SK240N04-TF

40V N-Channel MOSFET

General Features

➢ Proprietary New Trench Technology
➢ $R_{DS(ON),typ.}$=2.2mΩ@V_{GS}=10V
➢ Low Gate Charge Minimize Switching Loss
➢ Fast Recovery Body Diode

| BV_{DSS}	$R_{DS(ON),typ.}$	I_D[2]
40V	2.2mΩ	240A

Applications

➢ High efficiency DC/DC Converters
➢ Synchronous Rectification
➢ UPS Inverter

TO-220F
Package No to Scale

Ordering Information

Part Number	Package
SK240N04-TF	TO-220F
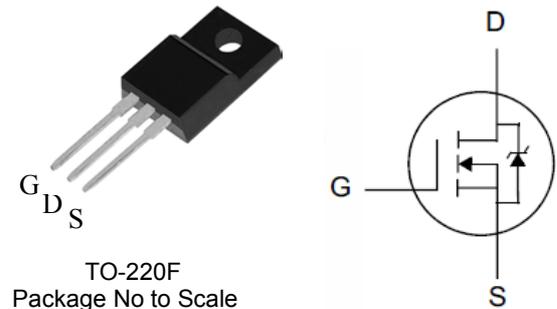
Absolute Maximum Ratings

T_C=25℃ unless otherwise specified

Symbol	Parameter	SK240N04-TF	Unit
V_{DSS}	Drain-to-Source Voltage[1]	40	V
V_{GSS}	Gate-to-Source Voltage	±20	
I_D	Continuous Drain Current[2]	240	A
	Continuous Drain Current[3]	80	
I_{DM}	Pulsed Drain Current at V_{GS}=10V[2,4]	960	
E_{AS}	Single Pulse Avalanche Energy	1200	mJ
dv/dt	Peak Diode Recovery dv/dt[3]	5.0	V/ns
P_D	Power Dissipation	300	W
	Derating Factor above 25℃	2.0	W/℃
T_L T_{PAK}	Maximum Temperature for Soldering Leads at 0.063in (1.6mm) from Case for 10 seconds, Package Body for 10 seconds	300 260	℃
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	SK240N04-TF	Unit
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	0.5	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	

SK240N04-TF

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	40	--	--	V	V_{GS}=0V, I_D=250uA
I_{DSS}	Drain-to-Source Leakage Current	--	--	1	uA	V_{DS}=40V, V_{GS}=0V
		--	--	100		V_{DS}=32V, V_{GS}=0V, T_J =125℃
I_{GSS}	Gate-to-Source Leakage Current	--	--	+100	nA	V_{GS}=+20V, V_{DS}=0V
		--	--	-100		V_{GS}=-20V, 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	--	2.2	3.0	mΩ	V_{GS}=10V, I_D=80A [5]
$V_{GS(TH)}$	Gate Threshold Voltage	2.0	--	4.0	V	V_{DS}=V_{GS}, I_D=250uA
gfs	Forward Transconductance	--	221	--	S	V_{DS}=10V,I_D=80A [5]

Dynamic Characteristics   Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
C_{iss}	Input Capacitance	--	4.84	--	nF	V_{GS}=0V, V_{DS}=25V, f=1.0MHz
C_{rss}	Reverse Transfer Capacitance	--	0.43	--		
C_{oss}	Output Capacitance	--	0.68	--		
R_G	Gate Series Resistance	--	2.1	--	Ω	f=1.0MHz
Q_g	Total Gate Charge	--	95	--	nC	V_{DD}=20V, I_D=80A, V_{GS}=0 to 10V
Q_{gs}	Gate-to-Source Charge	--	27	--		
Q_{gd}	Gate-to-Drain (Miller) Charge	--	28	--		

Resistive Switching Characteristics   Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Unit	Test Conditions
$t_{d(ON)}$	Turn-on Delay Time	--	21	--	ns	V_{DD}=20V, I_D=80A, V_{GS}= 10V R_G=2.5Ω
t_{rise}	Rise Time	--	22	--		
$t_{d(OFF)}$	Turn-Off Delay Time	--	53	--		
t_{fall}	Fall Time	--	21	--		

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]	--	--	240	A	Integral PN-diode in MOSFET
I_{SM}	Pulsed Source Current[2]	--	--	960		
V_{SD}	Diode Forward Voltage	--	0.90	1.2	V	I_S=80A, V_{GS}=0V
trr	Reverse recovery time	--	46	--	ns	V_{GS}=0V ,I_F=80A, di_F/dt=100A/µs
Qrr	Reverse recovery charge	--	19	--	nC	

