SK03N150-TF

## 1500V N-ch High Planar MOSFET

General Features

➢ RoHS Compliant
➢ $R_{DS(ON),typ.}$=5.4 Ω@V_{GS}=10V
➢ Low Gate Charge Minimize Switching Loss
➢ Fast Recovery Body Diode

BV_{DSS}	$R_{DS(ON),typ.}$	I_D
1500V	5.4Ω	3A

Applications

➢ Adaptor
➢ Charger
➢ SMPS Standby Power

TO-220F

Package No to Scale

Ordering Information

Part Number	Package
SK03N150-TF	TO-220F

Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter			Unit
V_{DSS}	Drain-to-Source Voltage	1500		V
V_{GSS}	Gate-to-Source Voltage	±30		
I_D	Continuous Drain Current	3		A
I_{DM}	Pulsed Drain Current at V_{GS}=10V	12		
E_{AS}	Single Pulse Avalanche Energy,L=30mH	500		mJ
P_D	Power Dissipation	90	35	W
	Derating Factor above 25℃	0.72	0.28	W/℃
T_L	Soldering Temperature Distance of 1.6mm from case for 10 seconds	300		℃
T_J& T_{STG}	Operating and Storage Temperature Range	-55 to 150		

Caution: Stresses greater than those listed in the "Absolute Maximum Ratings" may cause permanent damage to the device.

Thermal Characteristics

Symbol	Parameter			Unit
$R_{θJC}$	Thermal Resistance, Junction-to-Case	1.38	3.57	℃/W
$R_{θJA}$	Thermal Resistance, Junction-to-Ambient	50	100	

Electrical Characteristics

OFF Characteristics

$T_J = 25℃$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
BV_{DSS}	Drain-to-Source Breakdown Voltage	1500	--	--	V	$V_{GS}=0V$, $I_D=250uA$
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	uA	$V_{DS}=1500V$, $V_{GS}=0V$
		--	--	500		$V_{DS}=1200V$, $V_{GS}=0V$, $T_J=125℃$
I_{GSS}	Gate-to-Source Leakage Current	--	--	+100	nA	$V_{GS}=+30V$, $V_{DS}=0V$
		--	--	-100		$V_{GS}=-30V$, $V_{DS}=0V$

ON Characteristics

$T_J = 25℃$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$R_{DS(ON)}$	Static Drain-to-Source On-Resistance	--	5.4	8.2	Ω	$V_{GS}=10V$, $I_D=2.0A$
$V_{GS(TH)}$	Gate Threshold Voltage	2.5	--	4.5	V	$V_{DS}=V_{GS}$, $I_D=250uA$
gfs	Forward Transconductance	--	3.0	--	S	$V_{DS}=15V$, $ID=3A$

Dynamic Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	1600	--	pF	$V_{GS}=0V$, $V_{DS}=25V$, $f=1.0MH_Z$
C_{rss}	Reverse Transfer Capacitance	--	33	--		
C_{oss}	Output Capacitance	--	100	--		
Rg	Gate input resistance	--	4.5	--	Ω	f=1 MHz Gate DC Bias=0 Test signal level=20mV open drain
Q_g	Total Gate Charge	--	36	--	nC	$V_{DD}=750V$, $I_D=3A$, $V_{GS}=0$ to $10V$
Q_{gs}	Gate-to-Source Charge	--	9.5	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	12	--		

Resistive Switching Characteristics

Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
td(ON)	Turn-on Delay Time	--	25	--	nS	$V_{DD}=750V$, $I_D=3A$, $V_{GS}=10V$ Rg=4.7Ω
t(rise)	Rise Time	--	48	--		
td(OFF)	Turn-Off Delay Time	--	57	--		
t(fall)	Fall Time	--	52	--		

Source-Drain Body Diode Characteristics $T_J=25℃$ unless otherwise specified

Symbol	Parameter	Min	Typ.	Max.	Unit	Test Conditions
I_{SD}	Continuous Source Current[2]	--	--	3	A	Integral pn-diode in MOSFET
I_{SM}	Pulsed Source Current[2]	--	--	12		
V_{SD}	Diode Forward Voltage	--	--	1.5	V	$I_S=3A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	--	255	--	ns	$V_{GS}=0V$ $I_F=3A, di/dt=100A/\mu s$
Q_{rr}	Reverse Recovery Charge	--	1.1	--	uC	

