

**Multi-Epi Super Junction MOSFETs**


Lead Free Package and Finish

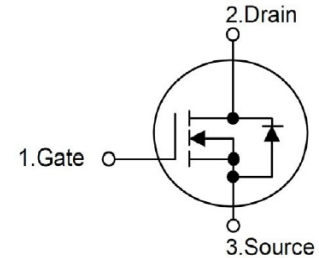
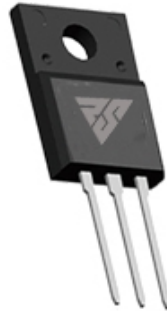
**Applications:**

- Switch Mode Power Supply(SMPS)
- Uninterruptible Power Supply(UPS)
- PFC stages for server & telecom
- Consumer

ID	R <sub>DS(ON)</sub> (Max.)	V <sub>DSS</sub>
12A	420mΩ	650V

**Features:**

- New revolutionary high voltage technology
- Better RDS(on) in TO-220F
- Ultra Low Gate Charge cause lower driving requirements
- Periodic avalanche rated
- Ultra low effective capacitances



Not to Scale

**Ordering Information**

Part Number	Package	Marking
RSU12N65F	TO-220F	RSU12N65F

**Absolute Maximum Ratings** T<sub>c</sub>=25°C unless otherwise specified

Symbol	Parameter	RSU12N65F	Units
V <sub>DSS</sub>	Drain-to-Source Voltage	650	V
I <sub>D</sub>	Continuous Drain Current (T <sub>C</sub> = 25°C)	12	A
	Continuous Drain Current (T <sub>C</sub> = 100°C)	7	
I <sub>DM</sub>	Pulsed Drain Current (Note*1)	44	
P <sub>D</sub>	Power Dissipation(T <sub>c</sub> =25°C)	31	W
V <sub>GS</sub>	Gate-to-Source Voltage	±30	V
E <sub>AS</sub>	Single Pulse Avalanche Energy (Note*2)	120	mJ
I <sub>AR</sub>	Avalanche Current (Note*1)	1.8	A
E <sub>AR</sub>	Repetitive Avalanche Energy (Note*1)	0.32	mJ
T <sub>L</sub> TPKG	Maximum Temperature for Soldering	300 260	°C
	Leads at 0.063in(1.6mm)from Case for 10 seconds		
	Package Body for 10 seconds		
T <sub>J</sub> and T <sub>STG</sub>	Operating Junction and Storage Temperature Range	-55 to 150	

\*Drain Current Limited by Maximum Junction Temperature

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

**Thermal Resistance**

Symbol	Parameter	RSU12N65F	Units	Test Conditions
R <sub>θJC</sub>	Junction-to-Case	4	°C/W	Drain lead soldered to water cooled heatsink,PD Adjusted for a peak junction temperature of +150°C.
R <sub>θJA</sub>	Junction-to-Ambient	78		1 cubic foot chamber,free air.

**OFF Characteristics**  $T_J=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
BVDSS	Drain-to-source Breakdown Voltage	650	--	--	V	$V_{GS} = 0V, I_D = 250\mu A, T_J = 25^{\circ}\text{C}$
		--	650	--	V	$V_{GS} = 0V, I_D = 250\mu A, T_J = 150^{\circ}\text{C}$
IDSS	Drain-to-Source Leakage Current	--	--	1.0	$\mu A$	$V_{DS}=650V, V_{GS}=0V$
IGSS	Gate-to-Source Forward Leakage	--	--	100	nA	$V_{GS}=+30V, V_{DS}=0V$
	Gate-to-Source Reverse Leakage	--	--	-100		$V_{GS}=-30V, V_{DS}=0V$

**ON Characteristics**  $T_J=25^{\circ}\text{C}$  unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
RDS(on)	Static Drain-to-Source On-Resistance	--	380	420	m $\Omega$	$V_{GS}=10V, I_D=6A$
VGS(TH)	Gate Threshold Voltage	3.5	4	4.5	V	$V_{GS}=V_{DS}, I_D=250\mu A$
gfs	Transconductance		40		S	$V_{DS}=20V, I_D=6A$

**Resistive Switching Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
td(ON)	Turn-on Delay Time	--	21	--	ns	$V_{DS}=400V, I_D=6A, R_G=25\Omega, V_{GS}=10V$
trise	Rise Time	--	20	--		
td(OFF)	Turn-OFF Delay Time	--	51			
tfall	Fall Time	--	40			

