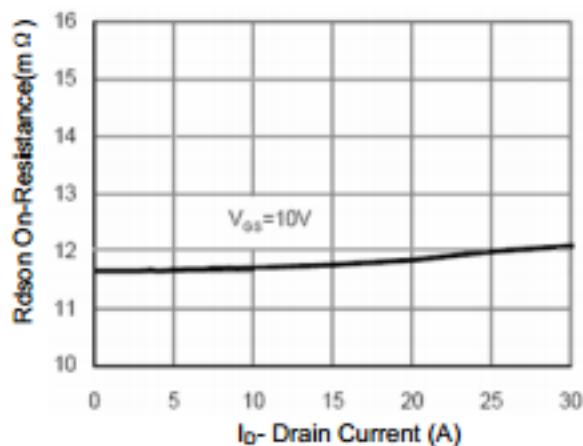


Figure 3 $R_{DS(on)}$ - Drain Current

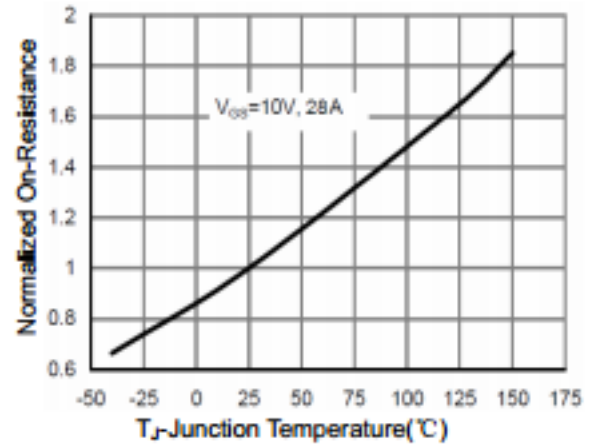


Figure 4 $R_{DS(on)}$ -Junction Temperature

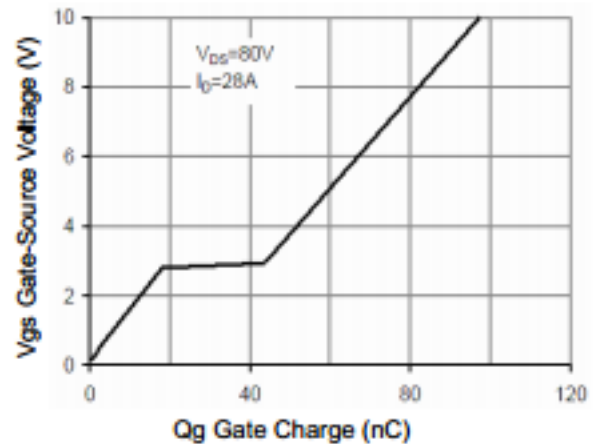


Figure 5 Gate Charge

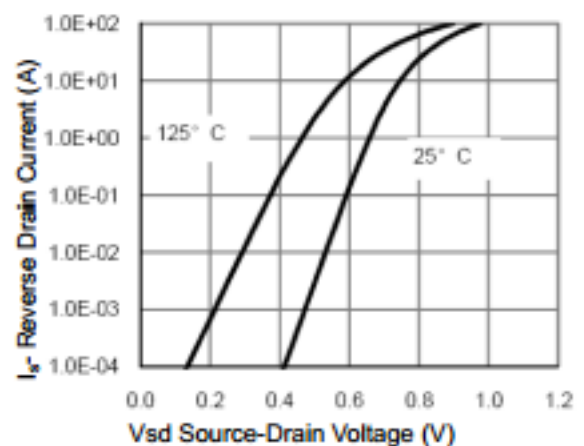


Figure 6 Source- Drain Diode Forward

Typical Characteristics