Typical Characteristics

Figure 1. Maximum Transient Thermal Impedance
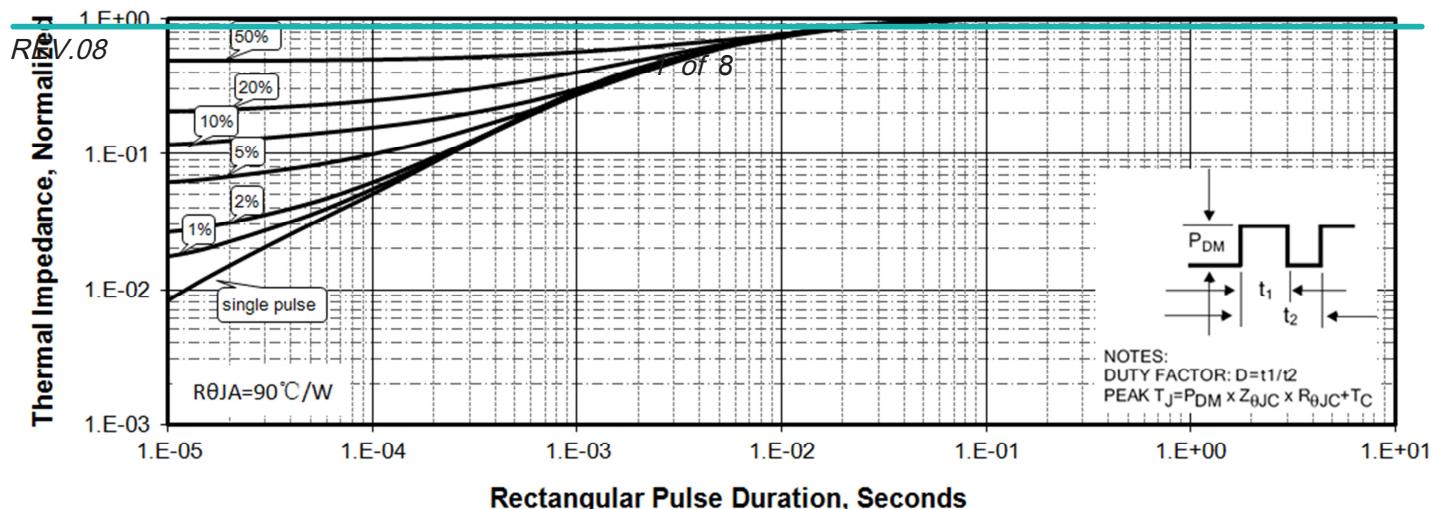
Figure 2 . Max. Power Dissipation vs Case Temperature
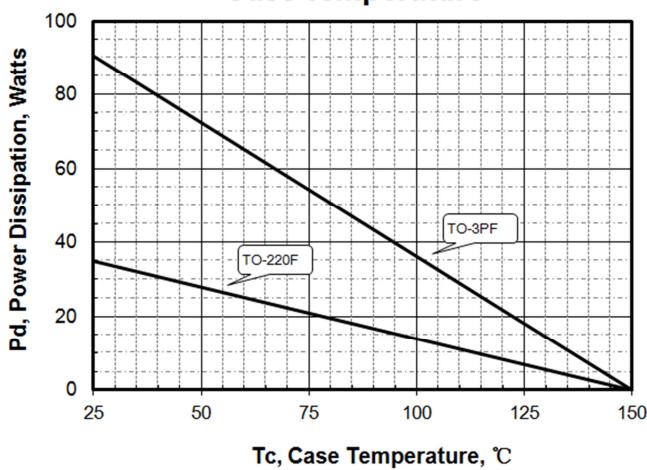