Typical Characteristics

Figure 1. Maximum Effective Thermal Impedance, Junction-to-Case
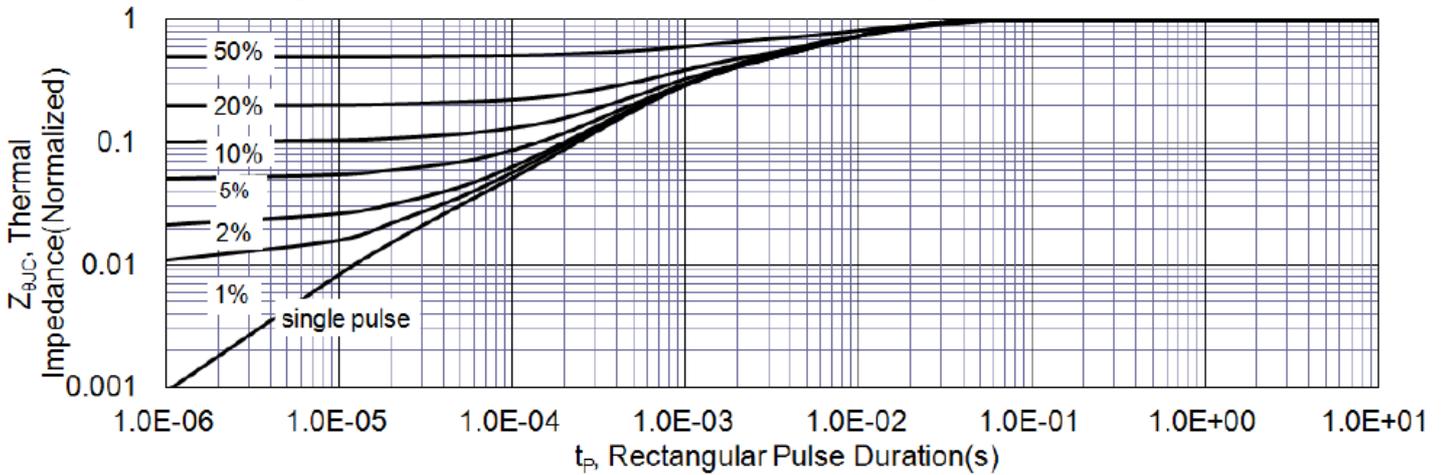
Figure 2. Maximum Power Dissipation vs Case Temperature

Figure3. Maximum Continuous Drain Current vs Case Temperature

Figure 4. Typical Output Characteristics
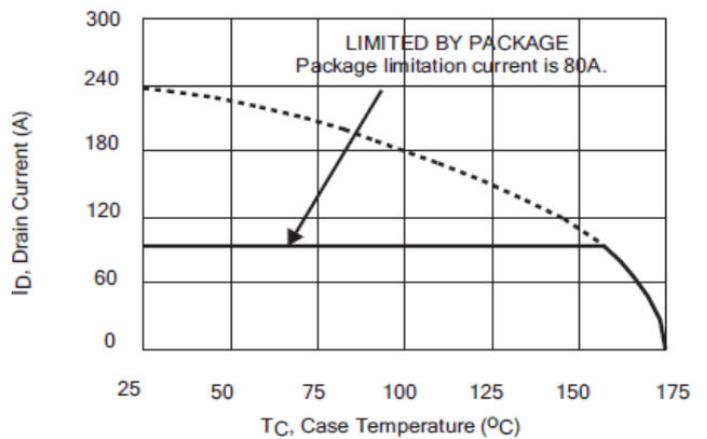
Figure 5. Typical Drain-to-Source ON Resistance vs. Gate Voltage

REV.08
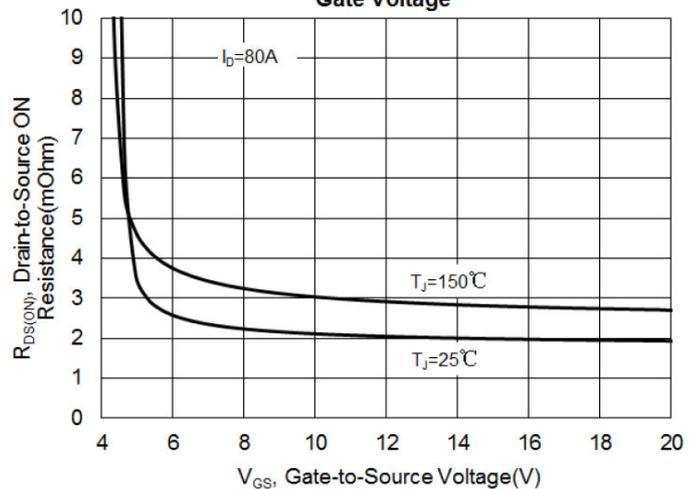
Typical Characteristics(Cont.)

