

### FEATURES

- Advanced trench process technology
- avalanche energy, 100% test
- Fully characterized avalanche voltage and current
- Lead free product

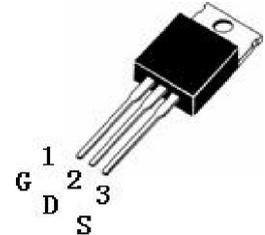
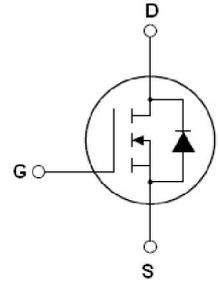
### DESCRIPTION

The SSF6010 is a new generation of middle voltage and high current N-Channel enhancement mode trench power MOSFET. This new technology increases the device reliability and electrical parameter repeatability. SSF6010 is assembled in high reliability and qualified assembly house.

### APPLICATIONS

- Power switching application

$I_D = 64A$   
 $BV = 60V$   
 $R_{DS(ON)} = 11m\Omega$  (typ.)



SSF6010 Top View (TO-220)

### Absolute Maximum Ratings

	Parameter	Max.	Units
$I_D @ T_c = 25^\circ C$	Continuous drain current, $V_{GS} @ 10V$	64	A
$I_D @ T_c = 100^\circ C$	Continuous drain current, $V_{GS} @ 10V$	45	
$I_{DM}$	Pulsed drain current ①	300	
$P_D @ T_c = 25^\circ C$	Power dissipation	144	W
	Linear derating factor	0.74	W/°C
$V_{GS}$	Gate-to-Source voltage	$\pm 20$	V
$E_{AS}$	Single pulse avalanche energy ②	220	mJ
$E_{AR}$	Repetitive avalanche energy	TBD	
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +175	°C

### Thermal Resistance

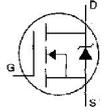
	Parameter	Min.	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case	—	1.04	—	°C/W
$R_{\theta JA}$	Junction-to-ambient	—	—	62	

### Electrical Characteristics @ $T_J = 25^\circ C$ (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$BV_{DSS}$	Drain-to-Source breakdown voltage	60	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	11	13	m $\Omega$	$V_{GS} = 10V, I_D = 30A$
$V_{GS(th)}$	Gate threshold voltage	2.0	—	4.0	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
$g_{fs}$	Forward transconductance	—	58	—	S	$V_{DS} = 5V, I_D = 30A$
$I_{DSS}$	Drain-to-Source leakage current	—	—	2	$\mu A$	$V_{DS} = 60V, V_{GS} = 0V$
		—	—	10		$V_{DS} = 60V,$ $V_{GS} = 0V, T_J = 150^\circ C$
$I_{GSS}$	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
	Gate-to-Source reverse leakage	—	—	-100		$V_{GS} = -20V$

$Q_g$	Total gate charge	—	45	—	nC	$I_D=30A$ $V_{DD}=30V$ $V_{GS}=10V$
$Q_{gs}$	Gate-to-Source charge	—	4.2	—		
$Q_{gd}$	Gate-to-Drain("Miller") charge	—	15	—		
$t_{d(on)}$	Turn-on delay time	—	14.6	—	nS	$V_{DD}=30V$ $I_D=2A, R_L=15\Omega$ $R_G=2.5\Omega$ $V_{GS}=10V$
$t_r$	Rise time	—	14.2	—		
$t_{d(off)}$	Turn-Off delay time	—	40	—		
$t_f$	Fall time	—	7.3	—		
$C_{iss}$	Input capacitance	—	1480	—	pF	$V_{GS}=0V$ $V_{DS}=25V$ $f=1.0MHZ$
$C_{oss}$	Output capacitance	—	190	—		
$C_{rss}$	Reverse transfer capacitance	—	135	—		

