

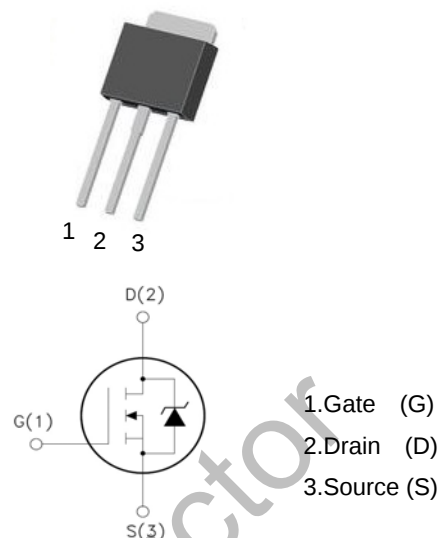
30N06

60V N-Channel MOSFET

Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 50nC (Typ.).
- ☐ VDSS= 60V, ID=30A
- ☐ R_{DS(on)} : 0.030Ω (Max) @V_G=10V
- ☐ 100% Avalanche Tested

TO-251

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

Symbol	PARAMETER	Value	Unit
V _{DSS}	Drain-Source Voltage	60	V
I _D	Drain Current	T _C =25°C	30
		T _C =100°C	21
V _{GSS}	Gate - Source voltage	±20	V
E _{AS}	Single Pulse Avalanche Energy (note1)	72	mJ
I _{AR}	Avalanche Current (note2)	90	A
P _D	Power Dissipation (T _c =25°C)	45	W
T _j	Junction Temperature(MAX)	175	°C
T _{stg}	Storage Temperature	-55~+175	°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	-	3.3	°C/W
R _{θJA}	Thermal Resistance, Junction to Ambient	-	-	°C/W
R _{θCS}	Thermal Resistance, Case to Sink	-	110	°C/W

Electrical Characteristics ($T_C=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$ $I_D=250\mu A$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics ^(Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=30A$	-	20	30	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$	11	-	-	S
Dynamic Characteristics ^(Note4)						
Input Capacitance	C_{ISS}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	590	-	PF
Output Capacitance	C_{OSS}		-	70	-	PF
Reverse Transfer Capacitance	C_{RSS}		-	64	-	PF
Switching Characteristics ^(Note 4)						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A,$ $V_{GS}=10V, R_G=3\Omega$	-	6.0	-	nS
Turn-on Rise Time	t_r		-	6.1	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	17	-	nS
Turn-Off Fall Time	t_f		-	3.0	-	nS
Total Gate Charge	Q_g	$V_{DS}=30V, I_D=15A,$ $V_{GS}=10V$	-	25.3	-	nC
Gate-Source Charge	Q_{gs}		-	4.7	-	nC
Gate-Drain Charge	Q_{gd}		-	6.1	-	nC
Drain-Source Diode Characteristics						
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=30A$	-		1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	30	A
Reverse Recovery Time	t_{rr}	$T_J = 25^{\circ}C, I_F = 30A$ $di/dt = 100A/\mu s$ ^(Note3)	-	29.5	-	nS
Reverse Recovery Charge	Q_{rr}		-	50	-	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, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition : $T_J=25^{\circ}\text{C}, V_{DD}=30V, V_G=10V, L=0.5mH, R_g=25\Omega$

