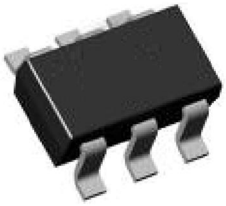
GOOD-ARK

SSF3051G7

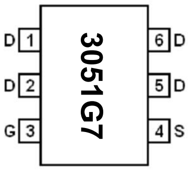
30V P-Channel MOSFET

Main Product Characteristics

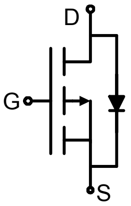
V_{DSS}	-30V
$R_{DS}(on)$	45mohm(typ.)
I_D	-4A



SOT23-6



Marking and Pin Assignment



Schematic Diagram

Features and Benefits:

- Advanced trench MOSFET process technology
- Special designed for buttery protection, load switching and general power management
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150℃ operating temperature
- Lead free product

Description

It utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in buttery protection, power switching application and a wide variety of other applications.

Absolute Max Rating

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	I_D	-4	A
	I_{DM}	-25	A
Maximum Power Dissipation	P_D	1.7	W
Operating Junction and Storage Temperature Range	T_J,T_{STG}	-55 To 150	℃

Thermal Resistance

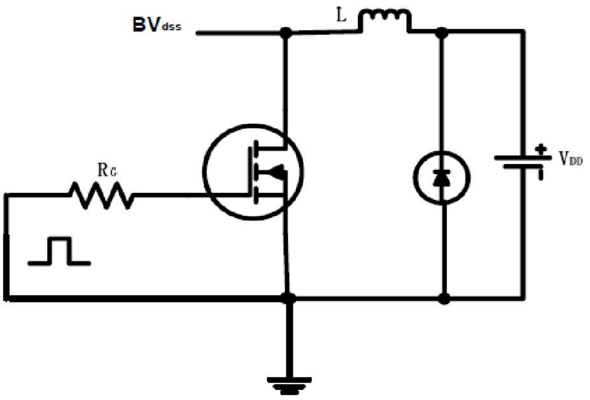
Thermal Resistance, Junction-to-Ambient (Note 2)	$R_{\theta JA}$	75	℃/W
Thermal Resistance, Junction-to-Case(Note 2)	$R_{\theta JC}$	30	℃/W

Electrical Characteristics @T_A=25℃ unless otherwise specified

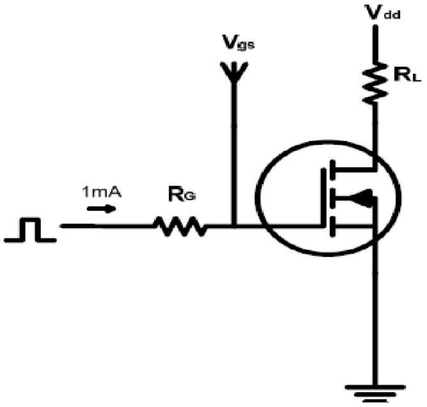
Parameter	Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=-250μA	-30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=-24V,V_{GS}=0V			-1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±25V,V_{DS}=0V			±100	nA
ON CHARACTERISTICS (Note 3)						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	-1	-1.6	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-4A		45	51	mΩ
		V_{GS}=-4.5V, I_D=-3.4A		65	85	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-5V,I_D=-4A		8.5		S
DYNAMIC CHARACTERISTICS (Note4)						
Input Capacitance	C_{lss}	V_{DS}=-15V,V_{GS}=0V, F=1.0MHz		520		PF
Output Capacitance	C_{oss}			94		PF
Reverse Transfer Capacitance	C_{rss}			73		PF
SWITCHING CHARACTERISTICS (Note 4)						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,I_D=-1A V_{GS}=-10V,R_{GEN}=6Ω		8.9		nS
Turn-on Rise Time	t_r			4.0		nS
Turn-Off Delay Time	$t_{d(off)}$			22.6		nS
Turn-Off Fall Time	t_f			5.5		nS
Total Gate Charge	Q_g	V_{DS}=-5V,I_D=-4A, V_{GS}=-5V		7.1		nC
Gate-Source Charge	Q_{gs}			0.86		nC
Gate-Drain Charge	Q_{gd}			3.9		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=-1.3A		-0.8	-1.2	V
Diode Forward Current (Note 2)	I_S				-4	A
Reverse Recovery Time	t_{rr}	Tj=25℃,IF=-4A, di/dt=-100A/uS		10.3		nS
Reverse Recovery Charge	Q_{rr}			4.3		nC

