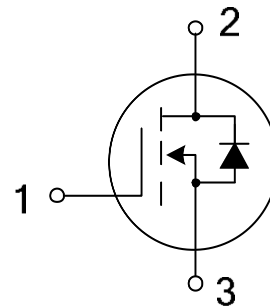
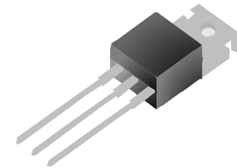
Features

- 650V,12A
  $R_{DS(ON)}$ <800mΩ@V_{GS}=10V TYP:605mΩ
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability



Applications

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)
- LED lighting power



TO-220

Package Marking and Ordering Information

Device Marking	Device	Device Package	Reel Size	Tape width	Quantity (PCS)
12N65	AP12N65	TO-220	-	-	1000

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	650	V
Gate-Source Voltage	V_{GS}	±30	V
Continuous Drain Current (T_a =25℃)	I_D	12	A
Avalanche Current(1)	I_{AS}	48	A
Pulsed Drain Current (1)	I_{DM}	48	A
Single Pulsed Avalanche Energy (2)	E_{AS}	311	mJ
Power Dissipation	P_D	225	W
Thermal Resistance from Junction to Case	$R_{\theta JC}$	0.56	℃/W
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	62.5	℃/W
Junction Temperature	T_J	150	℃
Storage Temperature	T_{STG}	-55~ +150	℃

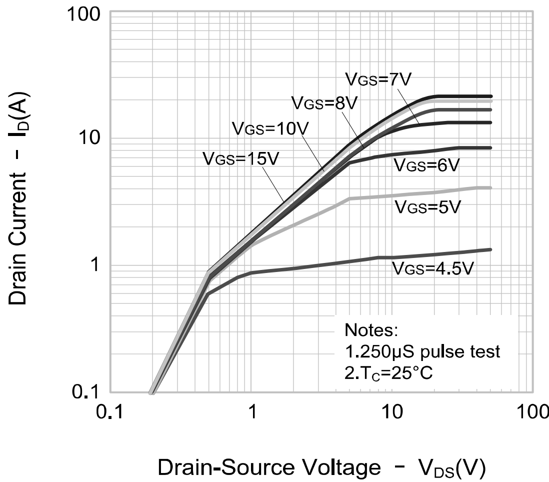
MOSFET ELECTRICAL CHARACTERISTICS(T_a=25℃ unless otherwise noted)

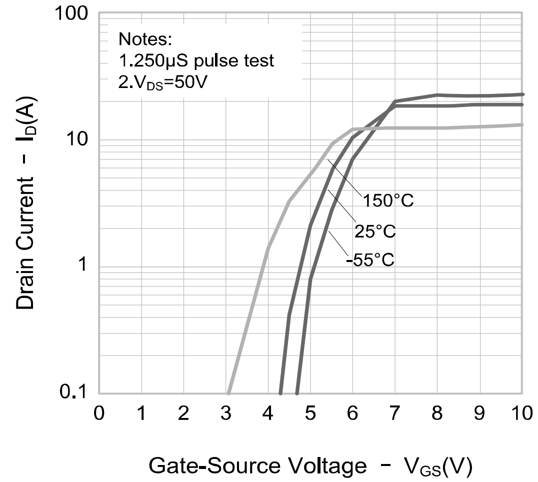
Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Static Characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS} = 0V, I_D =250μA	650	-	-	V
Zero gate voltage drain current	I_{DSS}	V_{DS} =650V, V_{GS} = 0V,T_J=25℃	-	-	1	μA
Gate-body leakage current	I_{GSS}	V_{GS} =±30V, V_{DS} = 0V	-	-	±100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS} =V_{GS}, I_D =250μA	2.0	3.0	4.0	V
Drain-source on-resistance(3)	$R_{DS(on)}$	V_{GS} =10V, I_D =3.0A	-	573	790	mΩ
		V_{GS} =10V, I_D =6.0A		605	800	mΩ
Dynamic characteristics						
Input Capacitance	C_{iss}	V_{DS} =25V, V_{GS} =0V, f =1.0MHz	-	2100	-	pF
Output Capacitance	C_{oss}		-	162.6	-	
Reverse Transfer Capacitance	C_{rss}		-	7.0	-	
Switching characteristics						
Turn-on delay time	$t_{d(on)}$	V_{DD}=325V, I_D=12A, R_G=25Ω	-	27.6	-	ns
Turn-on rise time	t_r		-	52.6	-	
Turn-off delay time	$t_{d(off)}$		-	75.2	-	
Turn-off fall time	t_f		-	42.5	-	
Total Gate Charge	Qg	V_{DS}=520V, I_D=12A, V_{GS}=10V	-	37	-	nC
Gate-Source Charge	Qgs		-	7.4	-	
Gate-Drain Charge	Qgd		-	18	-	
Source-Drain Diode characteristics						
Diode Forward voltage	V_{SD}	T_J=25℃, V_{GS} =0V, I_S=12A	-	-	1.4	V
Diode Forward current	I_S	T_C=25℃	-	-	12	A
Body Diode Reverse Recovery Time	trr	T_J=25℃，IF=12A,di/dt=100A/us		566		ns
Body Diode Reverse Recovery Charge	Qrr	T_J=25℃，IF=12A,di/dt=100A/us		58		uc

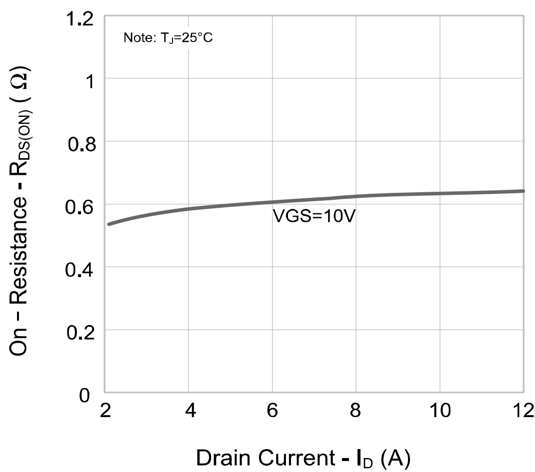
Notes:

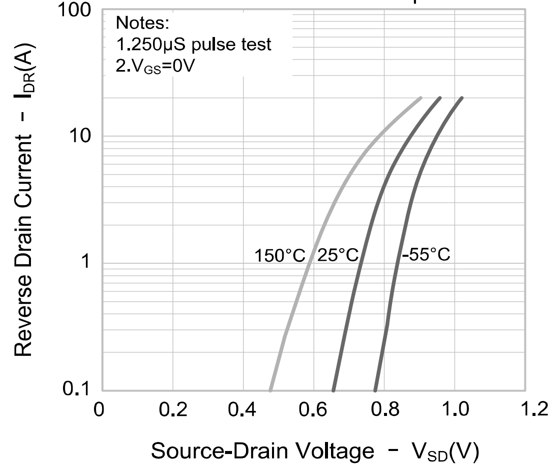
1. Pluse width limited by maximum junction temperature
2. L=20mH, VDD=100V, VG=10V, RG=25Ω, starting TJ=25℃
3. Pulse Test: Pulse width ≤300μs, Duty cycle≤2%
4. Essentially independent of operating temperature

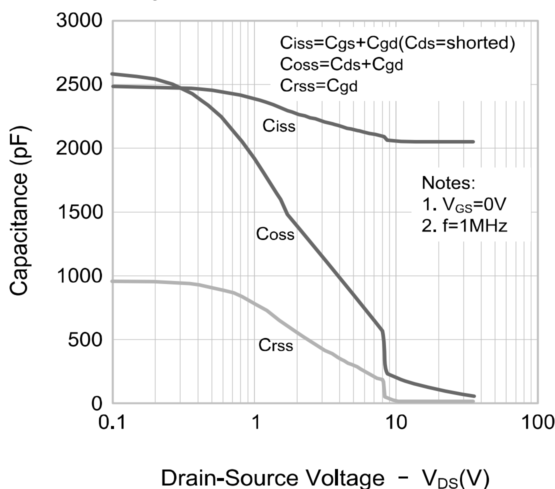
Typical Performance Characteristics

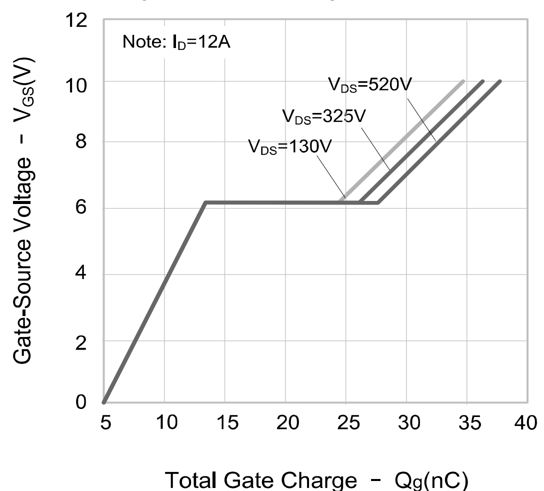




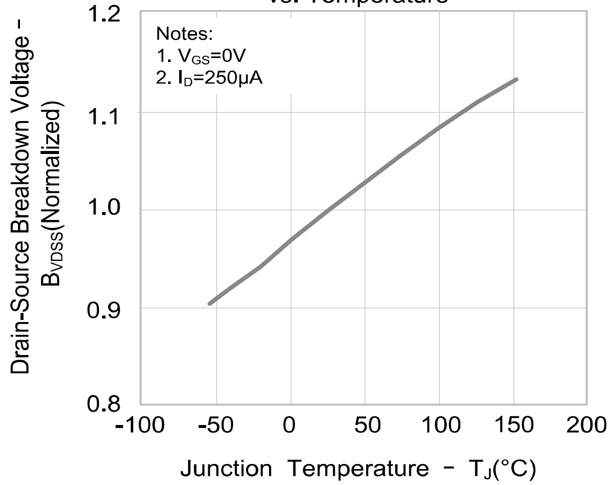


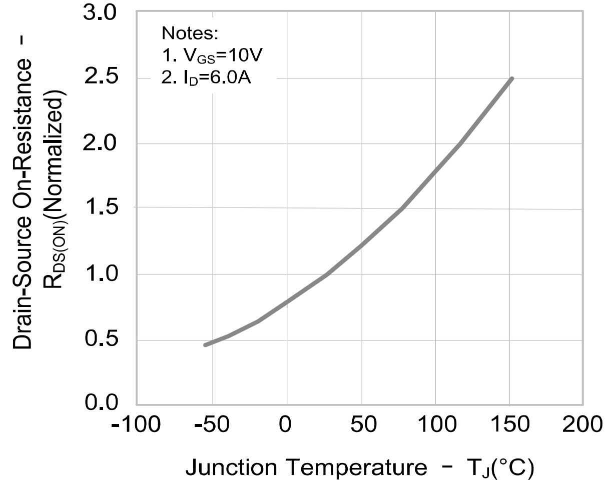


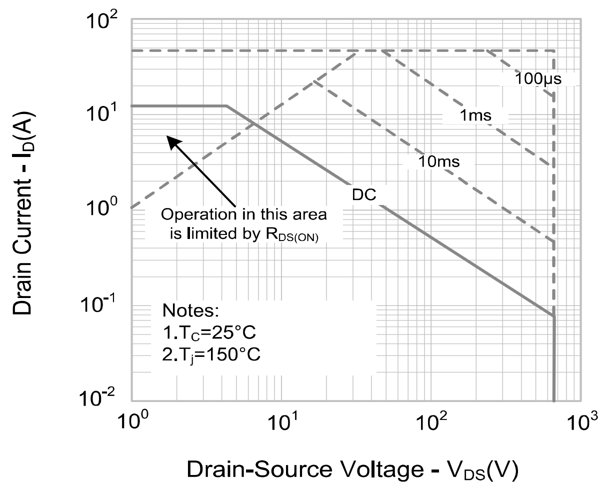




Typical Performance Characteristics