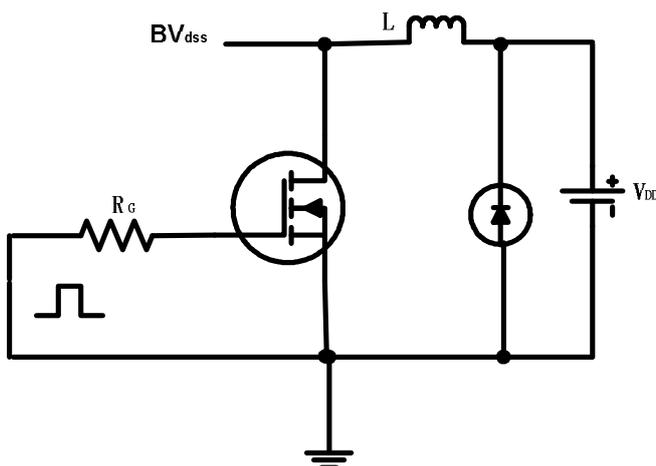
### Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Test Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	75	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode) ①	—	—	300		
$V_{SD}$	Diode Forward Voltage	—	—	1.3	V	$T_J=25^\circ C, I_S=40A, V_{GS}=0V$ ③
$t_{rr}$	Reverse Recovery Time	—	33	—	nS	$T_J=25^\circ C, I_F=60A$ $di/dt=100A/\mu s$ ③
$Q_{rr}$	Reverse Recovery Charge	—	61	—	nC	
$t_{on}$	Forward Turn-on Time	Intrinsic turn-on time is negligible (turn-on is dominated by $L_S + L_D$ )				

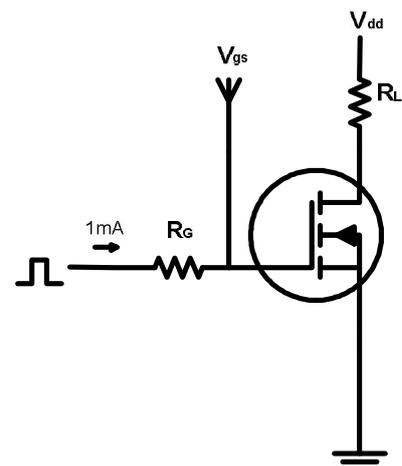
#### Notes:

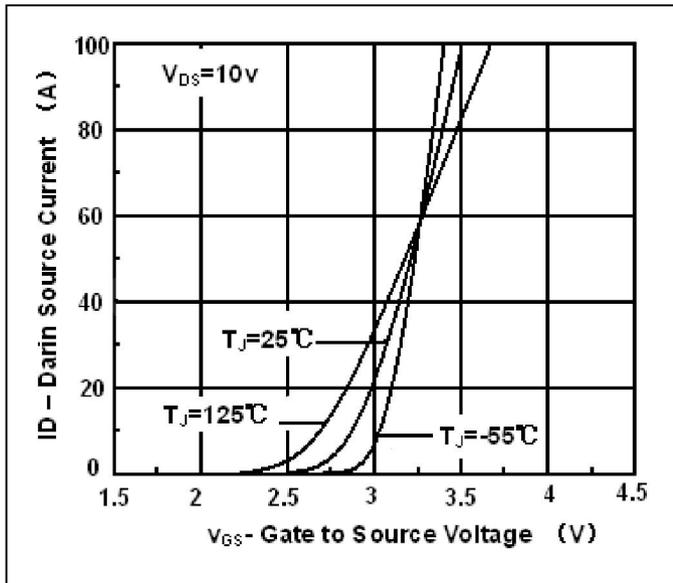
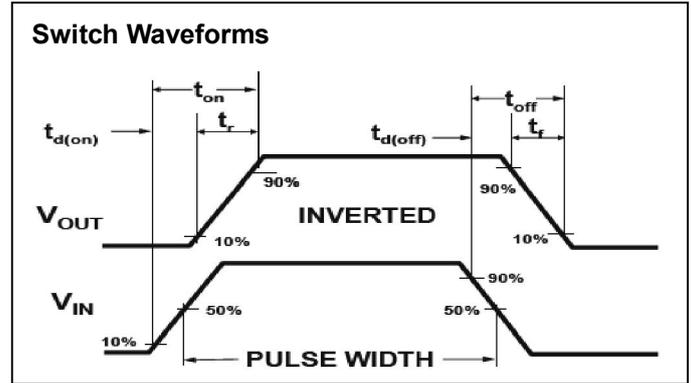
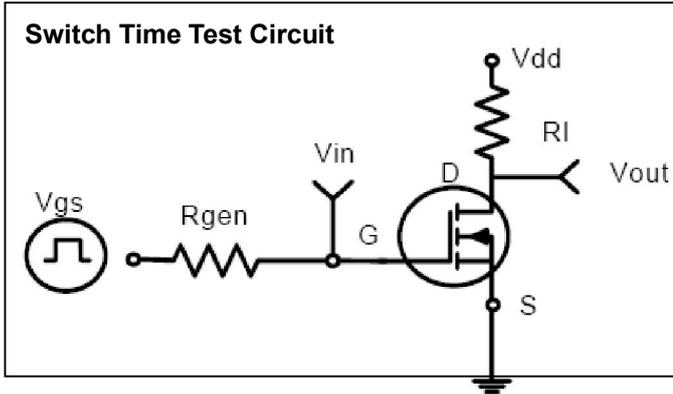
- ① Repetitive rating; pulse width limited by max junction temperature.
- ② Test condition:  $L = 0.3mH, V_{DD} = 30V, I_D=37A$ .
- ③ Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 1.5\%$ ;  $R_G = 25\Omega$  Starting  $T_J = 25^\circ C$ .