Typical Characteristics

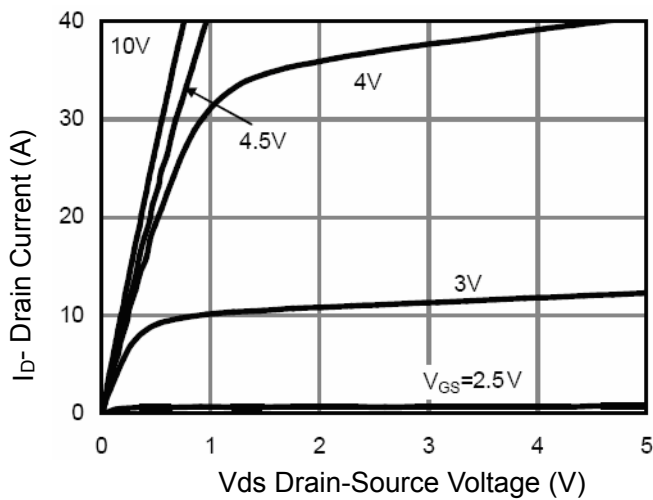


Figure 1 Output Characteristics

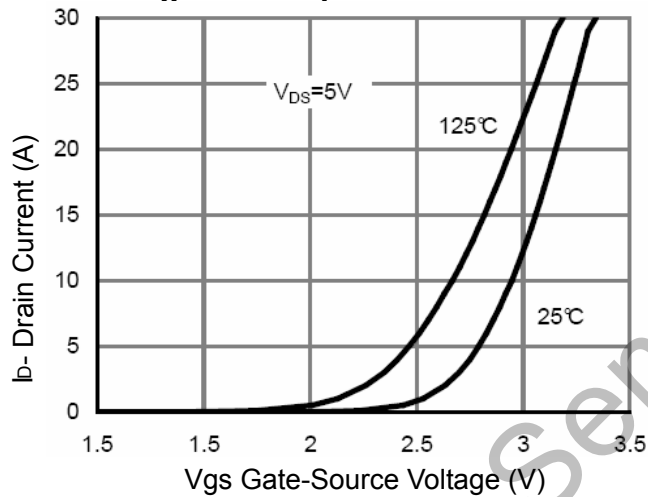


Figure 2 Transfer Characteristics

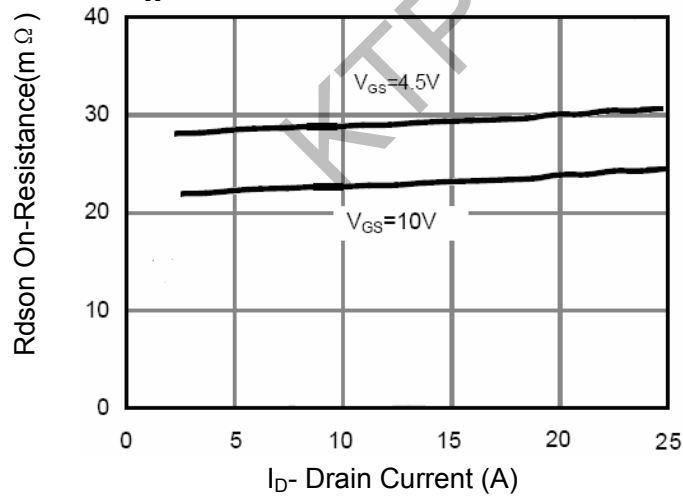


Figure 3 Rdson- Drain Current

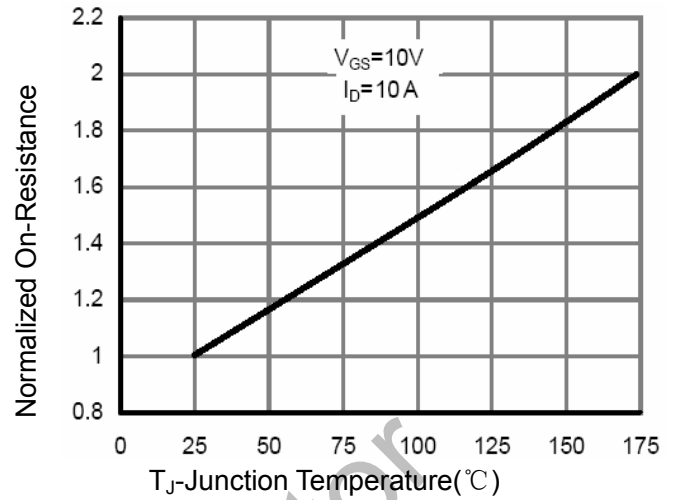


Figure 4 Rdson-Junction Temperature

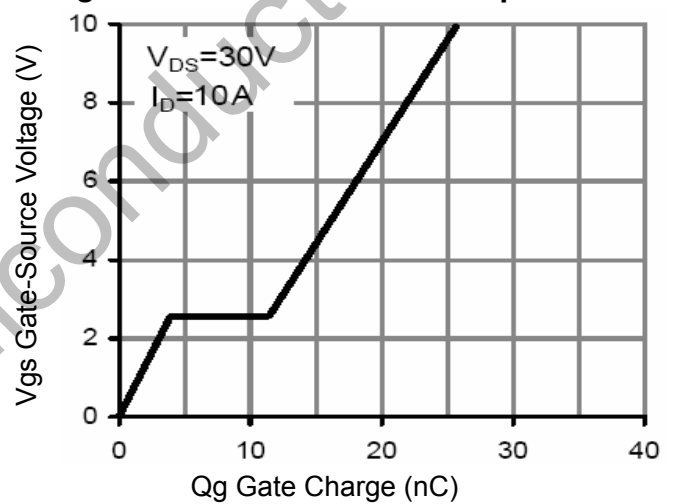


Figure 5 Gate Charge

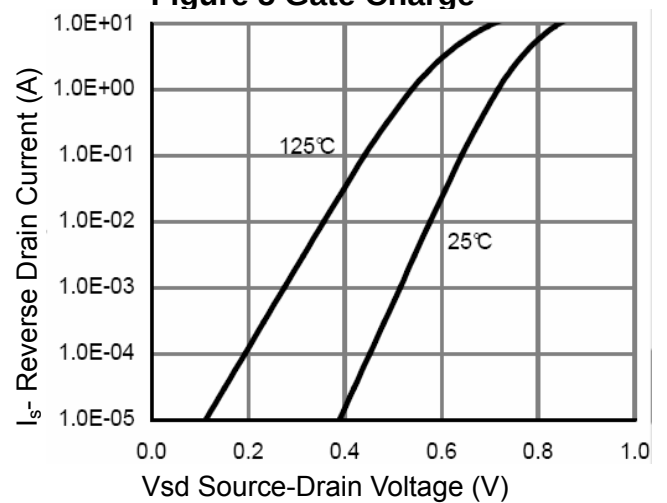


Figure 6 Source- Drain Diode Forward

Typical Characteristics (Continued)