Figure 3 .Maximum Continuous Drain Current vs Tc
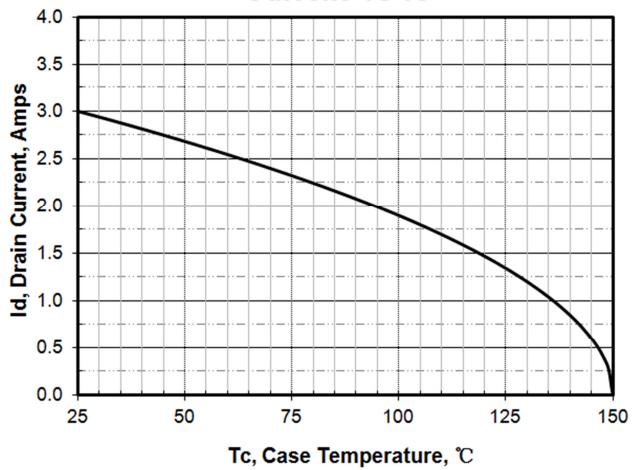
Figure 4. Output Characteristics
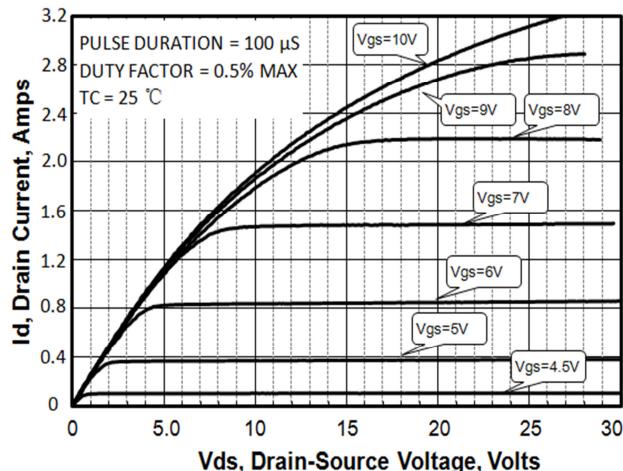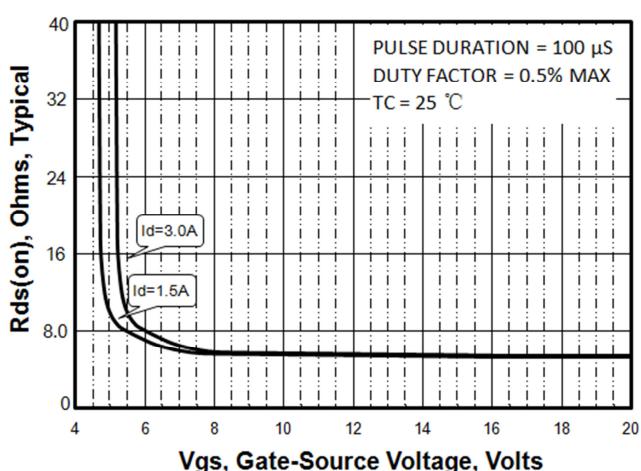
Figure 5. Rdson vs Gate Voltage