#### EAS test circuit

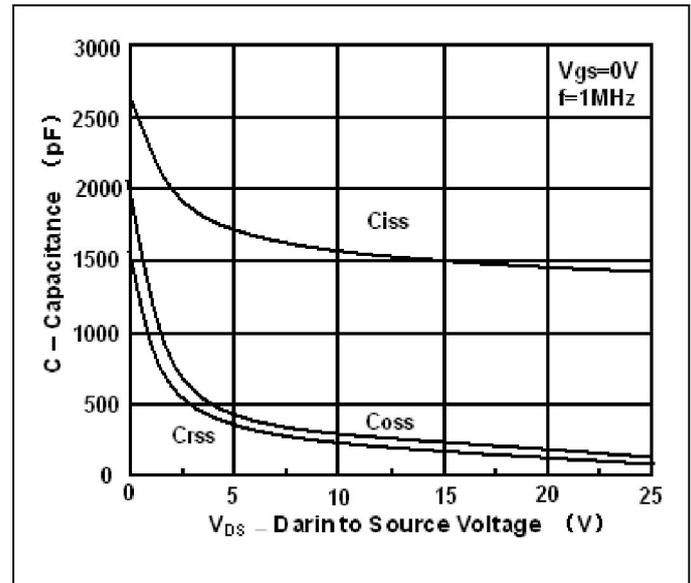


#### Gate charge test circuit

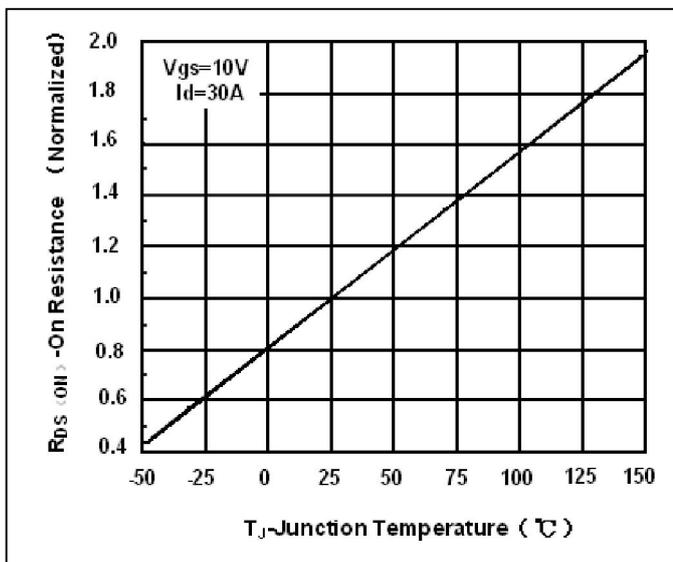




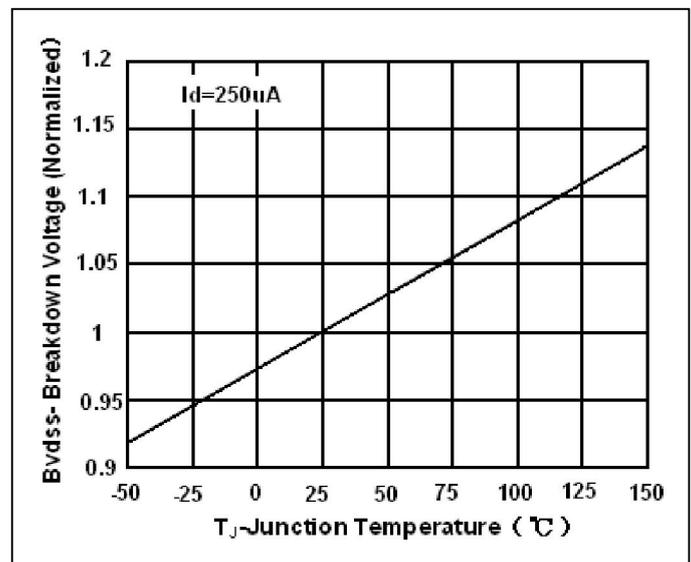
Transfer Characteristic