Figure 6. Maximum Peak Current Capability
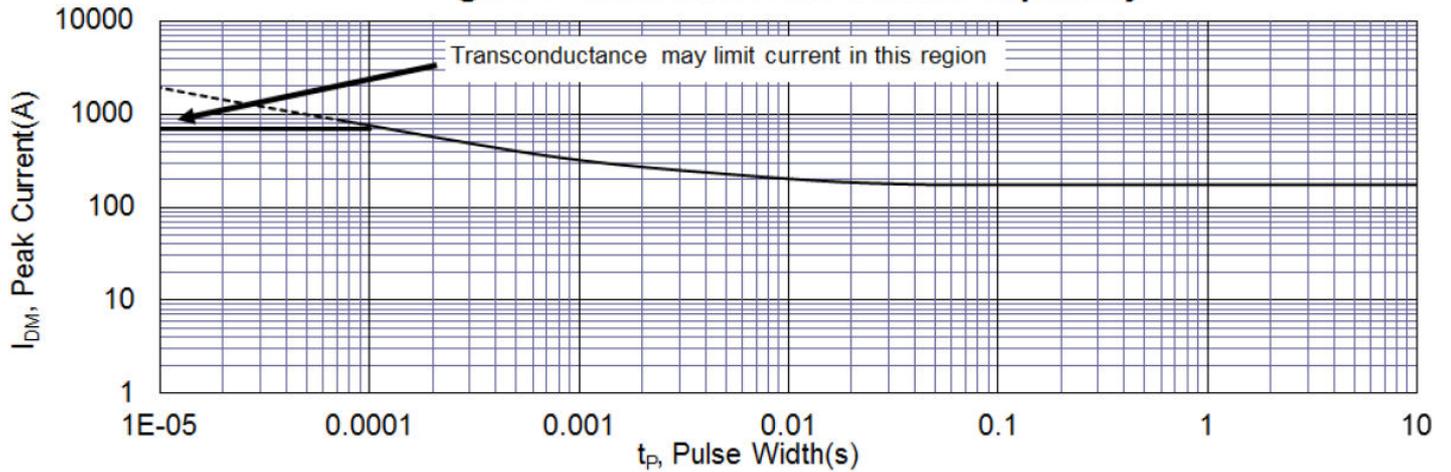
Figure 7. Typical Transfer Characteristics
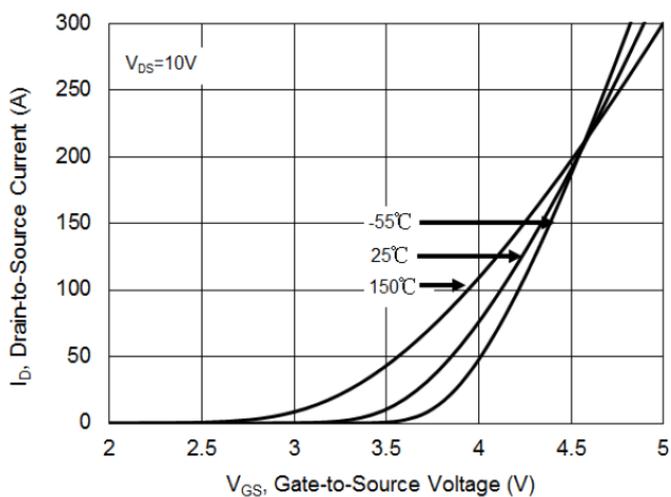
Figure 8. Unclamped Inductive Switching Capability
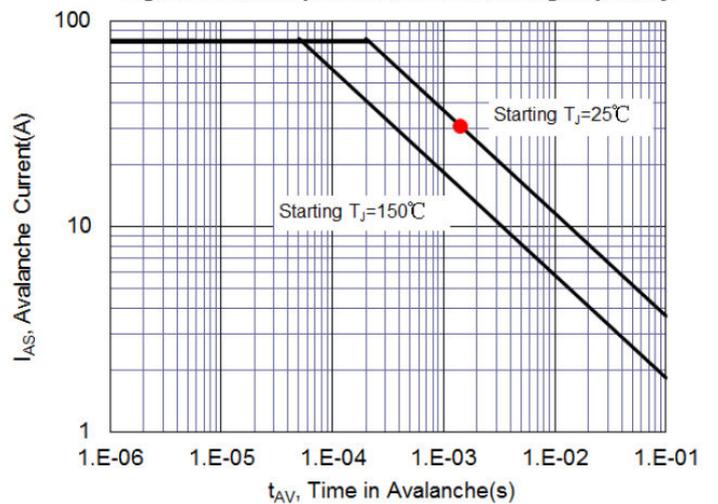
Figure 9. Typical Drain-to-Source ON Resistance
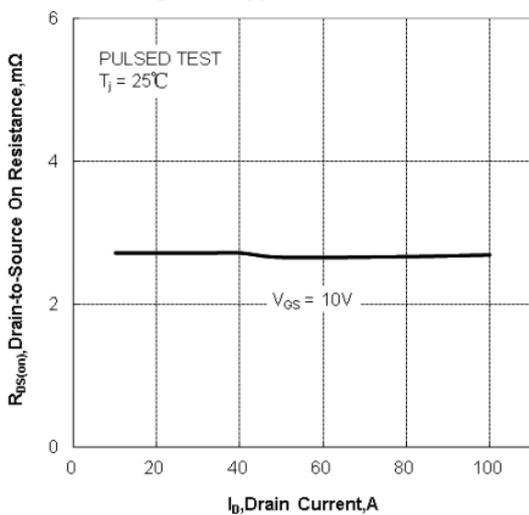
Figure 10. Typical Drain-to-Source On Resistance vs. Junction Temperature