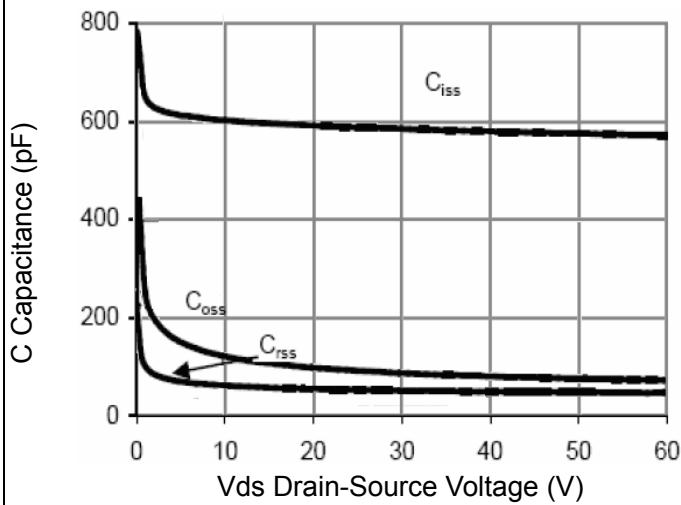


Figure 7 Capacitance vs Vds

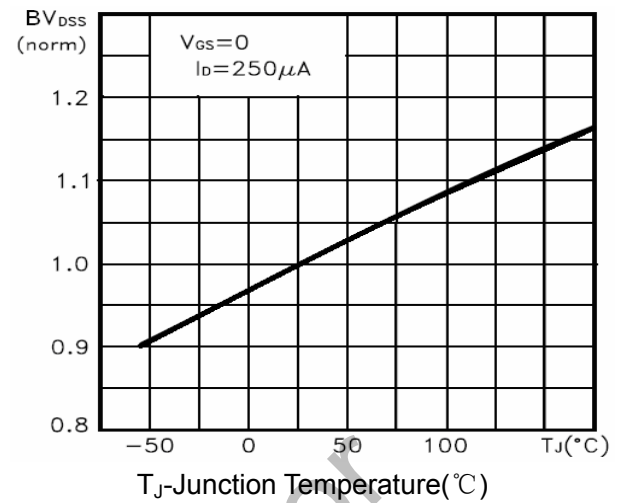


Figure 9 BV_{DSS} vs Junction Temperature

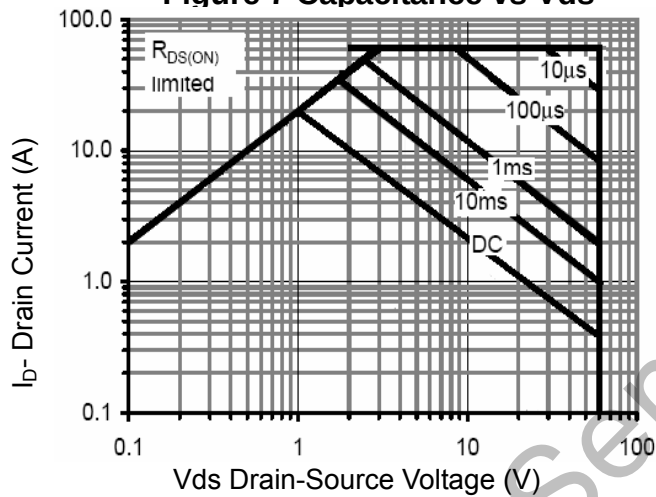