## Typical Characteristics(Cont.)

Figure 6. Peak Current Capability

TRANSCONDUCTANCE MAY LIMIT CURRENT IN THIS REGION

FOR TEMPERATURES ABOVE 25℃ DERATE PEAK CURRENT AS FOLLOWS:

$$I = I_{25}\left[\sqrt{\frac{150 - T_C}{125}}\right]$$

Idm, Peak Current, Amps vs t, Pulse Width, Seconds
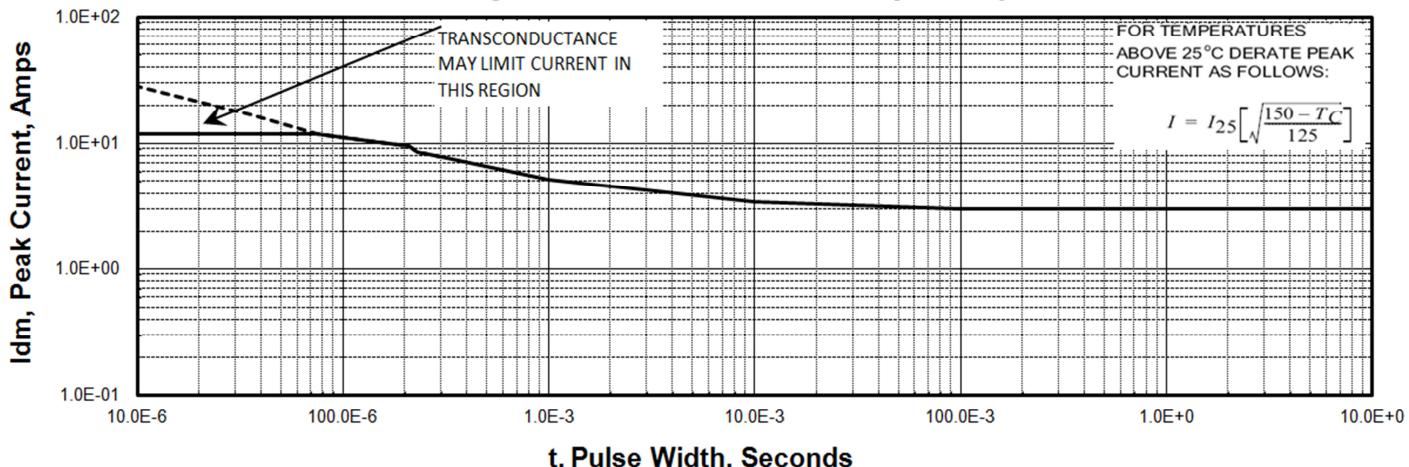
Figure 7. Transfer Characteristics

PULSE DURATION = 10 μS
DUTY FACTOR = 0.5% MAX
V_{DS}=15V

-55℃
+25℃
+175℃

Id, Drain to Source Current, Amps vs Vgs, Gate to Source Voltage, Volts

Figure 8. Unclamped Inductive Switching Capability

STARTING T_J = 25℃
STARTING T_J = 150℃

If R= 0: tAV= (L×IAS)/(1.3BVDSS-VDD)
If R 0: tAV= (L/R) ln[IAS×R)/(1.3BVDSS-VDD)+1]
R equals total Series resistance of Drain circuit

Id, Drain Current, Amps vs tav, Time in Avalanche, Seconds

Figure 9. Drain to Source ON Resistance vs Drain Current

PULSE DURATION = 10 μS
DUTY FACTOR = 0.5% MAX
TC = 25 ℃

V_{GS} = 10V

Rds(on), Ohms vs Id, Drain Current, Amps
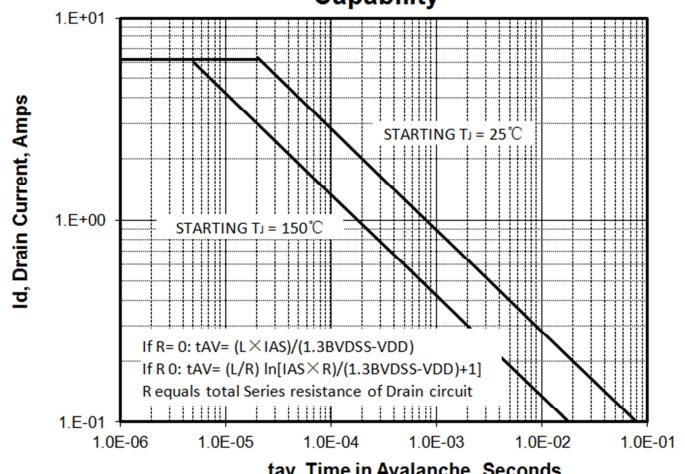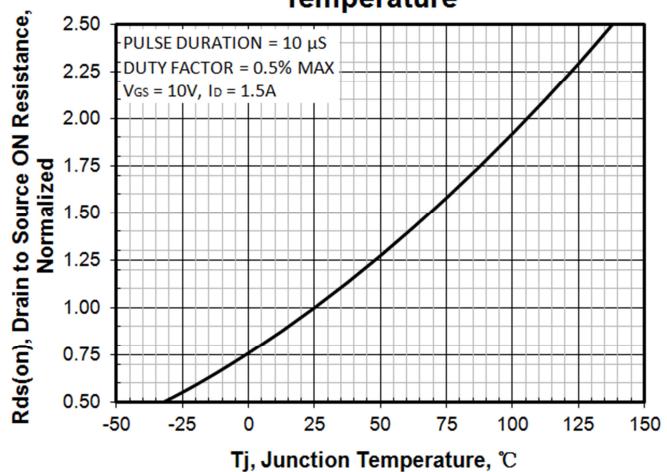
Figure 10. Rdson vs Junction Temperature

PULSE DURATION = 10 μS
DUTY FACTOR = 0.5% MAX
V_{GS} = 10V, I_D = 1.5A

Rds(on), Drain to Source ON Resistance, Normalized vs Tj, Junction Temperature, ℃

Typical Characteristics (Cont.)