**Dynamic Characteristics** Essentially independent of operating temperature

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
Ciss	Input Capacitance	--	850	--	pF	$V_{GS}=0V, V_{DS}=100V, f=1.0\text{MHz}$
Coss	Output Capacitance	--	35	--		
Crss	Reverse Transfer Capacitance	--	5	--		
Qg	Total Gate Charge	--	19	--	nC	$V_{DS}=520V, I_D=12A, V_{GS}=10V$
Qgs	Gate-to-Source Charge	--	6	--		
Qgd	Gate-to-Drain("Miller") Charge	--	6	--		

**Source-Drain Diode Characteristics**

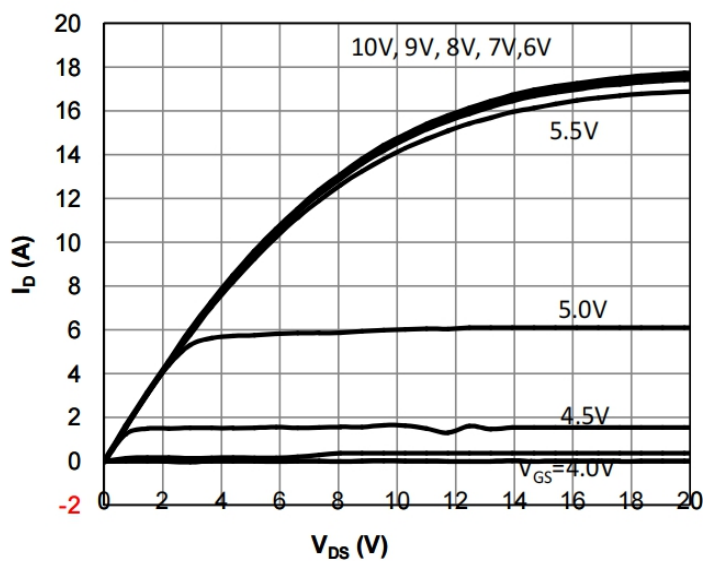
Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions
IS	Continuous Source Current	--	--	12	A	Integral pn-diode in MOSFET
ISM	Maximum Pulsed Current	--	--	44	A	
VSD	Diode Forward Voltage	--	0.9	1.2	V	IS=12A, VGS=0V Tj=25°C
trr	Reverse Recovery Time	--	212	--	nS	VR=400V, VGS=0V IS=12A, di/dt=100A/μs
Qrr	Reverse Recovery Charge	--	2.28	--	μC	

**Notes:**

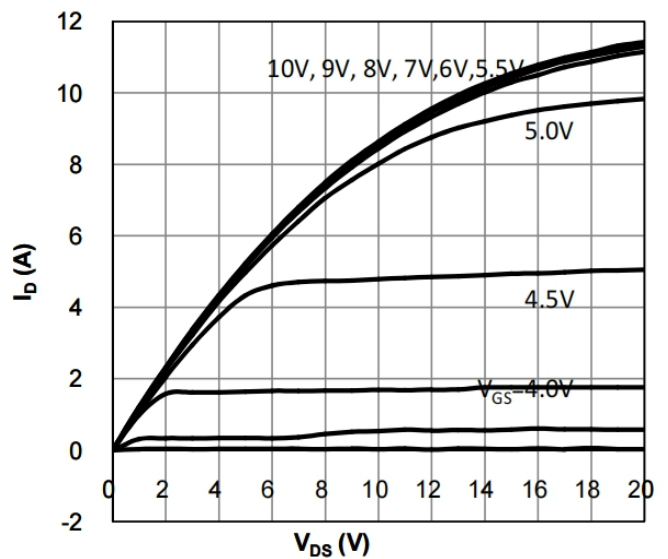
- \*1.Repetitive rating;pulse width limited by maximum junction temperature.
- \*2. IAS = 1.8A, VDD = 50V, RG = 25Ω, Starting Tj = 25°C Pulse width tp limited by Tj,max