REV.08
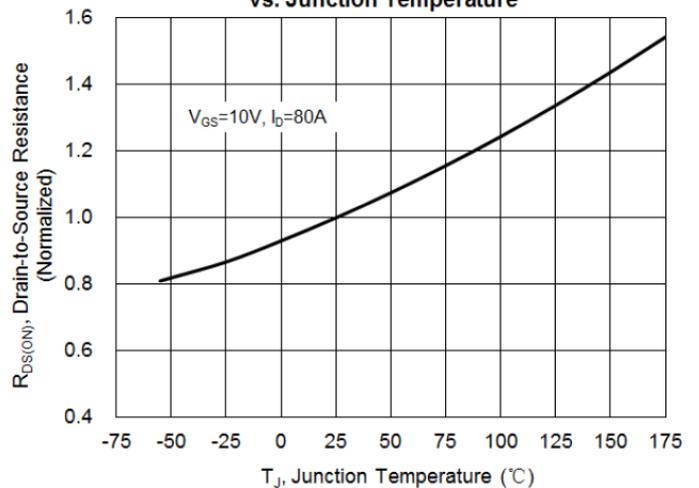
Typical Characteristics(Cont.)

Figure 11. Typical Breakdown Voltage vs. Junction Temperature

$V_{GS}=0V$, $I_D=10mA$
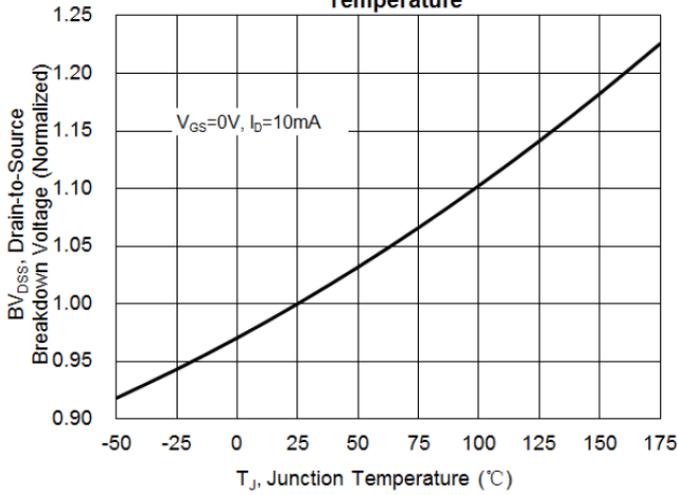
Figure 12. Typical Threshold Voltage vs. Junction Temperature