Test Circuits and Waveforms

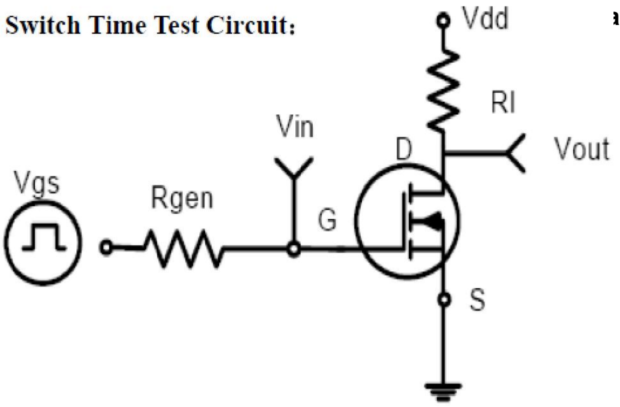
EAS test circuits:



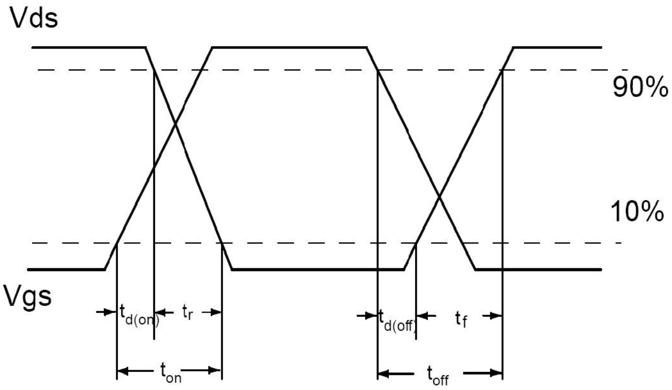
Gate charge test circuit:



Switch Time Test Circuit:



aveforms:



NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, t ≤ 10 sec.
3. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4. Guaranteed by design, not subject to production testing.