Figure 11. Breakdown Voltage vs Temperature

VGS = 0V
ID = 250 µA
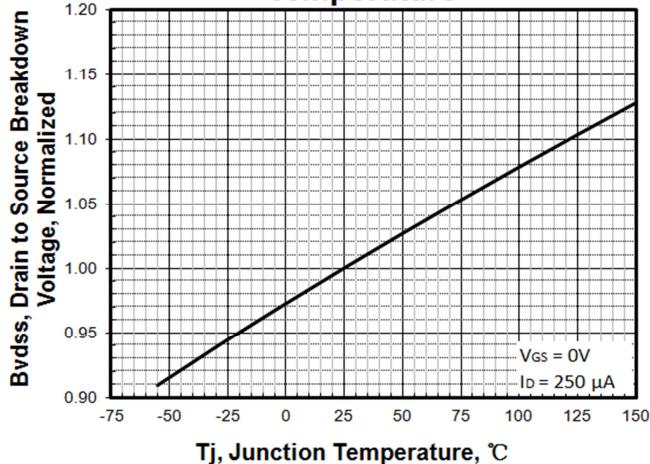
Figure 12. Threshold Voltage vs Temperature
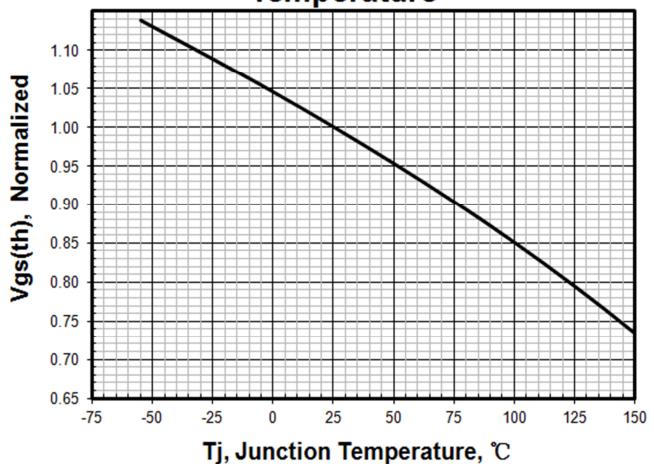
Figure 13 . Maximum Safe Operating Area(TO-3PF)

OPERATION IN THIS AREA MAY BE
LIMITED BY RDS(ON)
TJ = MAX RATED
TC = 25℃
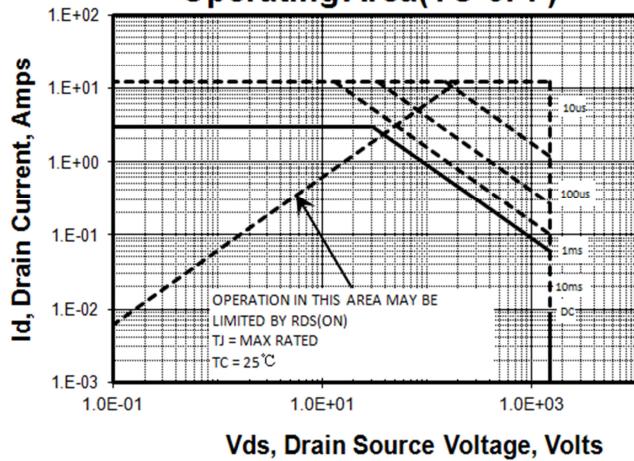
Figure 14 . Maximum Safe Operating Area(TO-220F)