Figure 8 Safe Operation Area

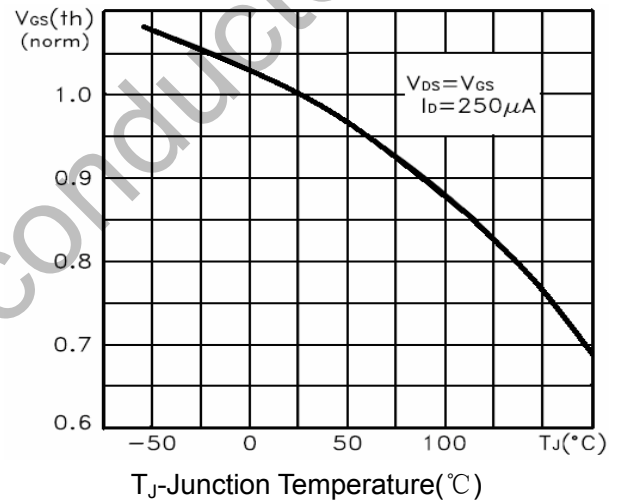


Figure 10 $V_{GS(th)}$ vs Junction Temperature

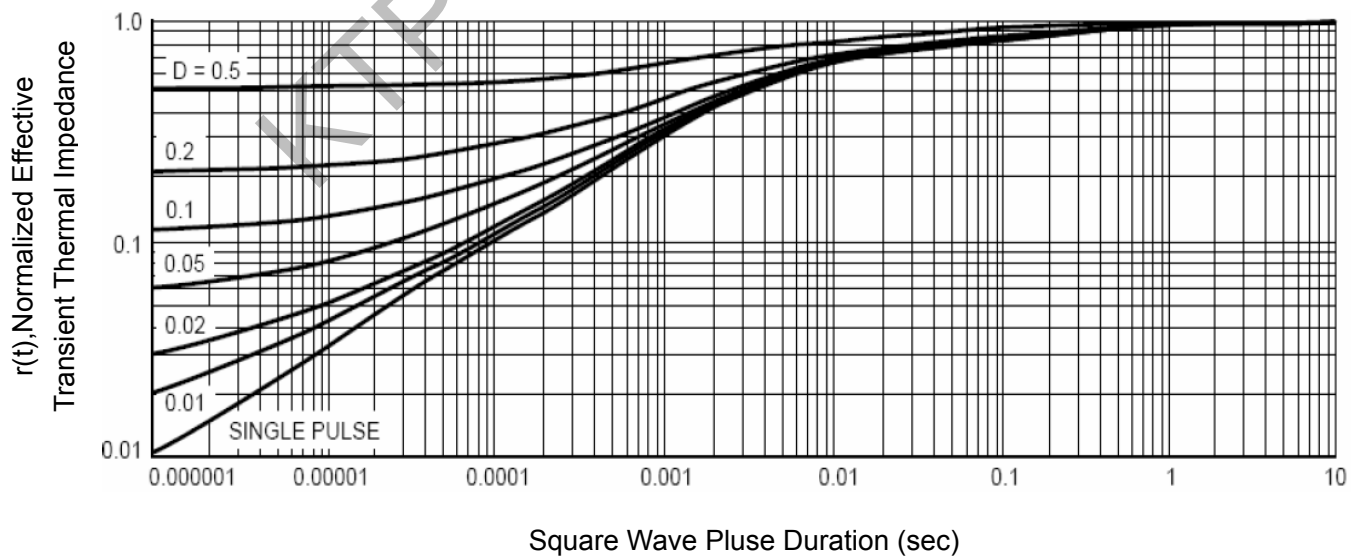
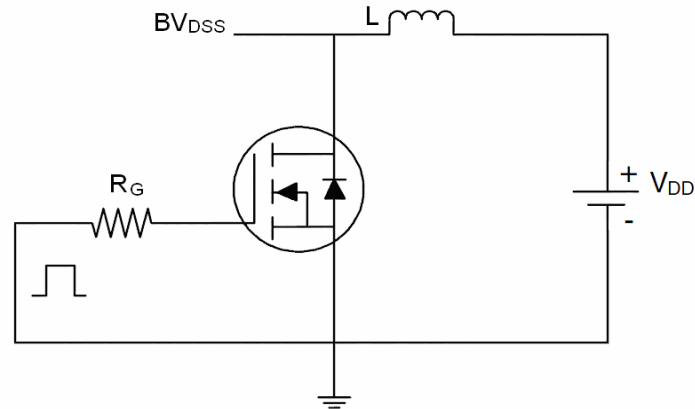