$V_{GS}=V_{DS}$, $I_D=250uA$
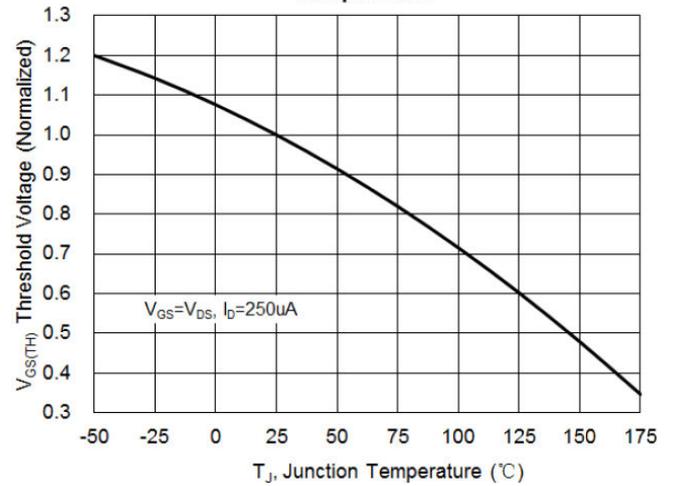
Figure 13. Maximum Forward Safe Operation Area

10us
100us
1ms
10ms
DC

Operating in this area may be limited by RDS(ON)
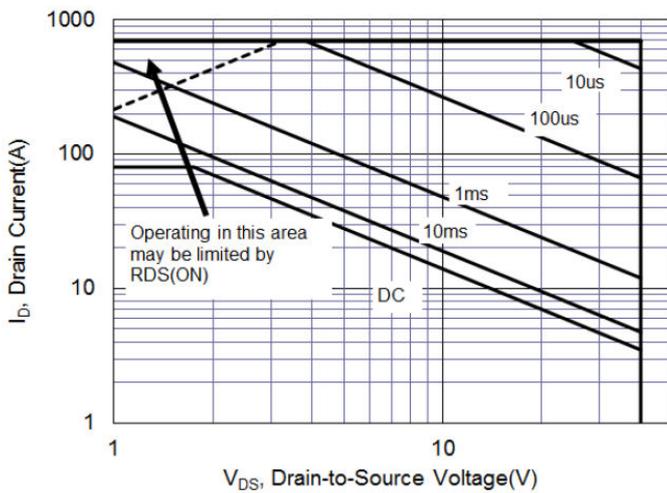
Figure 14. Typical Capacitance vs. Drain-to-Source Voltage

C_{iss}
C_{oss}
C_{rss}

f=1MHz, $V_{GS}=0V$
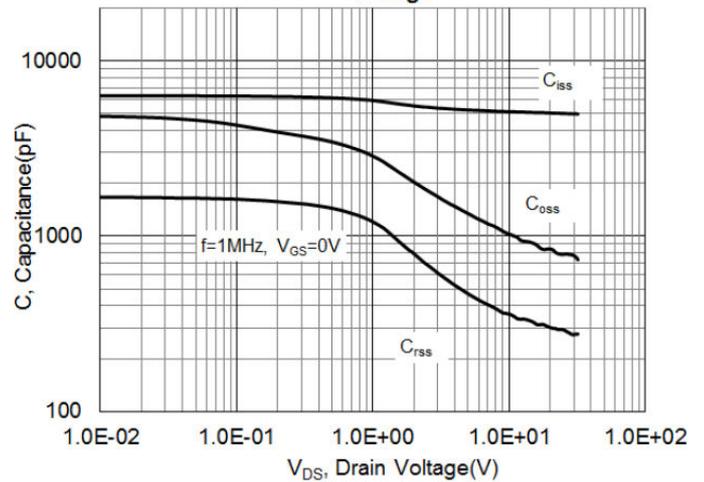
Figure 15. Typical Gate Charge vs. Gate-to-Source Voltage

$V_{DS}=20V$, $I_D=80A$
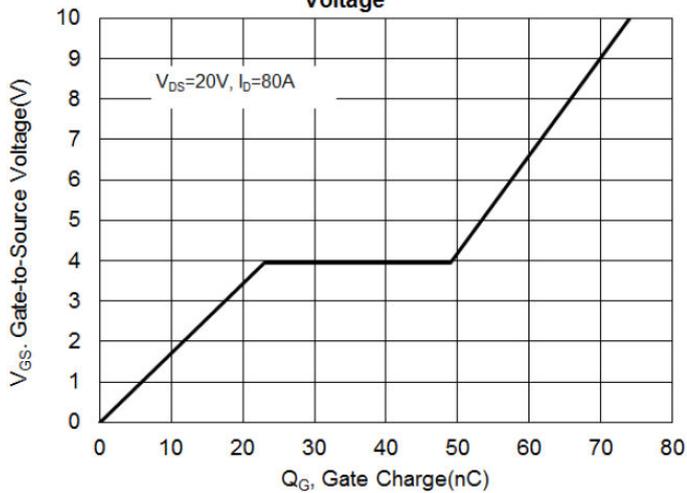
Figure 16. Typical Body Diode Transfer Characteristics

150℃
25℃
-55℃
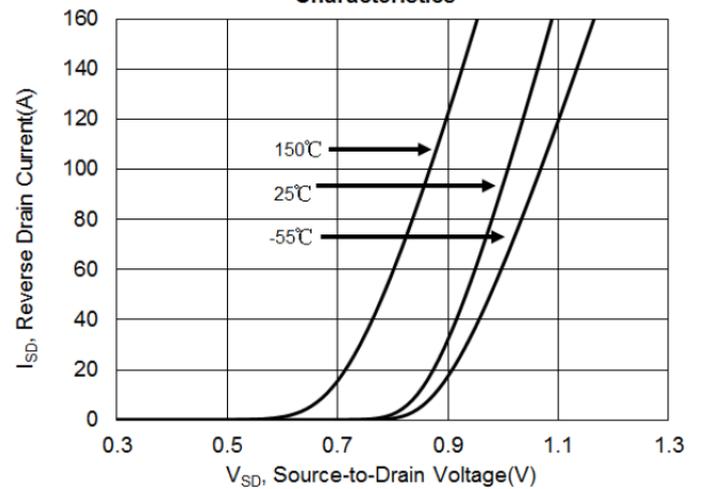