OPERATION IN THIS AREA MAY BE
LIMITED BY RDS(ON)
TJ = MAX RATED
TC = 25℃
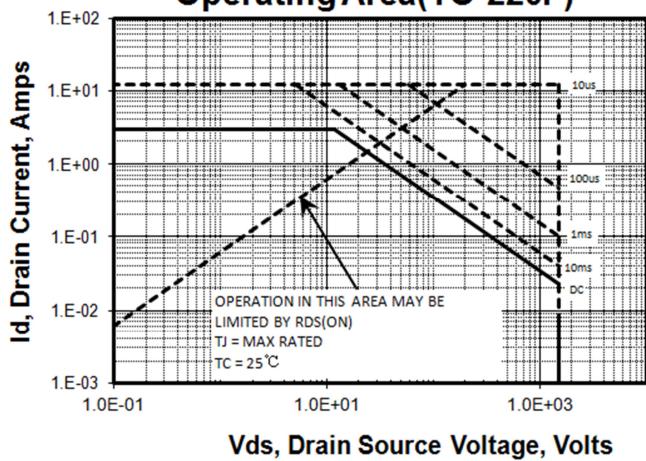
Figure 15. Capacitance vs Vds

VGS = 0V，f = 1MHz，
Ciss = Cgs + Cgd，
Coss Cds + Cgd，
Crss = Cgd

Ciss
Coss
Crss
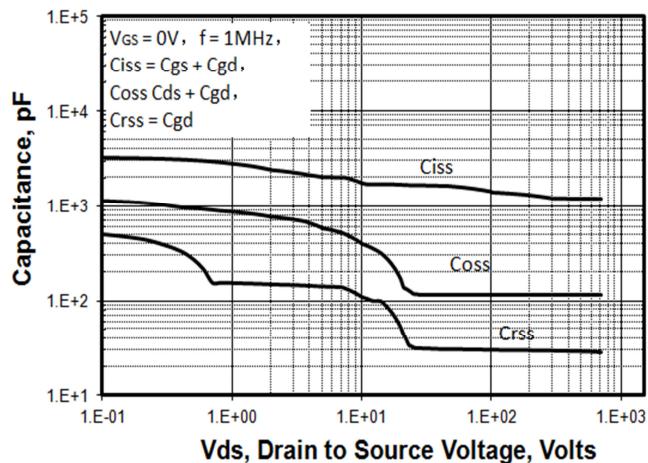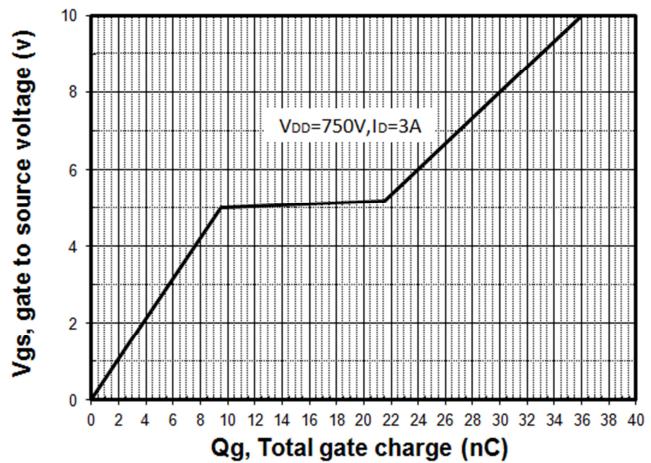
Figure 16 . Typical Gate Charge