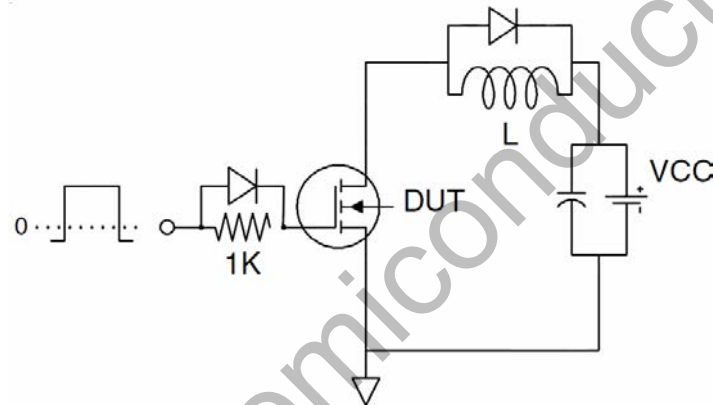
Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuit

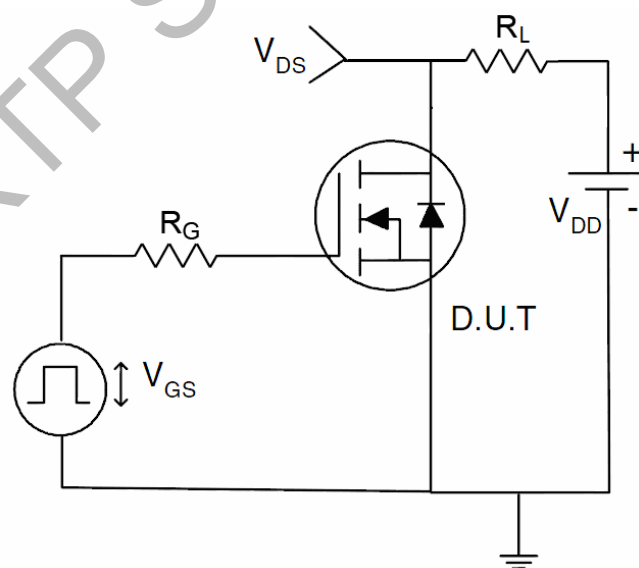
1) E_{AS} test Circuit



2) Gate charge test Circuit

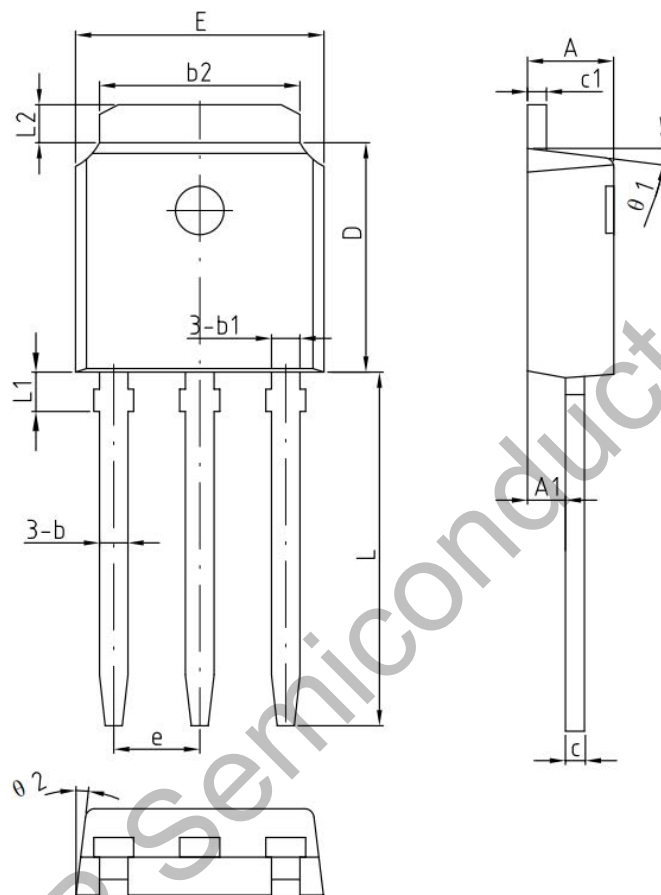


3) Switch Time Test Circuit



Package Dimension**TO-251**

Unit: mm



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	2.2	2.30	2.38
A1	0.90	1.01	1.10
b	0.71	0.76	0.86
b1	—	0.76	—
b2	5.13	5.33	5.46
c	0.46	0.50	0.60
c1	0.46	0.50	0.60
D	6.00	6.10	6.20
E	6.50	6.60	6.70
e	2.286BSC		
L	9.10	9.40	9.70
L1		1.05	
L2	0.90	—	1.25
θ 1		7°	
θ 2		7°	