Test Circuits and Waveforms
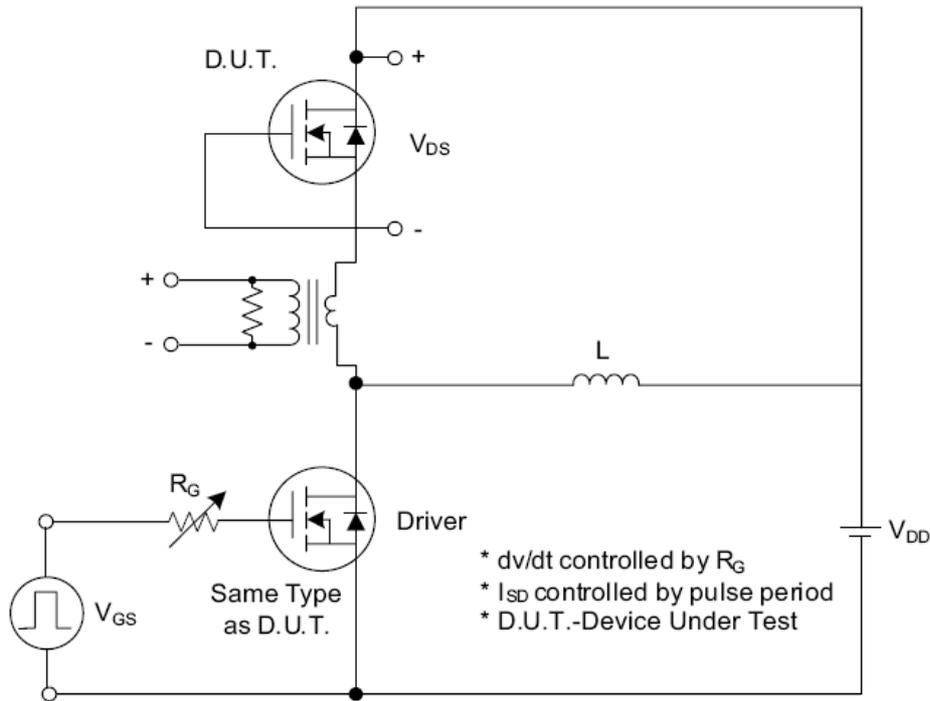
Fig. 1.1 Peak Diode Recovery dv/dt Test Circuit
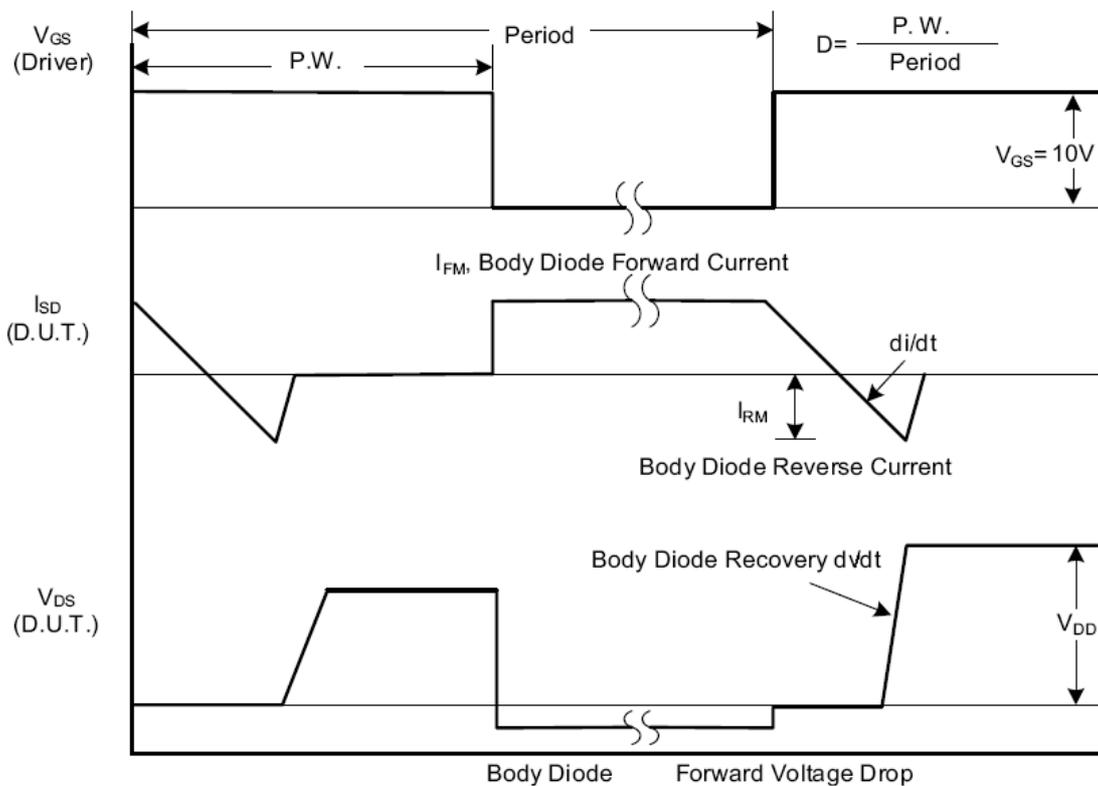
Fig. 1.2 Peak Diode Recovery dv/dt Waveforms