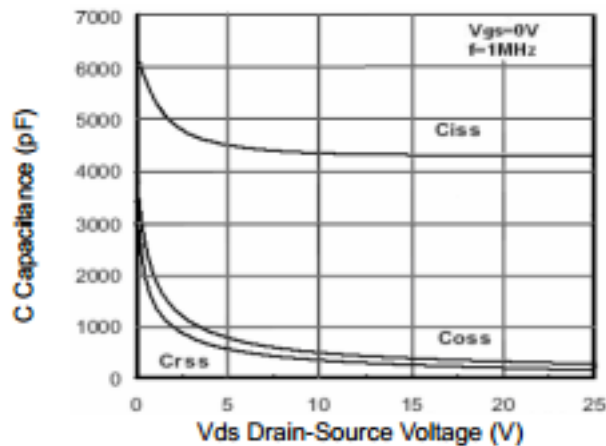


Figure 7 Capacitance vs V_{DS}

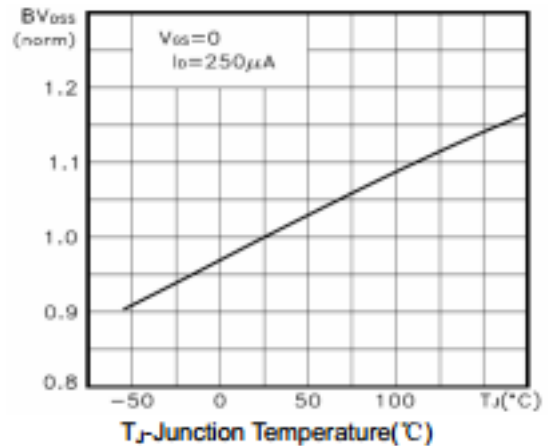


Figure 9 BV_{DSS} vs Junction Temperature

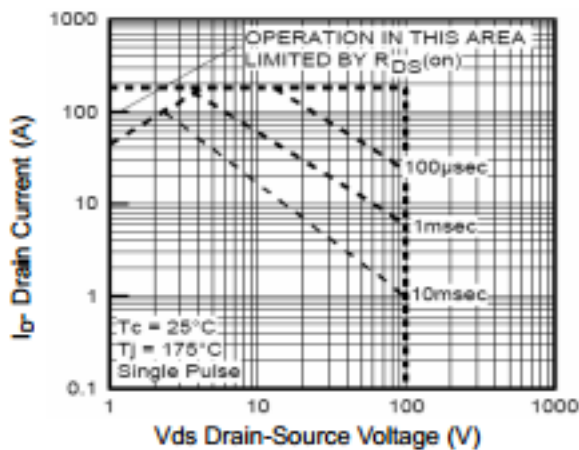


Figure 8 Safe Operation Area

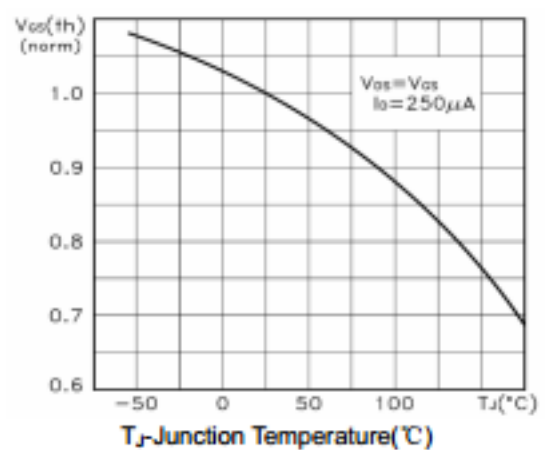


Figure 10 $V_{GS(th)}$ vs Junction Temperature