**Typical Feature curve** Tj=25°C, unless otherwise noted

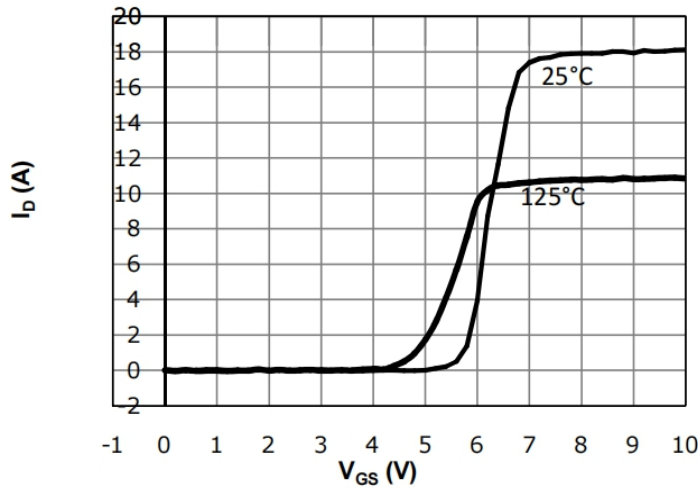
**Fig 1. Output Characteristics (Tj=25°C)**



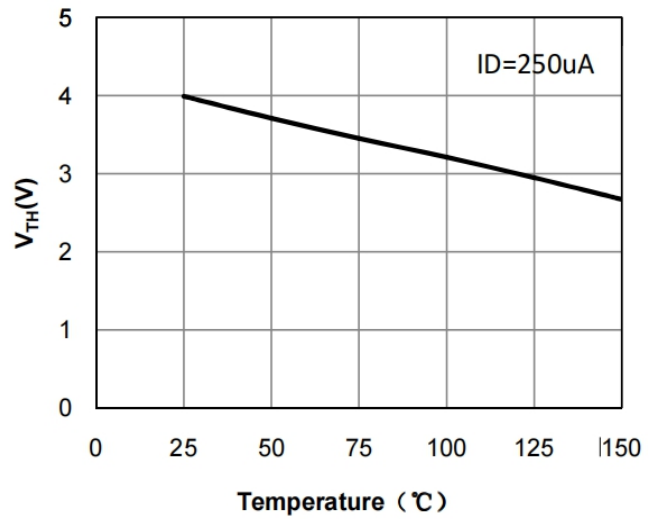
**Fig 2. Output Characteristics (Tj=125°C)**



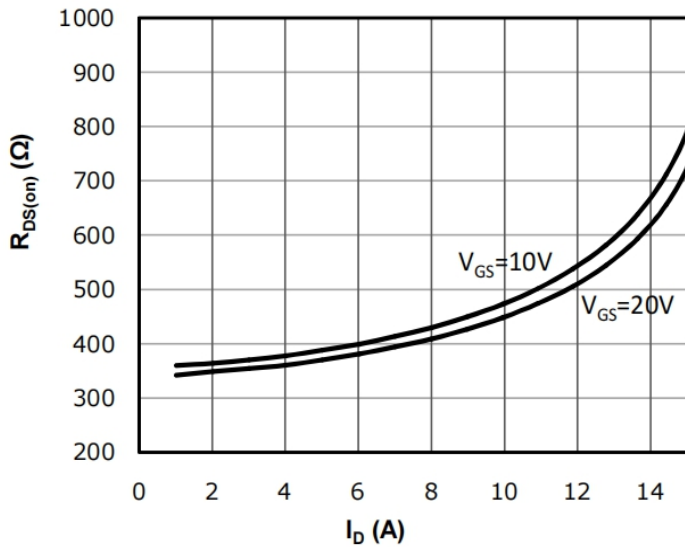
**Fig 3: Transfer Characteristics**



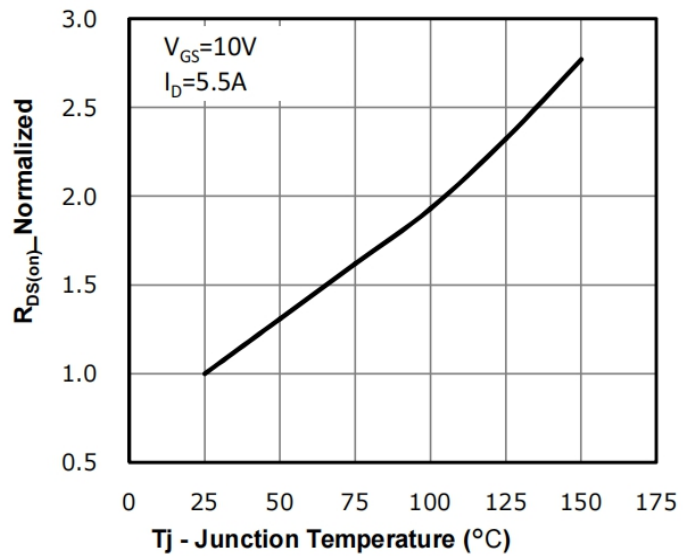
**Fig 4:  $V_{TH}$  Vs  $T_J$  Temperature Characteristics**