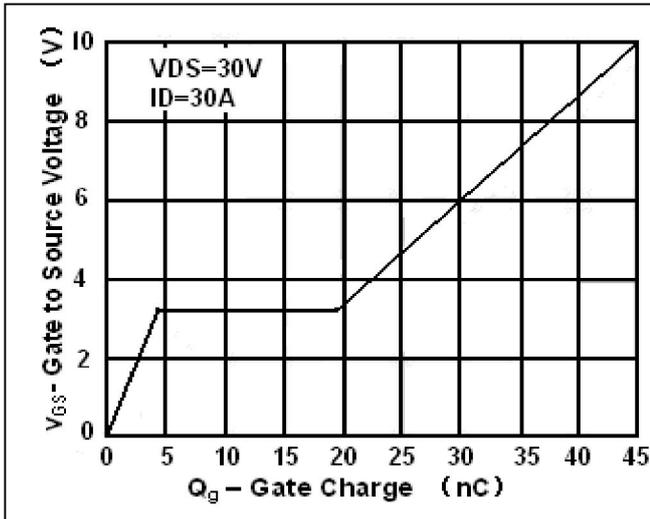
Capacitance



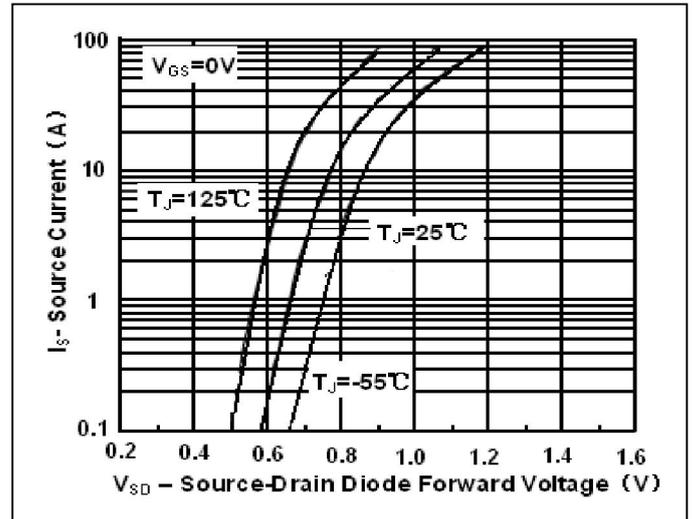
On Resistance vs. Junction Temperature



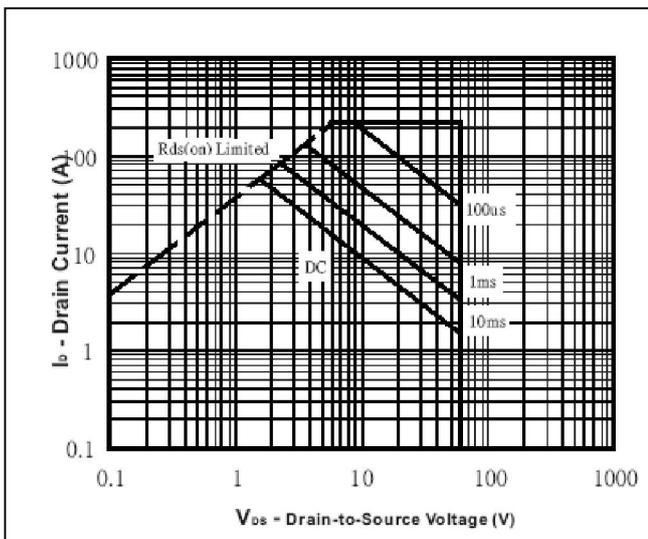
Breakdown Voltage vs. Junction Temperature