VDD=750V,ID=3A

REV.08

Test Circuits and Waveforms

Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit
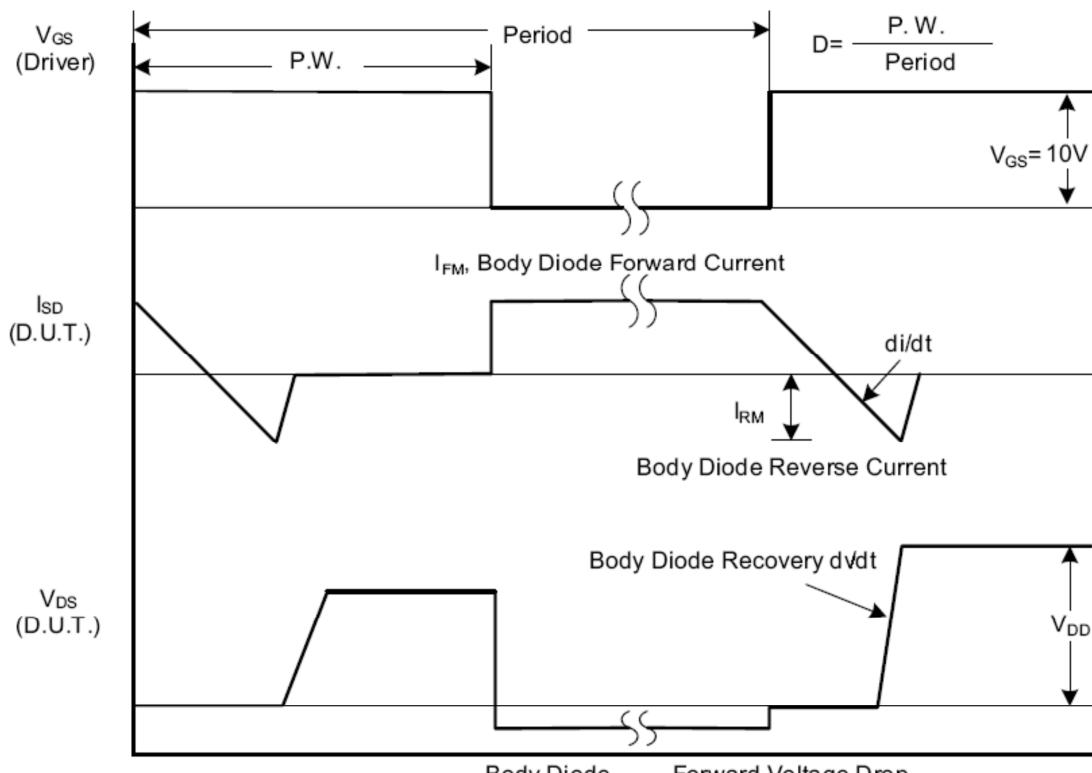
Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