Typical Electrical and Thermal Characteristics

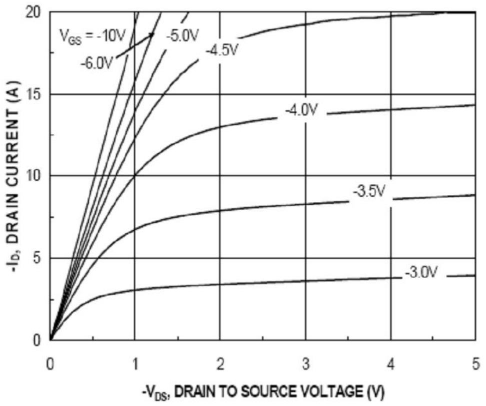


Figure 1: Typical Output Characteristics

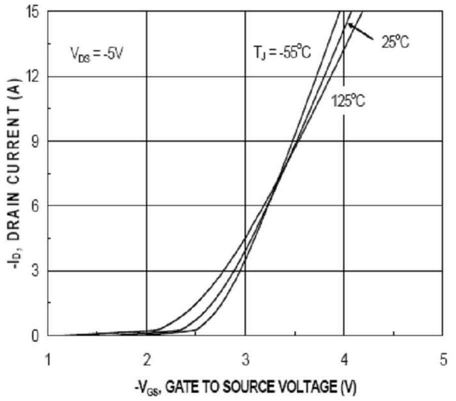


Figure 2: Transfer Characteristics

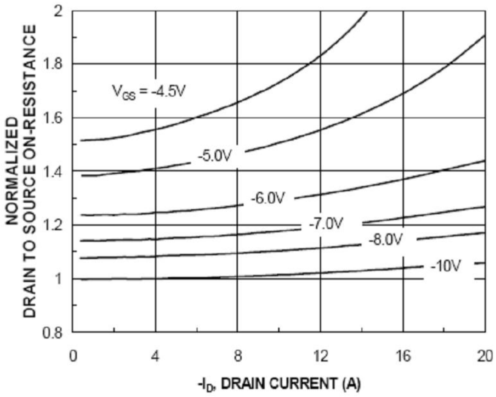


Figure 3: Drain-Source On-Resistance

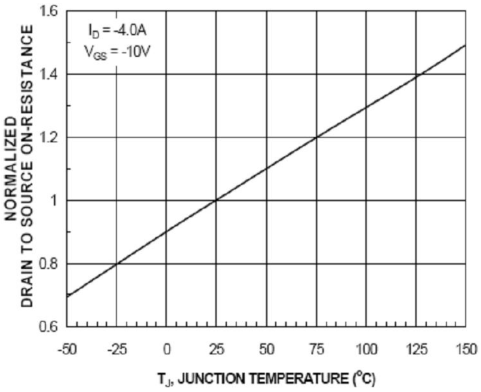


Figure 4： Drain-Source On-Resistance

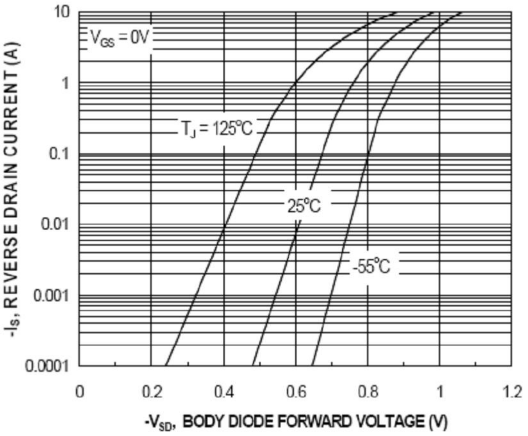


Figure 5 : Source- Drain Diode Forward

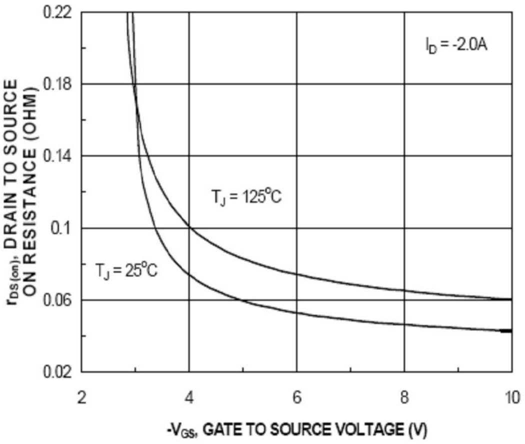


Figure 6: Rdson vs Vgs

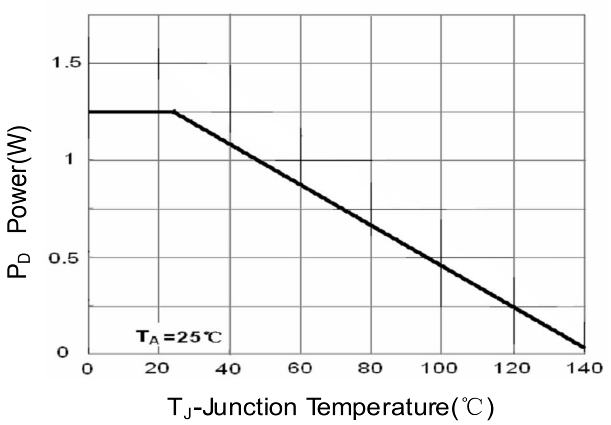


Figure 7: Power Dissipation

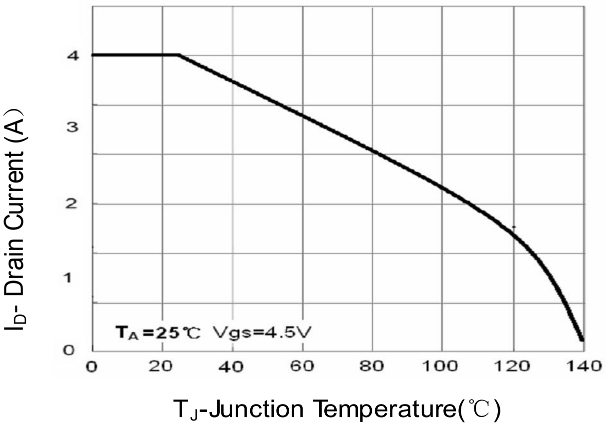


Figure 8: Drain Current

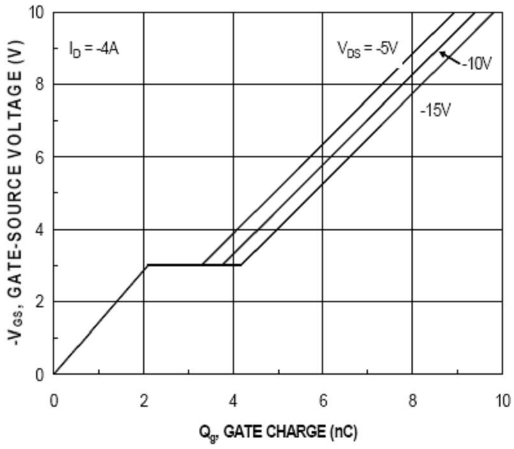


Figure 9: Gate Charge