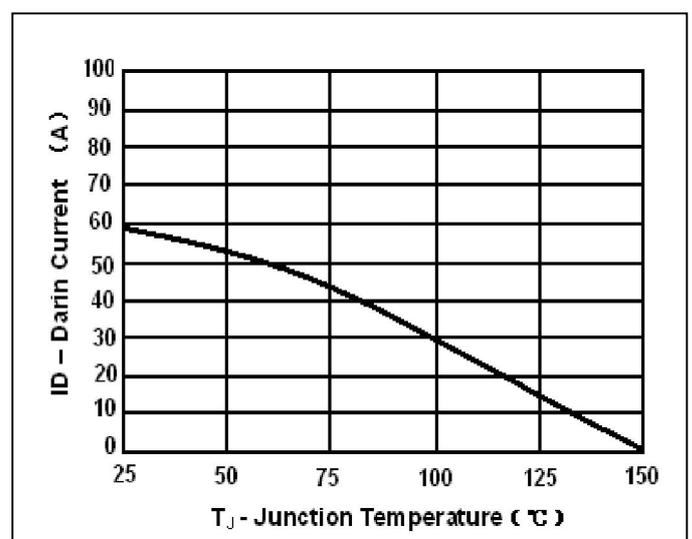
Gate Charge



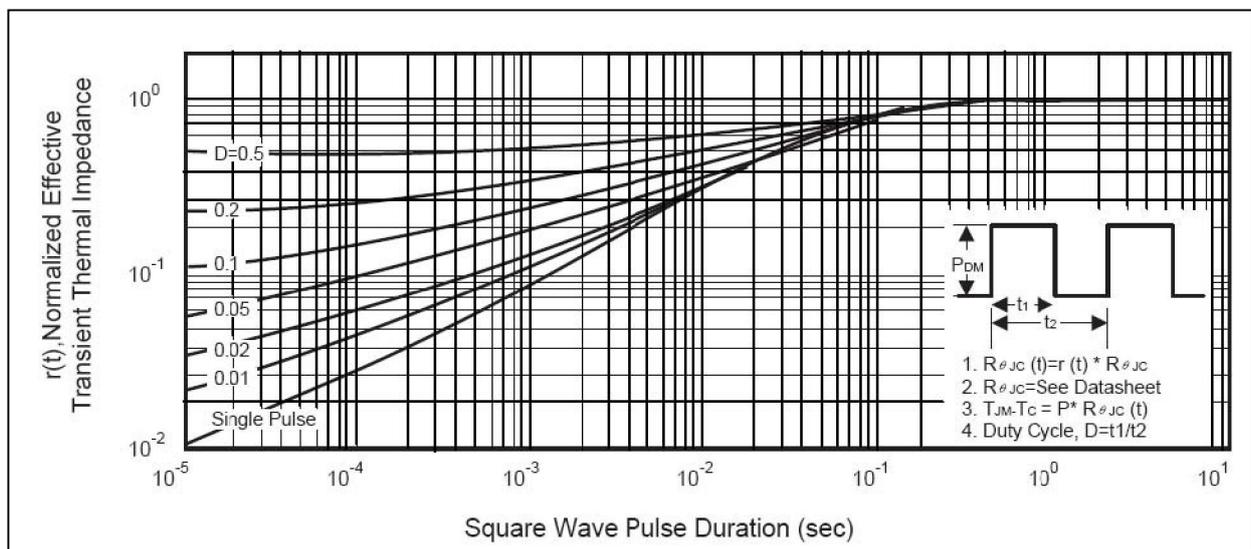
Source-Drain Diode Forward Voltage



Safe Operation Area



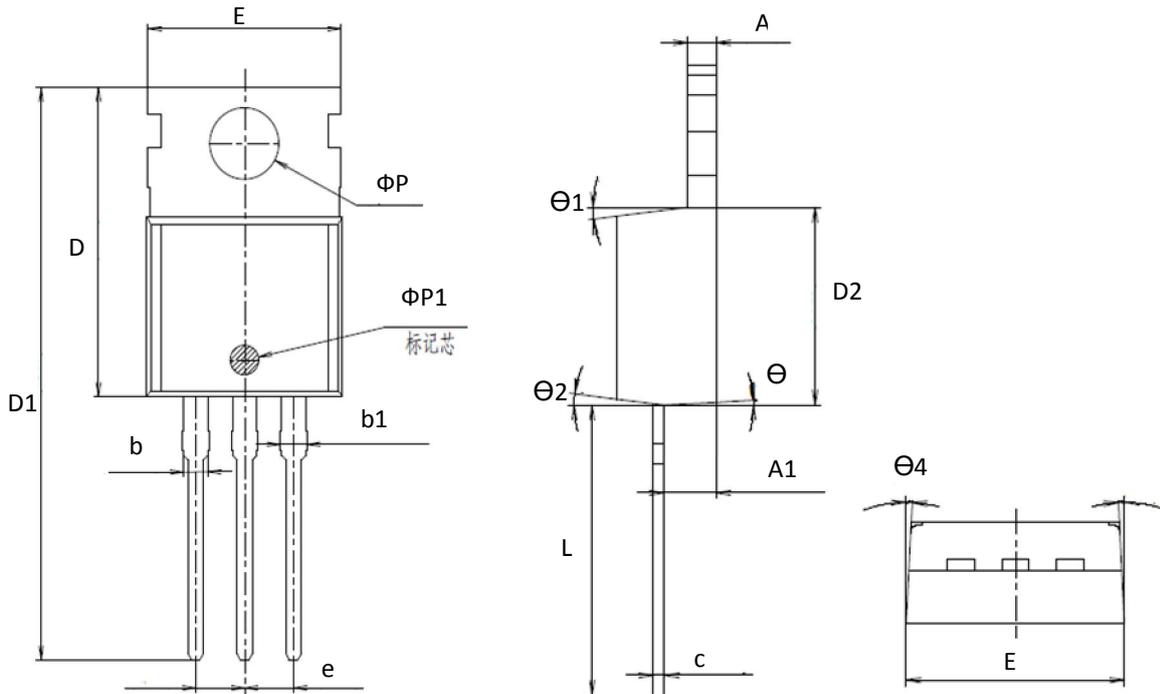
Max Drain Current vs. Junction Temperature



Transient Thermal Impedance Curve

## TO-220 MECHANICAL DATA

TO-220 PACKAGE OUTLINE DIMENSION\_GN



Symbol	Dimension In Millimeters			Dimension In Inches		
	Min	Nom	Max	Min	Nom	Max
A	-	1.300	-	-	0.051	-
A1	2.200	2.400	2.600	0.087	0.094	0.102
b	-	1.270	-	-	0.050	-
b1	1.270	1.370	1.470	0.050	0.054	0.058
c	-	0.500	-	-	0.020	-
D	-	15.600	-	-	0.614	-
D1	-	28.700	-	-	1.130	-
D2	-	9.150	-	-	0.360	-
E	9.900	10.000	10.100	0.390	0.394	0.398
E1	-	10.160	-	-	0.400	-
ΦP	-	3.600	-	-	0.142	-
ΦP1	-	1.500	-	-	0.059	-
e	2.54BSC			0.1BSC		
L	12.900	13.100	13.300	0.508	0.516	0.524
Θ1	-	7°	-	-	7°	-
Θ2	-	7°	-	-	7°	-
Θ3	-	3°	-	5°	7°	9°
Θ4	-	3°	-	1°	3°	5°