## Test Circuits and Waveforms (Cont.)
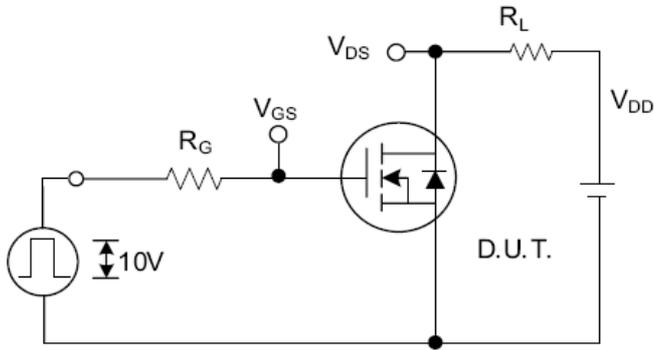
Fig. 2.1 Switching Test Circuit
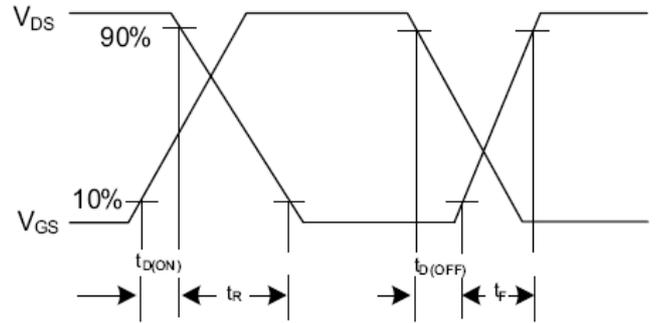
Fig. 2.2 Switching Waveforms
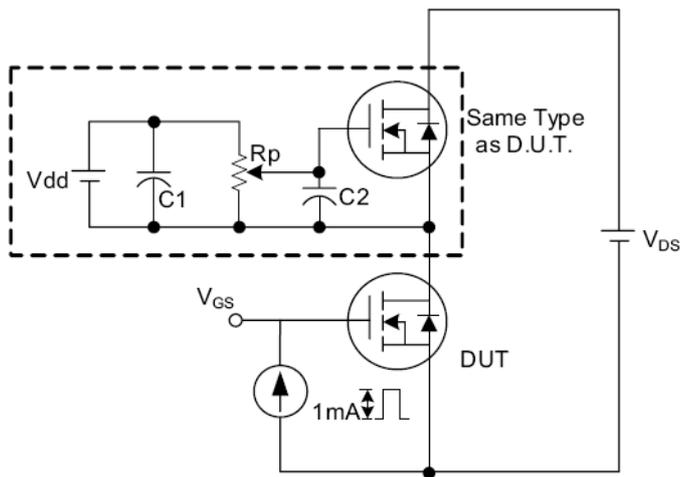
Fig. 3 . 1 Gate Charge Test Circuit
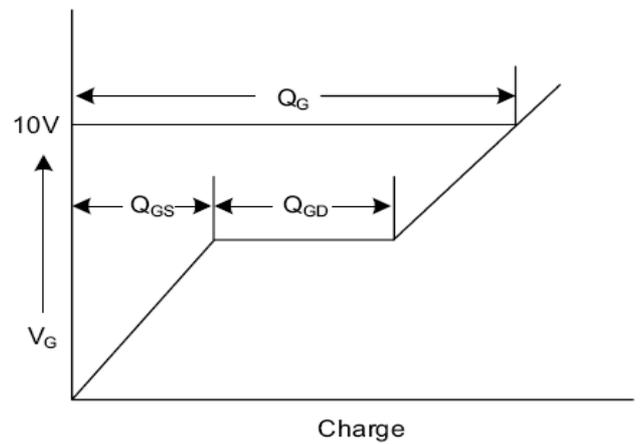
Fig. 3 . 2 Gate Charge Waveform
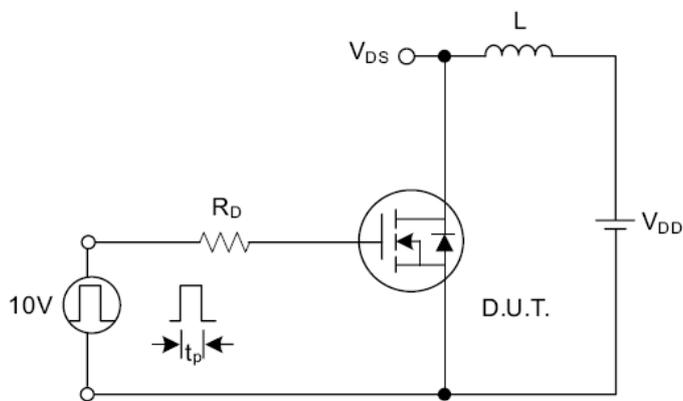
Fig. 4.1 Unclamped Inductive Switching Test Circuit
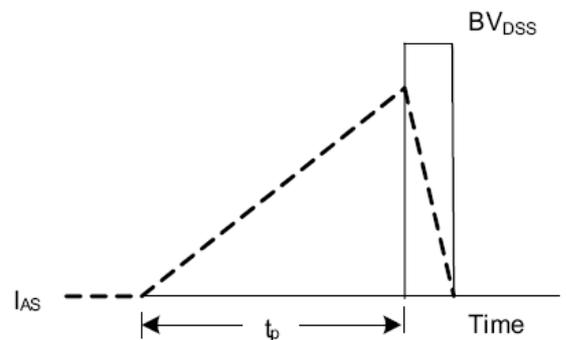
Fig. 4.2 Unclamped Inductive Switching Waveforms

单击下面可查看定价，库存，交付和生命周期等信息

>>SHIKUES(时科)