Test Circuits and Waveforms (Cont.)
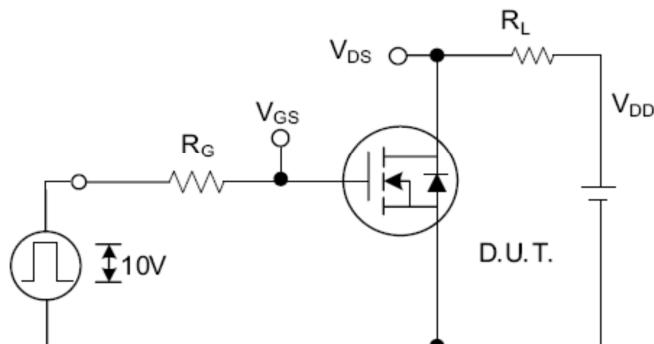


Fig. 2.1 Switching Test Circuit
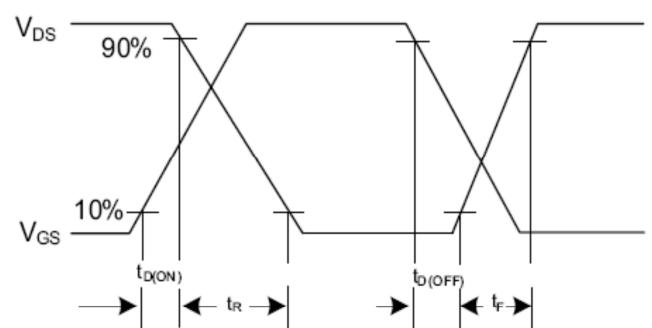

Fig. 2.2 Switching Waveforms
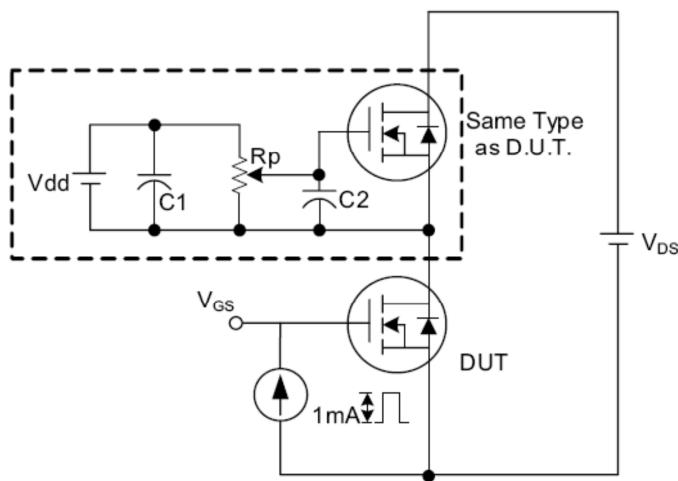

Fig. 3 . 1 Gate Charge Test Circuit
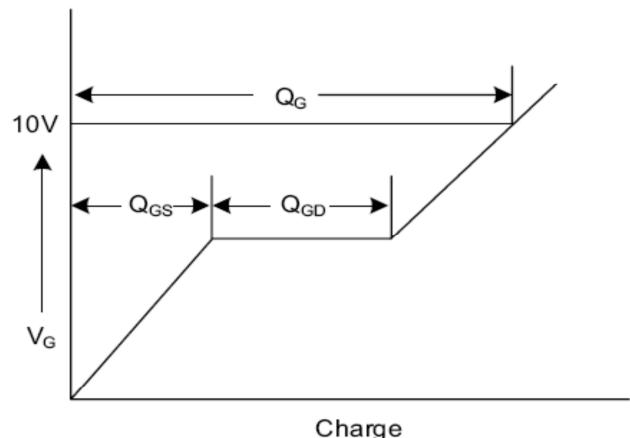

Fig. 3 . 2 Gate Charge Waveform
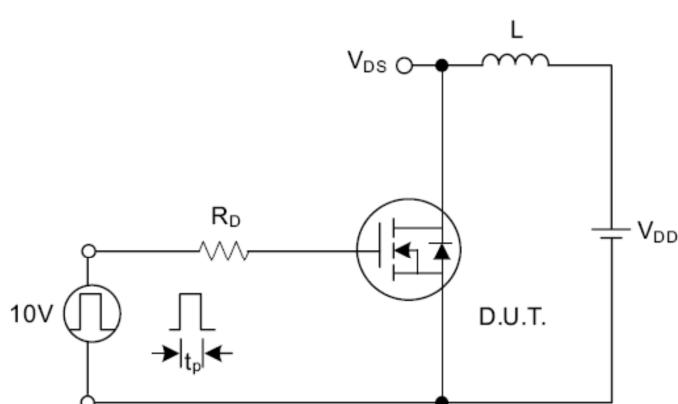
Fig. 4.1 Unclamped Inductive Switching Test Circuit
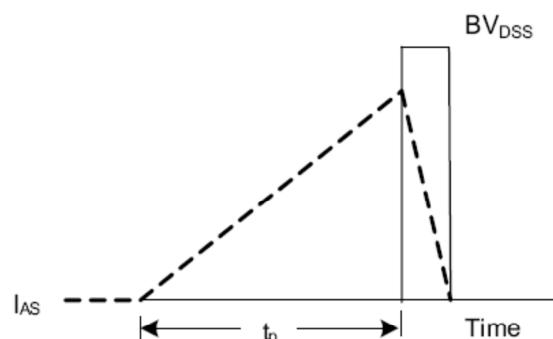
Fig. 4.2 Unclamped Inductive Switching Waveforms

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for MOSFET *category:*

Click to view products by Shikues *manufacturer:*

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [BUK455-60A/B](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#) [IPS70R2K0CEAKMA1](#) [SQD23N06-31L-GE3](#) [TK16J60W,S1VQ(O](#) [2SK2614(TE16L1,Q)](#) [DMN1017UCP3-7](#) [DMN1053UCP4-7](#) [SQJ469EP-T1-GE3](#) [NTE2384](#) [DMC2700UDMQ-7](#) [DMN2080UCB4-7](#) [DMN61D9UWQ-13](#) [US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#) [IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [DMN2990UFB-7B](#) [IPB80P04P405ATMA2](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [MCQ7328-TP](#) [BXP7N65D](#) [BXP4N65F](#) [AOL1454G](#) [WMJ80N60C4](#) [BXP2N20L](#) [BXP2N65D](#) [BXT1150N10J](#) [BXT1700P06M](#) [TSM60NB380CP ROG](#) [RQ7L055BGTCR](#) [DMNH15H110SK3-13](#) [SLF10N65ABV2](#) [BSO203SP](#) [BSO211P](#) [IPA60R230P6](#) [IPA60R460CE](#)