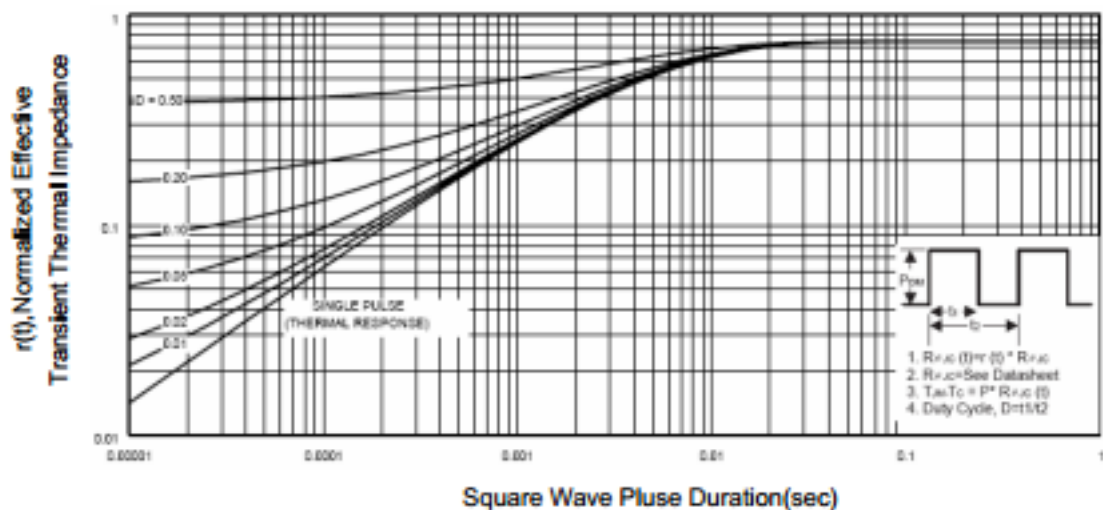
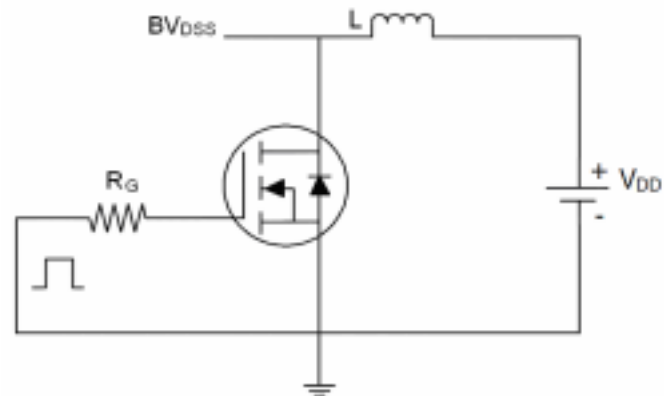


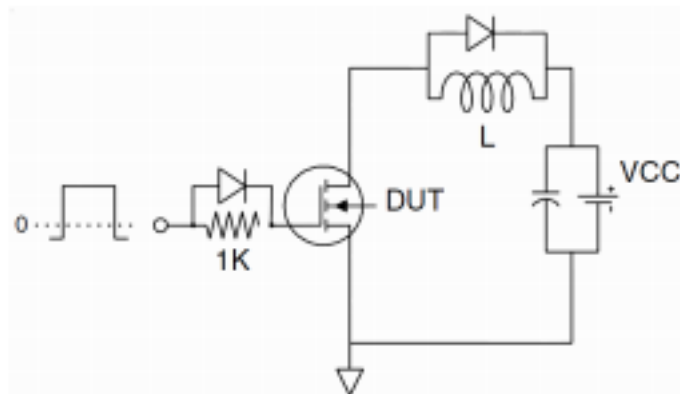
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

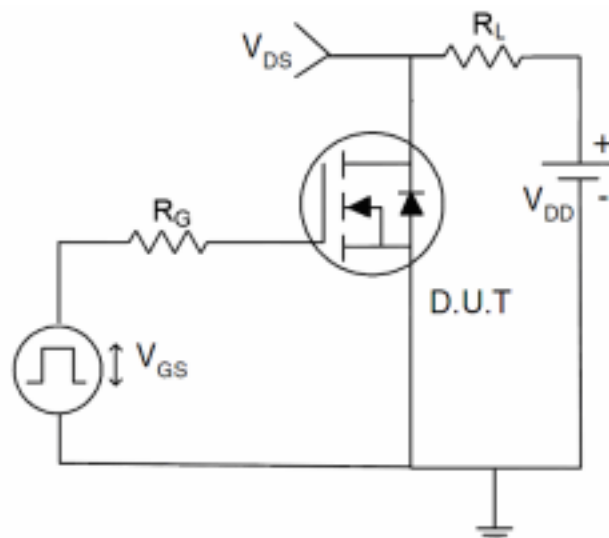
1) E_{AS} test Circuit



2) Gate charge test Circuit



3) Switch Time Test Circuit



TO-220-3L Package Outline Dimensions

Unit:mm