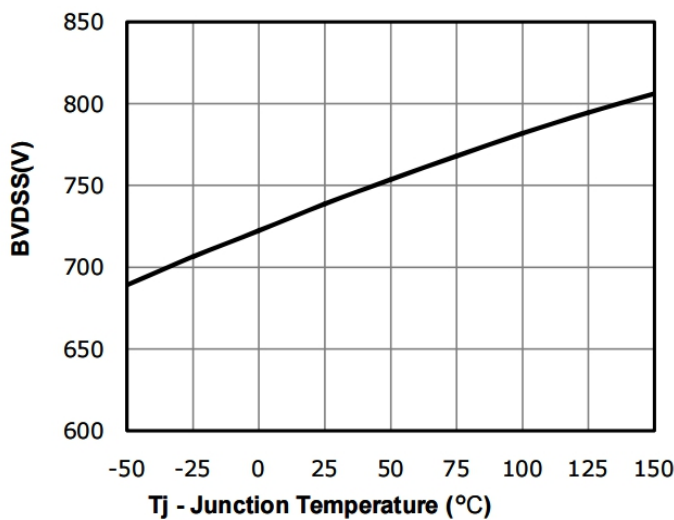
**Fig 5:  $R_{DS(on)}$  Vs  $I_{DS}$  Characteristics ( $T_C = 25^{\circ}C$ )**



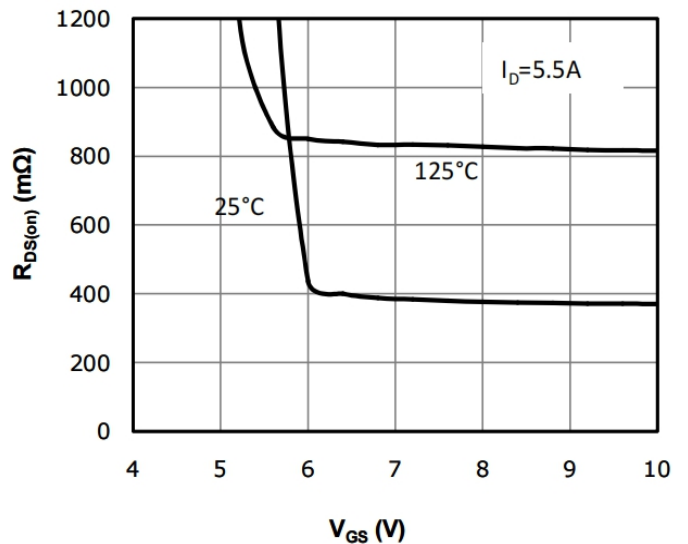
**Fig 6:  $R_{DS(on)}$  vs. Temperature**



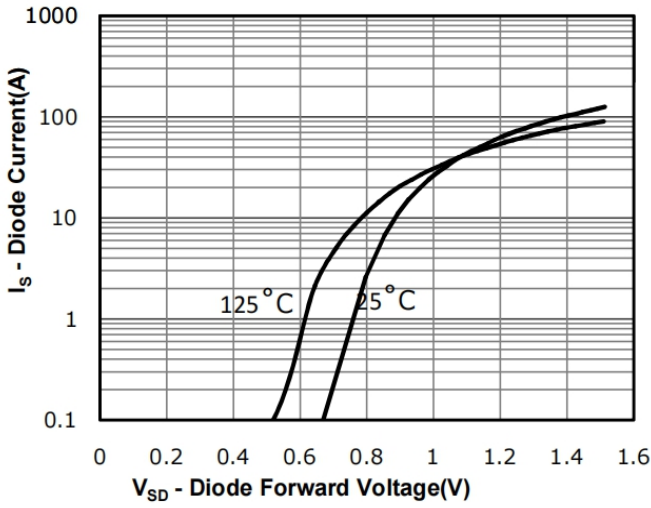
**Fig 7: BVDSS vs. Temperature Characteristics**



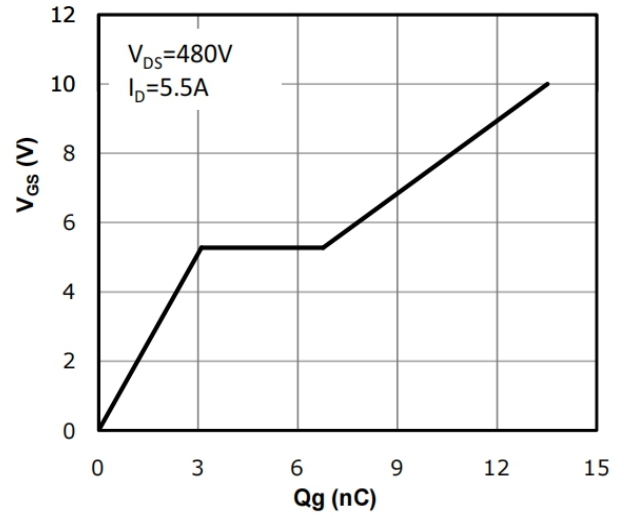
**Fig 8:  $R_{DS(on)}$  vs Gate Voltage**



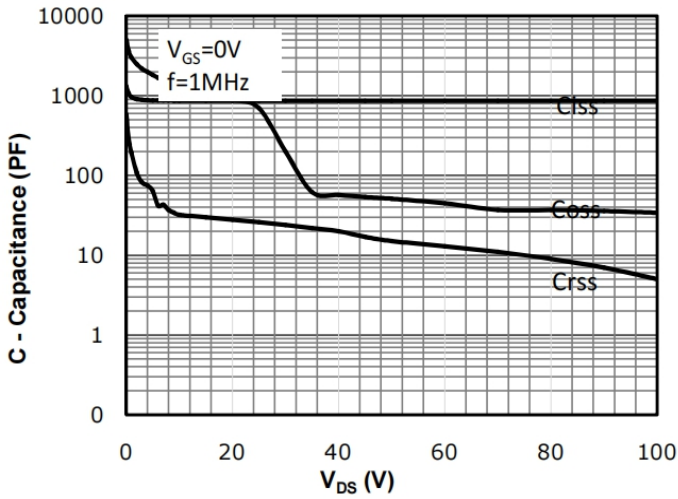
**Fig 9: Body-diode Forward Characteristics**



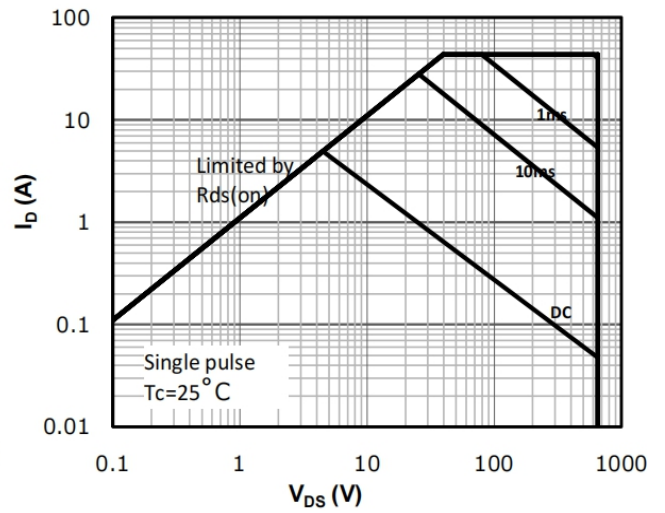
**Fig 10: Gate Charge Characteristics**



**Fig 11: Capacitance Characteristics**

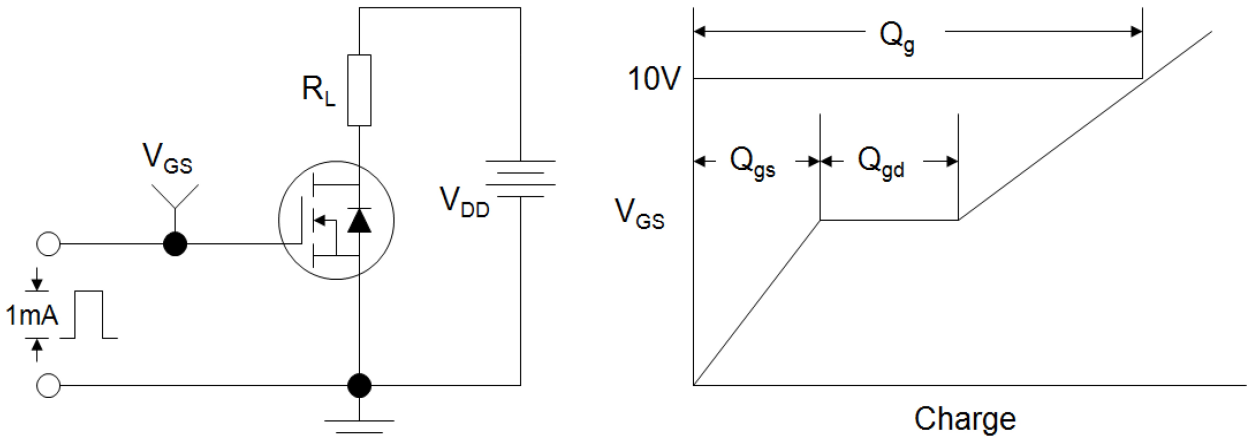


**Fig 12: Safe Operating Area**

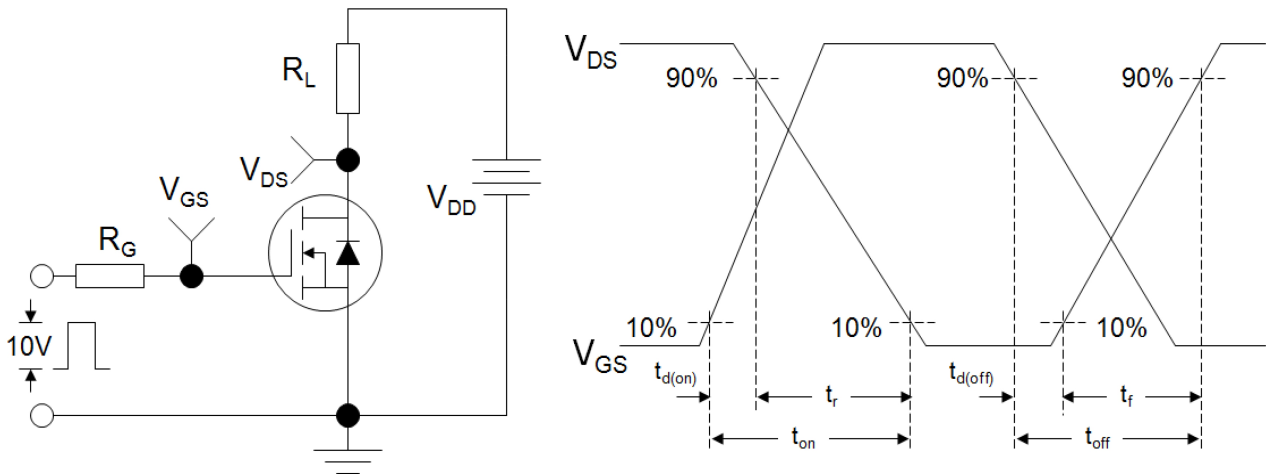


**Test Circuits and Waveforms**

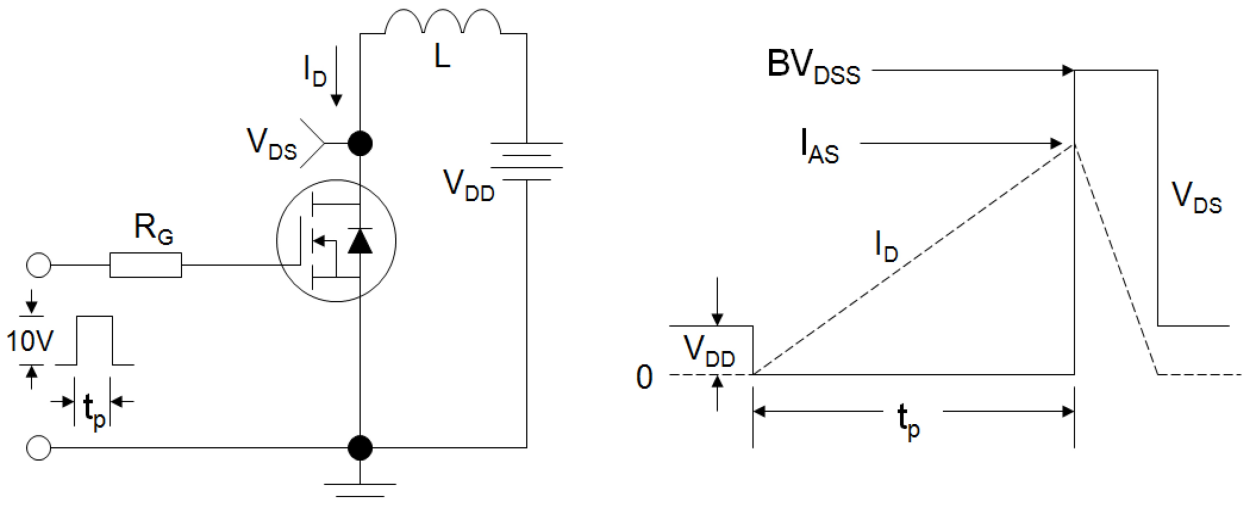
**Figure A: Gate Charge Test Circuit and Waveform**



