


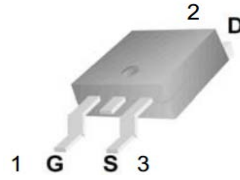
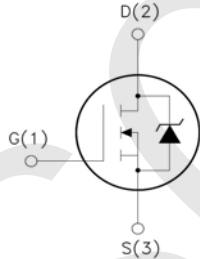
SM30N10

100V N-Channel MOSFET

Features:

- Low Intrinsic Capacitances.
- Excellent Switching Characteristics.
- Extended Safe Operating Area.
- Unrivalled Gate Charge : $Q_g = 61.7\text{nC}$ (Typ.).
- $BV_{DSS} = 100\text{V}, I_D = 30\text{A}$
- $R_{DS(on)} : 0.032\Omega$ (Max) @ $V_G = 10\text{V}$
- 100% Avalanche Tested

TO-252

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

Absolute Maximum Ratings* ($T_c = 25^\circ\text{C}$ Unless otherwise noted)

Symbol	PARAMETER	Value	Unit
V_{DSS}	Drain-Source Voltage	100	V
I_D	Drain Current	$T_c = 25^\circ\text{C}$	30
		$T_c = 100^\circ\text{C}$	21
$V_{GS(TH)}$	Gate Threshold Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy (note1)	256	mJ
I_{AR}	Avalanche Current (note2)	30	A
P_D	Power Dissipation ($T_c = 25^\circ\text{C}$)	85	W
T_j	Junction Temperature(MAX)	175	$^\circ\text{C}$
T_{stg}	Storage Temperature	-55~+175	$^\circ\text{C}$
TL	Maximum lead temperature for soldering purpose, 1/8" from case for 5 seconds	300	$^\circ\text{C}$

Thermal Characteristics

Symbol	PARAMETER	Typ.	MAX.	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	-	1.8	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	-	65	$^\circ\text{C}/\text{W}$
$R_{\theta CS}$	Thermal Resistance, Case to Sink	-	110	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Condition	Min	Typ	Max	Unit
Off Characteristics						
B _V DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	-	-	V
I _D SS	Zero Gate Voltage Drain Current	V _{DS} =100V, V _{GS} =0V	-	-	1	μA
I _G SS	Gate-Body Leakage Current	V _{GS} =±20V, V _{DS} =0V	-	-	±100	nA
On Characteristics (Note 3)						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.3	1.8	2.5	V
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _D =10A	-	25	32	mΩ
g _{FS}	Forward Transconductance	V _{DS} =5V, I _D =10A	-	15	-	S
Dynamic Characteristics (Note 4)						
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, F=1.0MHz	-	2356	-	PF
C _{oss}	Output Capacitance		-	94	-	PF
C _{rss}	Reverse Transfer Capacitance		-	83.3	-	PF
Switching Characteristics (Note 4)						
t _{d(on)}	Turn-on Delay Time	V _{DD} =50V, R _L =5Ω V _{GS} =10V, R _{GEN} =3Ω	-	7	-	nS
t _r	Turn-on Rise Time		-	7	-	nS
t _{d(off)}	Turn-Off Delay Time		-	29	-	nS
t _f	Turn-Off Fall Time		-	7	-	nS
Q _g	Total Gate Charge	V _{DS} =50V, I _D =10A, V _{GS} =10V	-	61.7	-	nC
Q _{gs}	Gate-Source Charge		-	8.3	-	nC
Q _{gd}	Gate-Drain Charge		-	16.7	-	nC
Drain-Source Diode Characteristics						
V _{SD}	Diode Forward Voltage (Note 3)	V _{GS} =0V, I _S =10A	-	-	1.2	V
I _S	Diode Forward Current (Note 2)	-	-	-	30	A
t _{rr}	Reverse Recovery Time	T _J = 25°C, I _F = 10A	-	32	-	nS
Q _{rr}	Reverse Recovery Charge	di/dt = 100A/μs (Note 3)	-	53	-	nC
t _{on}	Forward Turn-On Time	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, I_{AS}=32A

Typical Characteristics

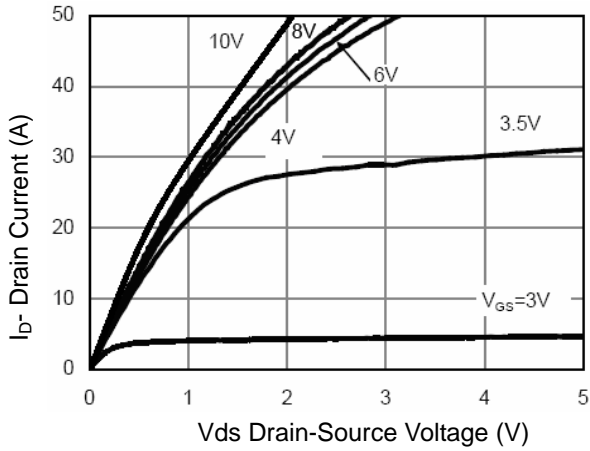


Figure 1 Output Characteristics

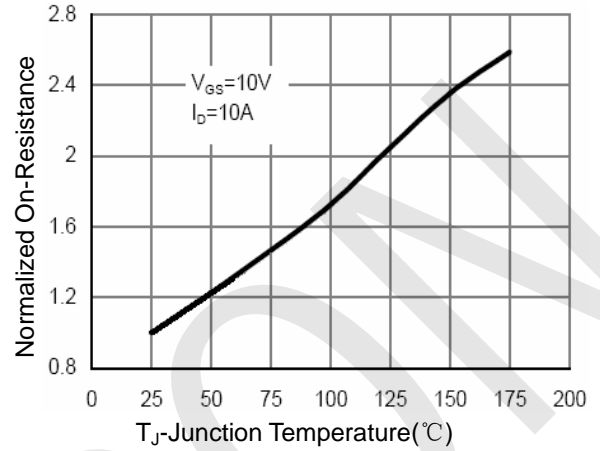


Figure 4 R_{dson} -Junction Temperature

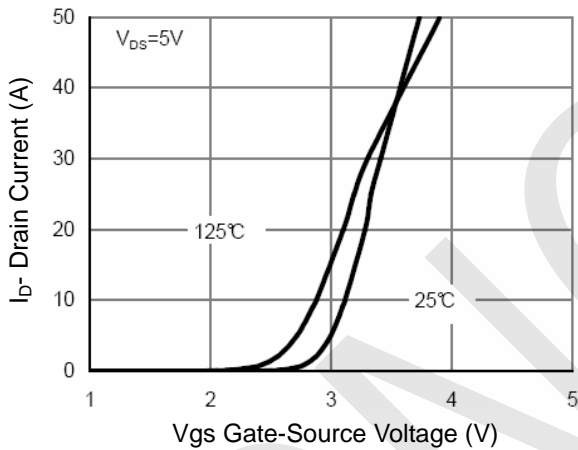


Figure 2 Transfer Characteristics

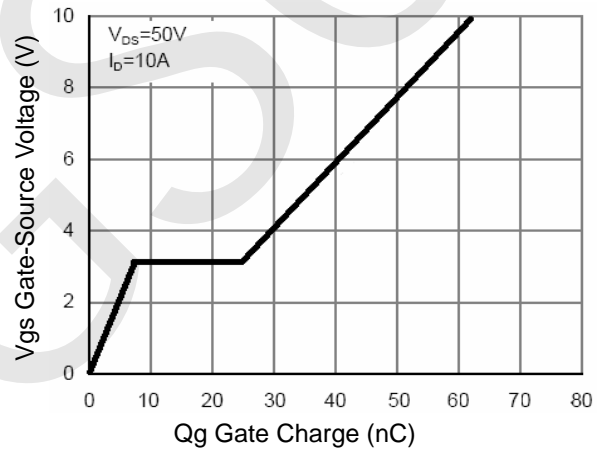


Figure 5 Gate Charge

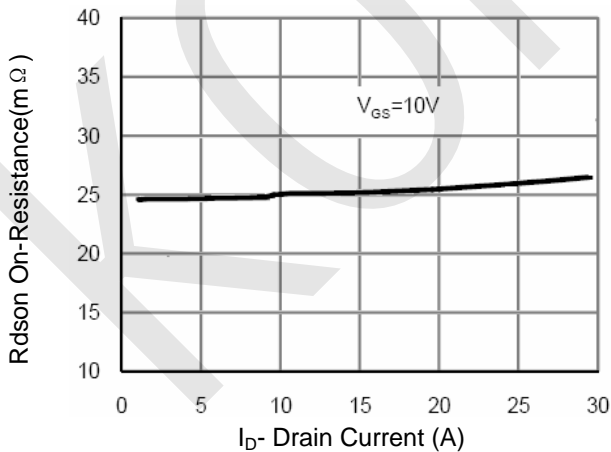


Figure 3 R_{dson} - Drain Current

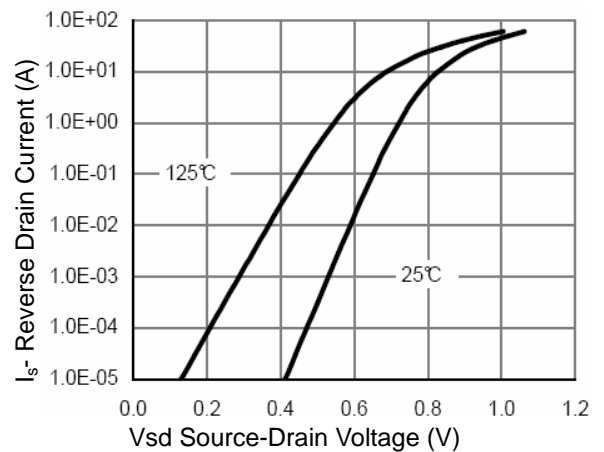


Figure 6 Source- Drain Diode Forward

Typical Characteristics (Continued)

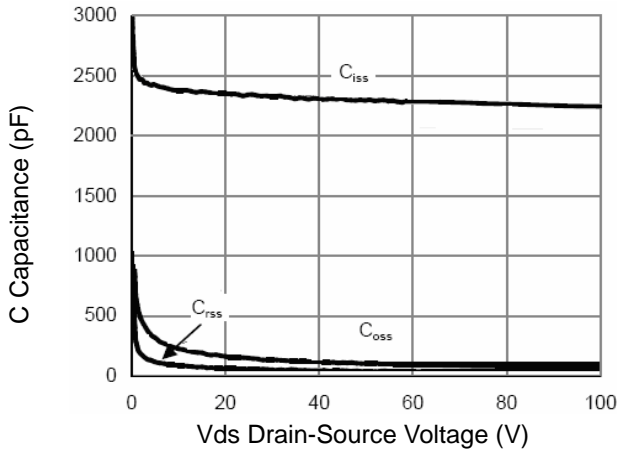


Figure 7 Capacitance vs Vds

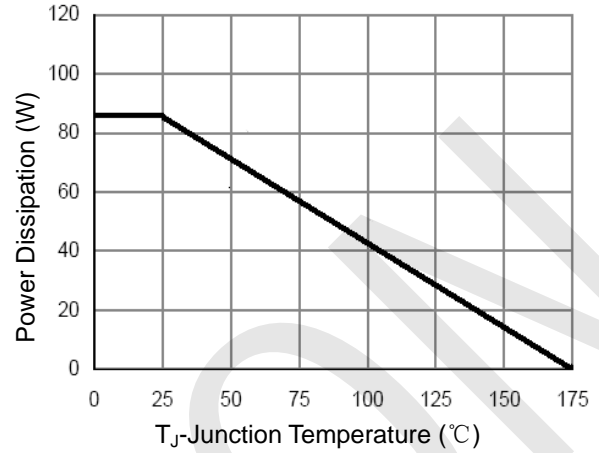


Figure 9 Power De-rating

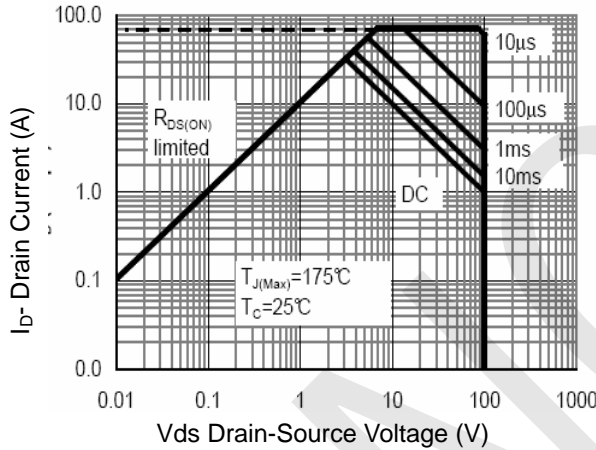


Figure 8 Safe Operation Area

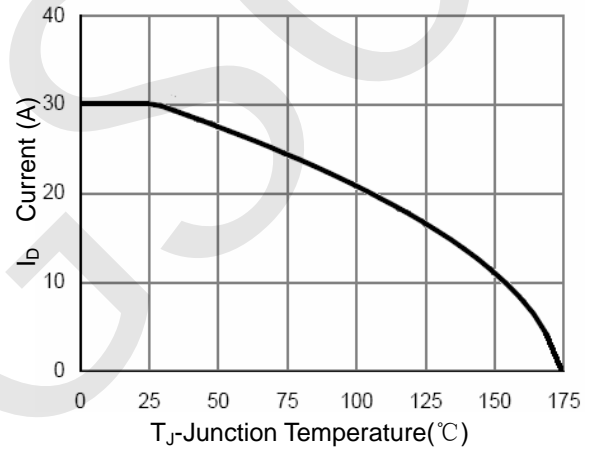


Figure 10 Id Current- Junction Temperature

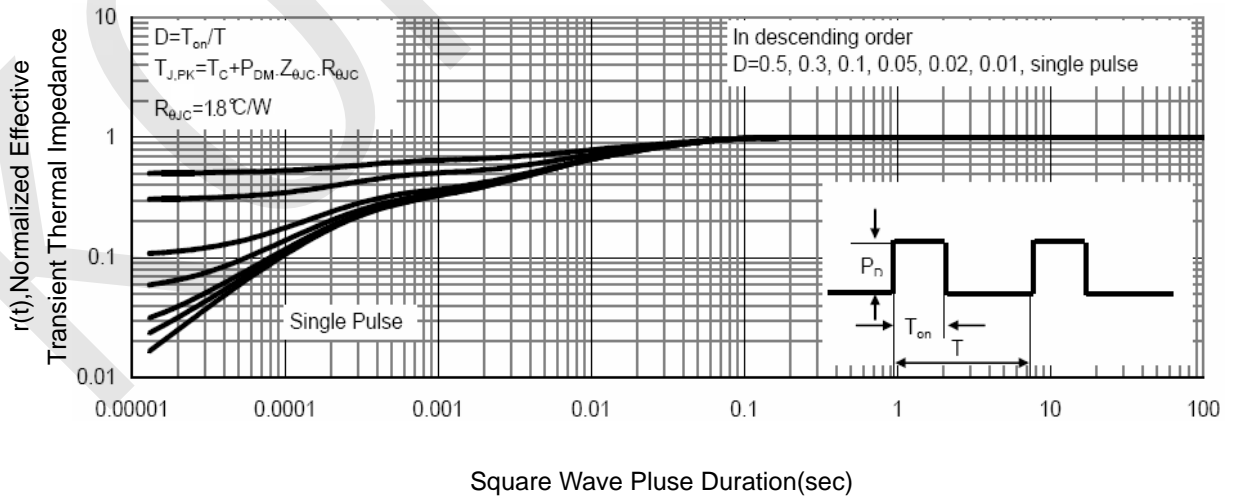
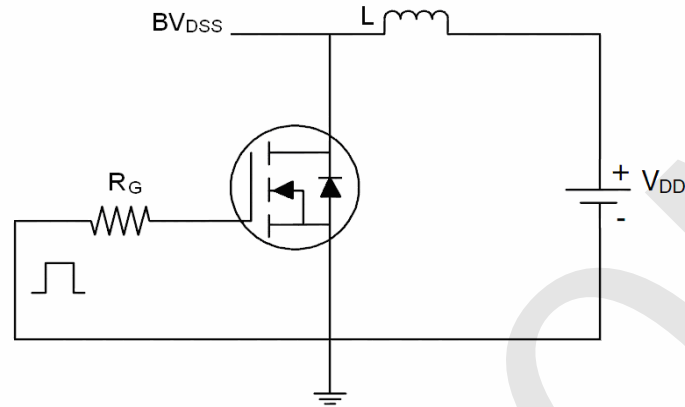


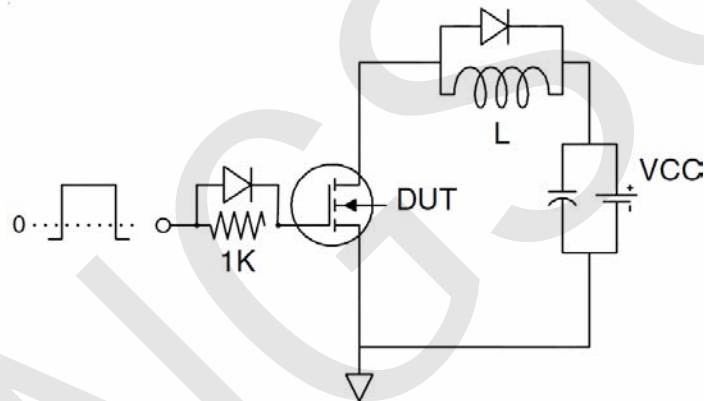
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

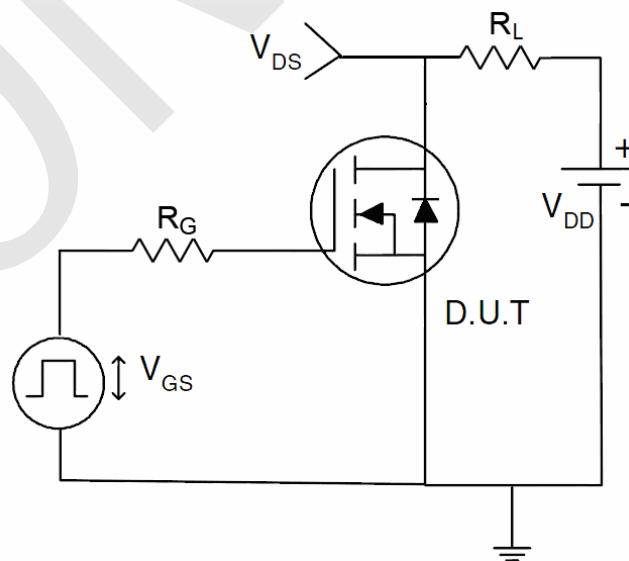
1) A_S Test Circuit



2) Gate Charge Test Circuit



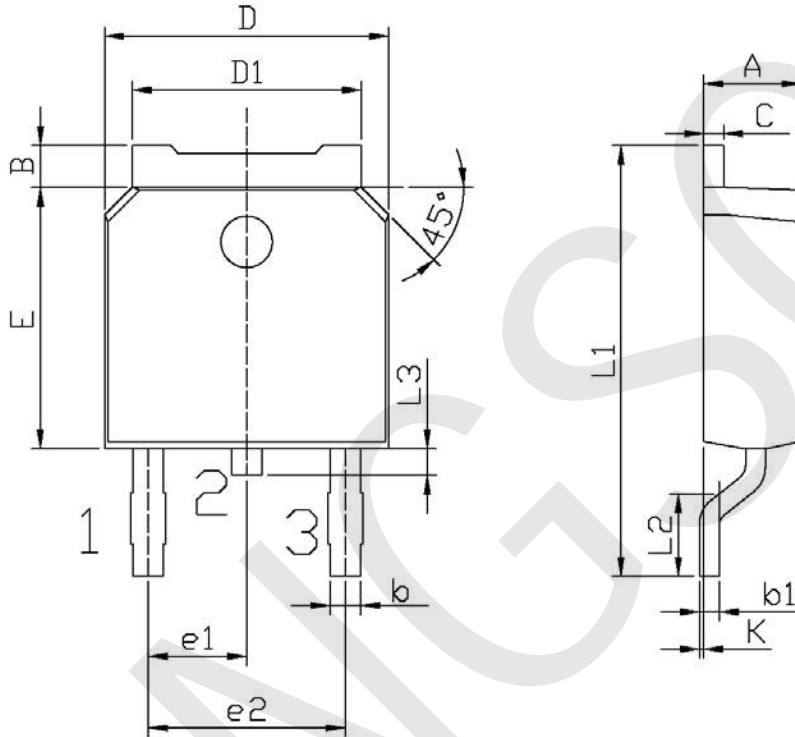
3) Switch Time Test Circuit



Package Dimension

TO-252

Unit:mm



Symbol	Dimensions In Millimeters		Symbol	Dimensions In Millimeters	
	Min	Max		Min	Max
A	2.20	2.40	E	5.95	6.25
B	0.95	1.25	e1	2.24	2.34
b	0.70	0.90	e2	4.43	4.73
b1	0.45	0.55	L1	9.85	10.35
C	0.45	0.55	L2	1.25	1.75
D	6.45	6.75	L3	0.60	0.90
D1	5.20	5.40	K	0.00	0.10