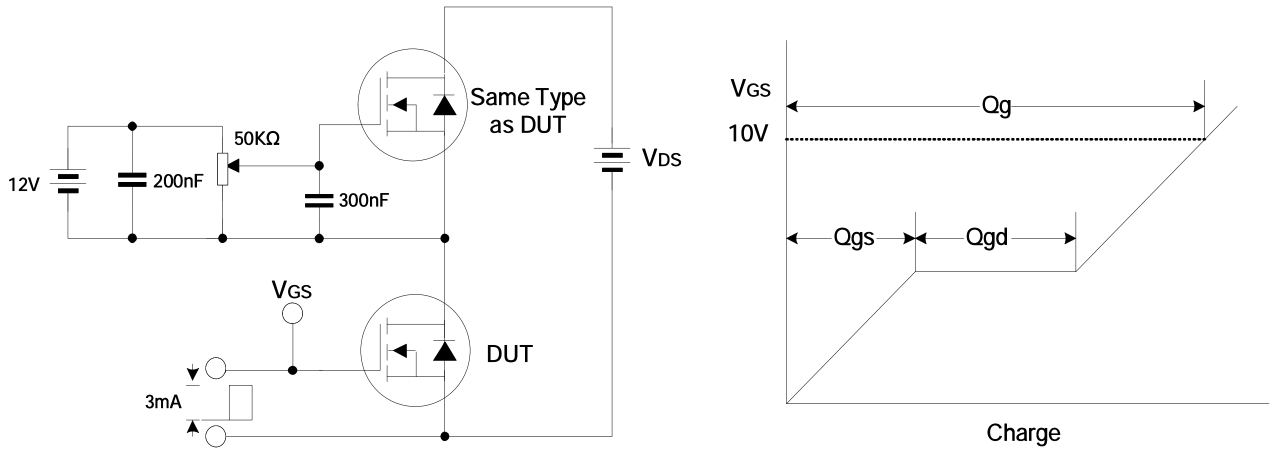




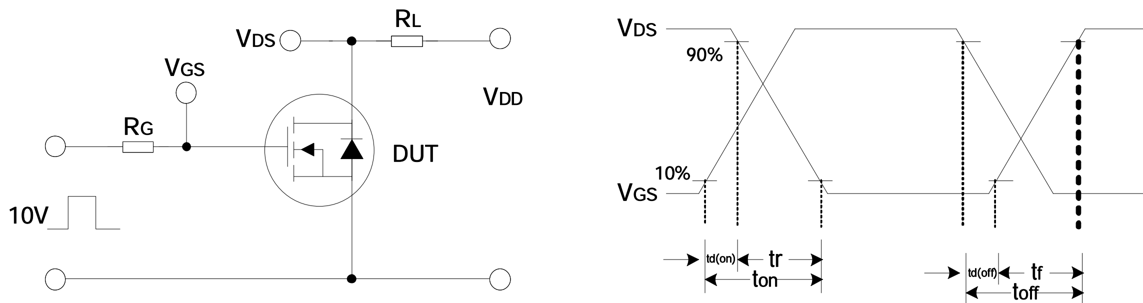


TYPICAL TEST CIRCUIT

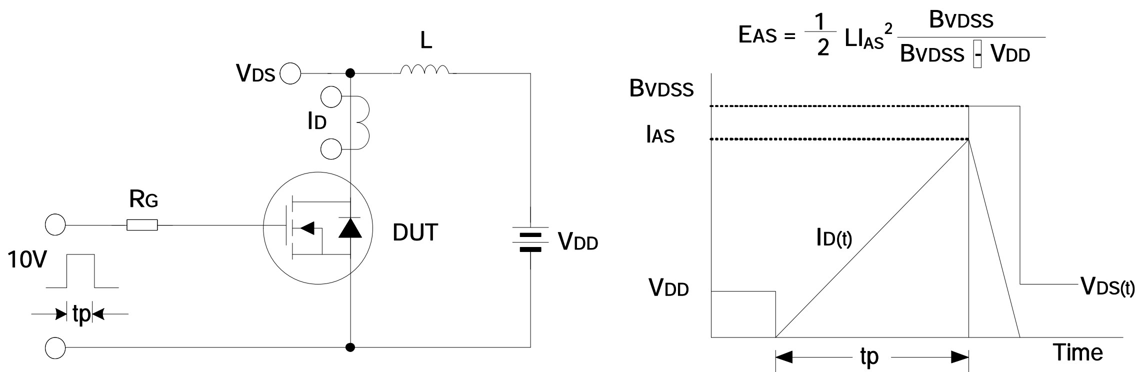
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveform



Unclamped Inductive Switching Test Circuit & Waveform



PACKAGE OUTLINE(continued)

TO-220 UNIT: mm