**Figure B: Resistive Switching Test Circuit and Waveform**

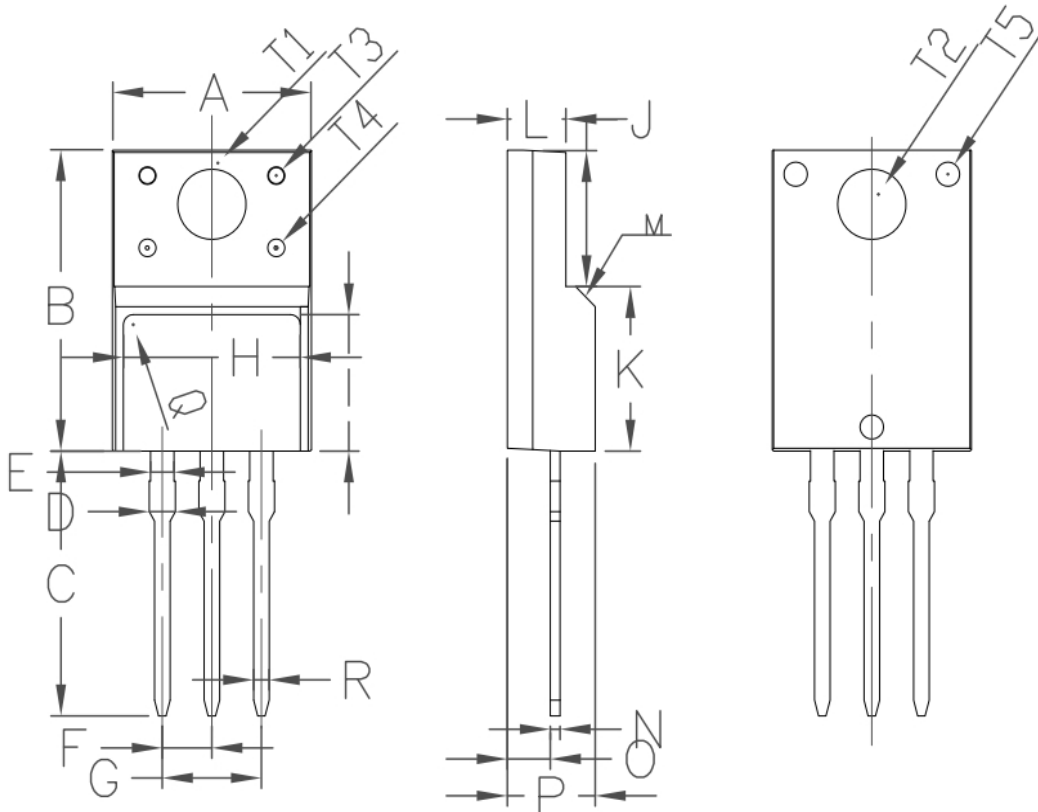


**Figure C: Unclamped Inductive Switching Test Circuit and Waveform**



**Package outline drawing**

Unit:mm



Symbol	Min	Non	Max
A	9.96	10.16	10.36
B	15.67	15.87	16.07
C	13.14	13.34	13.54
D	1.20	1.30	1.40
E		1.20	
F		2.54	
G		5.08	
H	7.60	7.80	8.00
I	7.10	7.30	7.50
J	6.48	6.68	6.88
K	8.99	9.19	9.39
L	2.34	2.54	2.74
M		45°	
N	0.49	0.50	0.52
O	2.15	2.35	2.55
P	4.50	4.70	4.90
Q		0.50	
S	4°	4.5°	5°
T1		3.45	
T2		3.18	
T3		1.50	
T4		1.20	
T5		1.50	
R	0.77	0.8	0.83

**Disclaimers:**

Reasunos Semiconductor Technology CO.,LTD(Reasunos)reserves the right to make changes without notice in order to improve reliability,function or design and to discontinue any product or service without notice .Customers should obtain the latest relevant information before orders and should verify that such information in current and complete.All products are sold subject to Reasunos's terms and conditions supplied at the time of order acknowledgement.

Reasunos Semiconductor Technology CO.,LTD warrants performance of its hardware products to the specifications at the time of sale.Testing, reliability and quality control are used to the extene Reasunos deems necessary to support this warrantee. Except where agreed upon by contractual agreement,testing of all parameters of each product is not necessarily performed.

Reasunos Semiconductor Technology CO.,LTD does not assume any liability arising from the use of any product or circuit designs described herein.Customers are responsible for their products and applications using Reasunos's components.To minimize risk,customers must provide adequate design and operating safeguards.

Reasunos Semiconductor Technology CO.,LTD does not warrant or convey any license either expressed or implied under its patent rights,nor the rights of others.Reproduction of information in Reasunos's data sheeets or data books is permissible only if reproduction is without modification oralteration.Reproduction of this information with any alteration is an unfair and deceptive business practice. Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such altered documentation.

Resale of Reasunos's products with statements different from or beyond the parameters stated by Reasunos Semiconductor Technology CO.,LTD for that product or service voids all express or implied warranties for the associated Reasunos's product or service and is unfair and deceptive business practice. Reasunos Semiconductor Technology CO.,LTD is not responsible or liable for such statements.

---

**Life Support Policy:**

Reasunos Semiconductor Technology CO.,LTD's Products are not authorized for use as critical components in life support devices or systems without the expressed written approval of Reasunos Semiconductor Technology CO.,LTD.

As used herein:

- 1.Life support devices or systems are devices or systems which:
  - a.are intended for surgical implant into the human body,
  - b.support or sustain life,
  - c.whose failuer to when properly used in accordance with instructions for used provided in the laeling,can be reasonably expected to result in significant injury to the user.

system whose failure to perform can be reasonably expected to cause the failure of the life support device or system,or to affect its safety or effectiveness.

---



## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [MOSFET](#) category:*

*Click to view products by [REASUNOS](#) manufacturer:*

Other Similar products are found below :

[IRFD120](#) [JANTX2N5237](#) [2SK2267\(Q\)](#) [BUK455-60A/B](#) [TK100A10N1,S4X\(S](#) [MIC4420CM-TR](#) [VN1206L](#) [NDP4060](#) [SI4482DY](#)  
[IRS2092STRPBF-EL](#) [IPS70R2K0CEAKMA1](#) [TK31J60W5,S1VQ\(O](#) [TK31J60W,S1VQ\(O](#) [TK16J60W,S1VQ\(O](#) [2SK2614\(TE16L1,Q\)](#)  
[DMN1017UCP3-7](#) [EFC2J004NUZTDG](#) [P85W28HP2F-7071](#) [NTE2384](#) [DMC2700UDMQ-7](#) [DMN2080UCB4-7](#) [DMN61D9UWQ-13](#)  
[US6M2GTR](#) [DMN31D5UDJ-7](#) [DMP22D4UFO-7B](#) [IPS60R3K4CEAKMA1](#) [DMN1006UCA6-7](#) [DMN16M9UCA6-7](#) [STF5N65M6](#)  
[IRF40H233XTMA1](#) [STU5N65M6](#) [DMN6022SSD-13](#) [DMN13M9UCA6-7](#) [DMTH10H4M6SPS-13](#) [IPS60R360PFD7SAKMA1](#)  
[DMN2990UFB-7B](#) [SSM3K35CT,L3F](#) [IPLK60R1K0PFD7ATMA1](#) [2N7002W-G](#) [MCAC30N06Y-TP](#) [IPWS65R035CFD7AXKSA1](#)  
[MCQ7328-TP](#) [SSM3J143TU,LXHF](#) [DMN12M3UCA6-7](#) [PJMF280N65E1\\_T0\\_00201](#) [PJMF380N65E1\\_T0\\_00201](#)  
[PJMF280N60E1\\_T0\\_00201](#) [PJMF600N65E1\\_T0\\_00201](#) [PJMF900N65E1\\_T0\\_00201](#) [PJMF900N60E1\\_T0\\_00201](#)