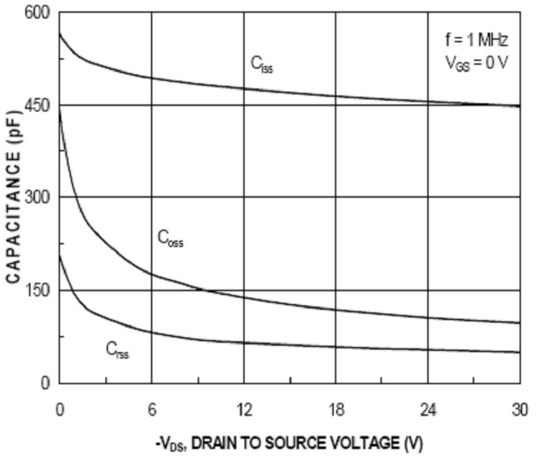


Figure 10: Capacitance vs Vds

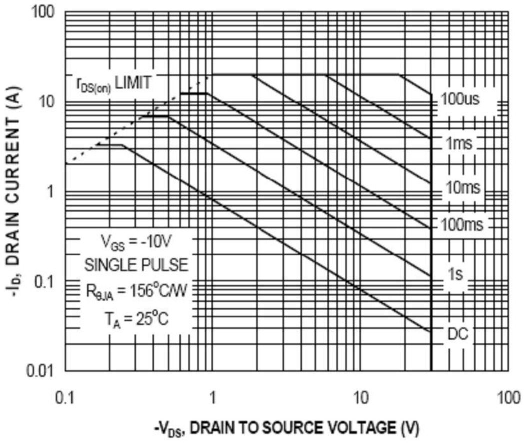


Figure 11: Safe Operation Area

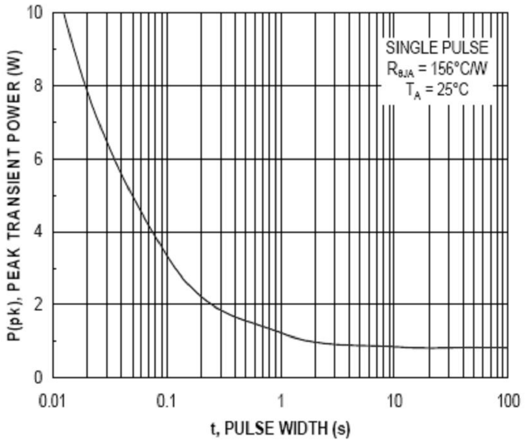


Figure 12: Single Pulse Maximum Power Dissipation

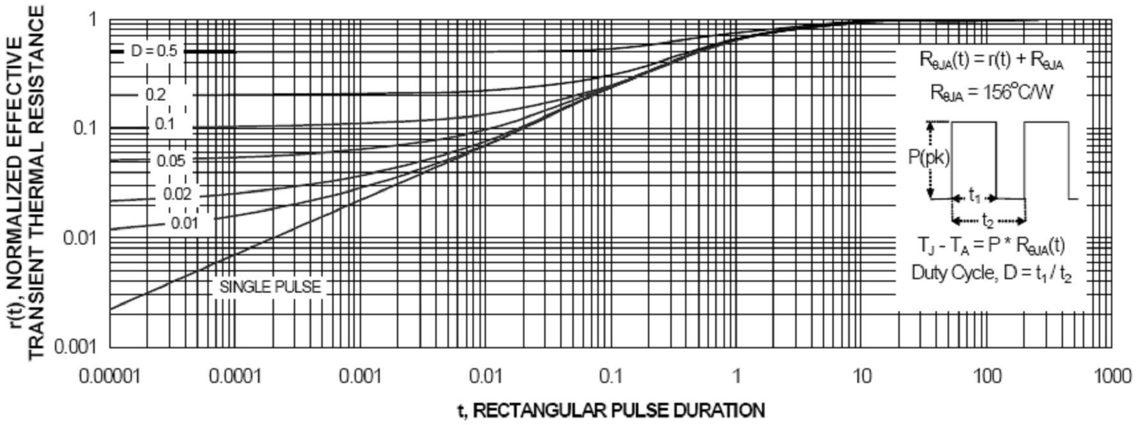
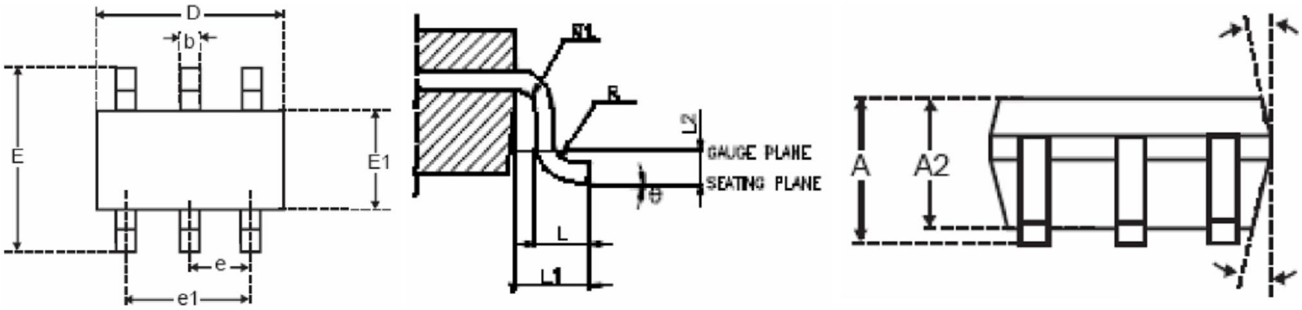
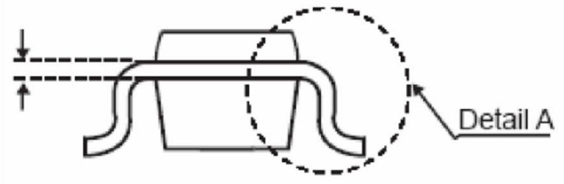


Figure 13: Normalized Maximum Transient Thermal Impedance

Mechanical Data

SOT23-6 Dimensions in Millimeters (UNIT:mm)





SYMBOLS	MILLMETERS		
	MIN.	NOM.	MAX.
A			1.45
A1			0.15
A2	0.90	1.15	1.30
b	0.30		0.50
c	0.08		0.22
D	2.90 BSC.		
E	2.80 BSC.		
E1	1.60 BSC.		
e	0.95 BSC.		
e1	1.90 BSC.		
L	0.30	0.45	0.60
L1	0.60 REF		
L2	0.25 BSC.		
R	0.10		
R1	0.10		0.25
θ	0°	4°	8°
θ1	5°	10°	15°

NOTES:

1. All dimensions are in millimeters.
2. Dimensions are inclusive of plating
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

Ordering and Marking Information

Device Marking: 3051G7

Package (Available)
SOT23-6
Operating Temperature Range
C : -55 to 150 °C

Devices per Unit

Package Type	Units/ Tube	Tubes/ Inner Box	Units/ Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
SOT23-6	3000pcs	10pcs	30000pcs	4pcs	120000pcs

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T_j=125℃ or 150℃ @ 80% of Max V_{DSS}/V_{CES}/VR	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	T_j=125℃ or 150℃ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices