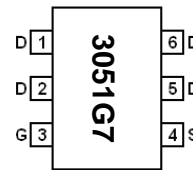
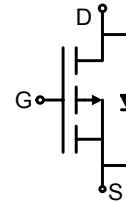


**Main Product Characteristics:**

$V_{DSS}$	-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 battery protection, load switching and general power management
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature


**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 battery protection, power switching application and a wide variety of other applications

**Absolute max Rating:**

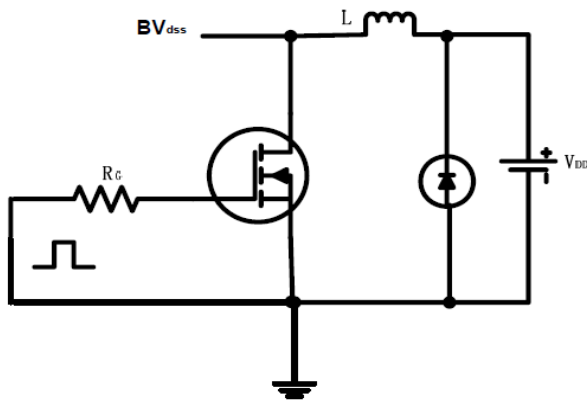
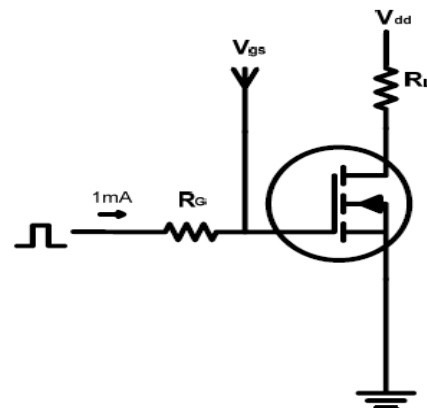
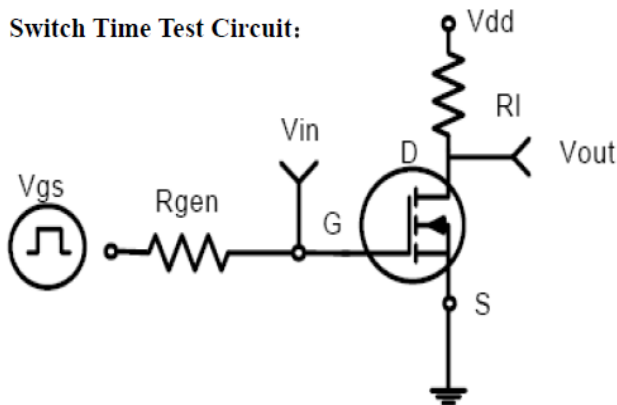
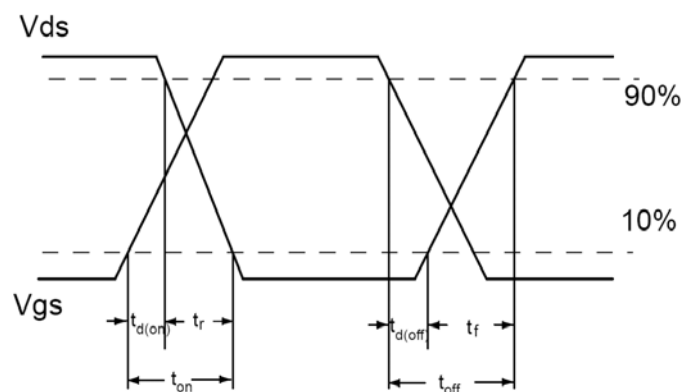
Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	-30	V
Gate-Source Voltage	$V_{GS}$	±25	V
Drain Current-Continuous@ Current-Pulsed (Note 1)	$I_D$	-4	A
	$I_{DM}$	-25	A
Maximum Power Dissipation	$P_D$	1.7	W
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 To 150	°C

**Thermal Resistance**

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

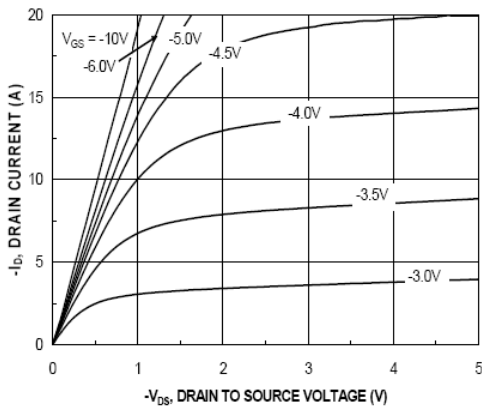
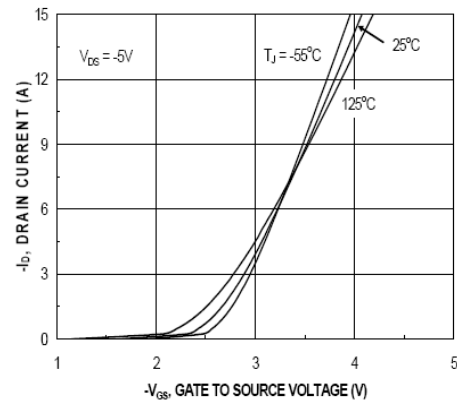
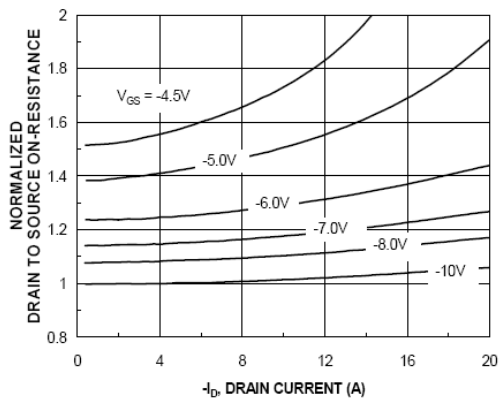
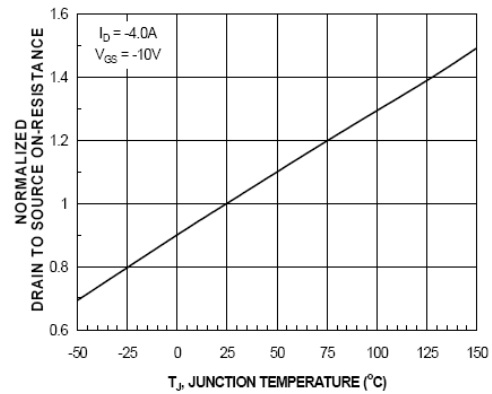
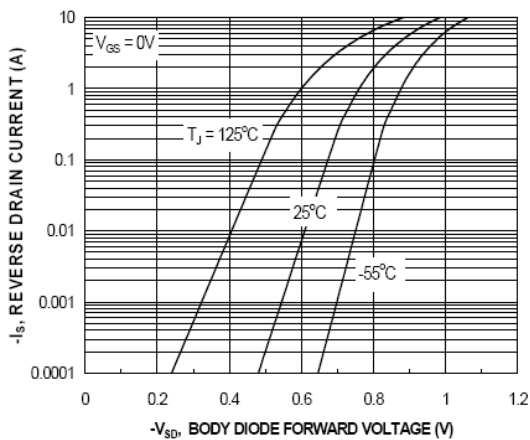
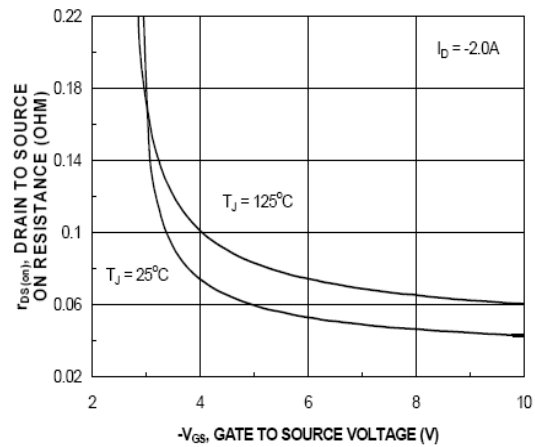
**Electrical Characterizes @ $T_A=25^{\circ}\text{C}$  unless otherwise specified**

Parameter	Symbol	Condition	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=-24V, V_{GS}=0V$			-1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 25V, V_{DS}=0V$			$\pm 100$	nA
<b>ON CHARACTERISTICS (Note 3)</b>						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	-1	-1.6	-3	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-4A$		45	51	m $\Omega$
		$V_{GS}=-4.5V, I_D=-3.4A$		65	85	m $\Omega$
Forward Transconductance	$g_{FS}$	$V_{DS}=-5V, I_D=-4A$		8.5		S
<b>DYNAMIC CHARACTERISTICS (Note4)</b>						
Input Capacitance	$C_{ISS}$	$V_{DS}=-15V, V_{GS}=0V,$ $F=1.0\text{MHz}$		520		PF
Output Capacitance	$C_{OSS}$			94		PF
Reverse Transfer Capacitance	$C_{RSS}$			73		PF
<b>SWITCHING CHARACTERISTICS (Note 4)</b>						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-1A$ $V_{GS}=-10V, R_{GEN}=6\Omega$		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
<b>DRAIN-SOURCE DIODE CHARACTERISTICS</b>						
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	$t_{rr}$	$T_j=25^{\circ}\text{C}, I_F=-4A,$ $di/dt=-100A/\mu S$		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:**

**Waveforms:**

**NOTES:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
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**

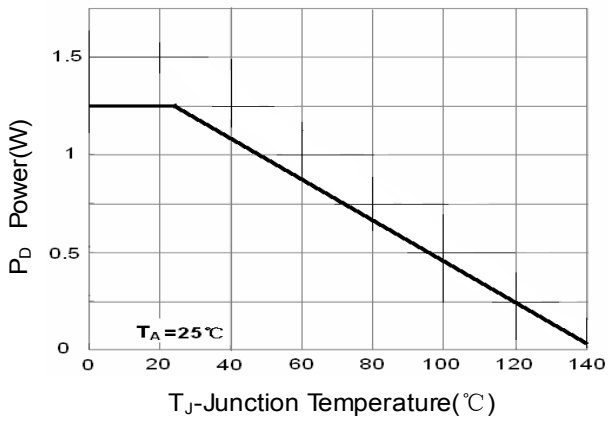


Figure 7: Power Dissipation

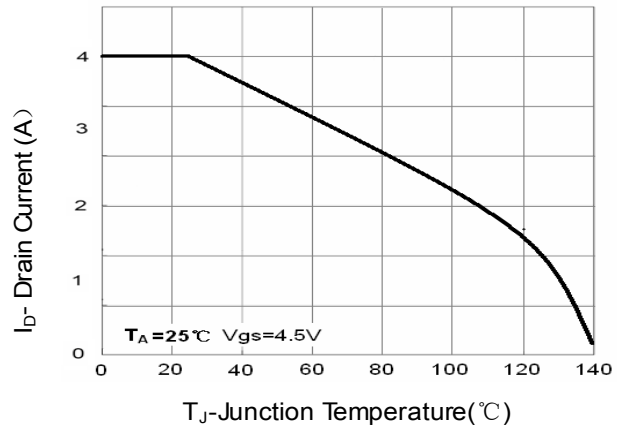


Figure 8: Drain Current

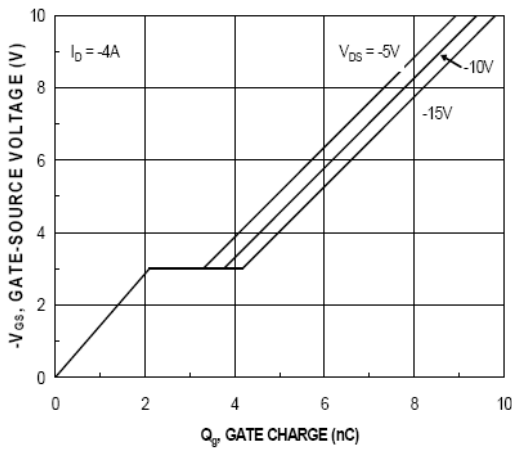


Figure 9: Gate Charge

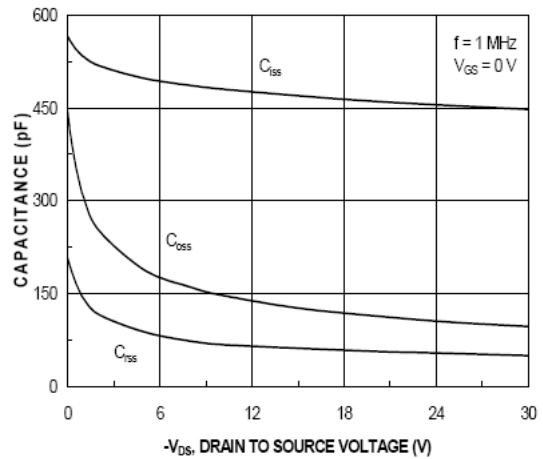


Figure 10: Capacitance vs Vds

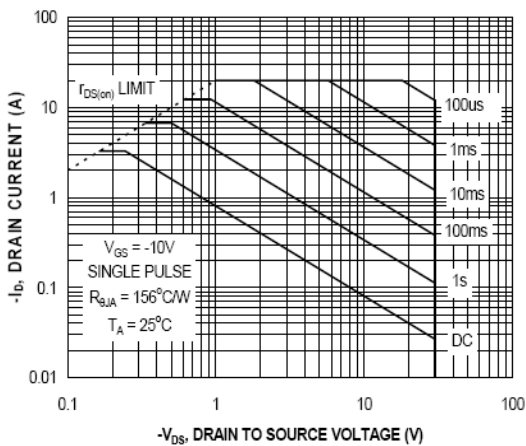


Figure 11: Safe Operation Area

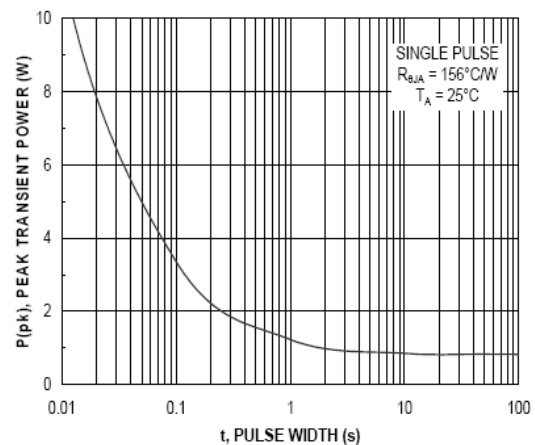


Figure 12: Single Pulse Maximum Power Dissipation

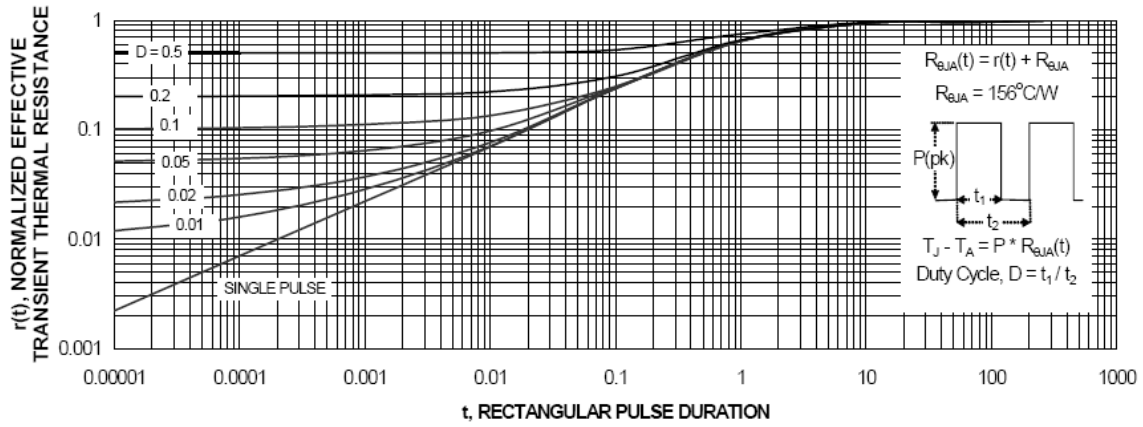
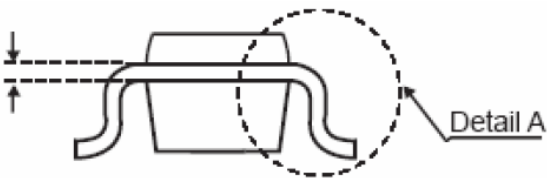
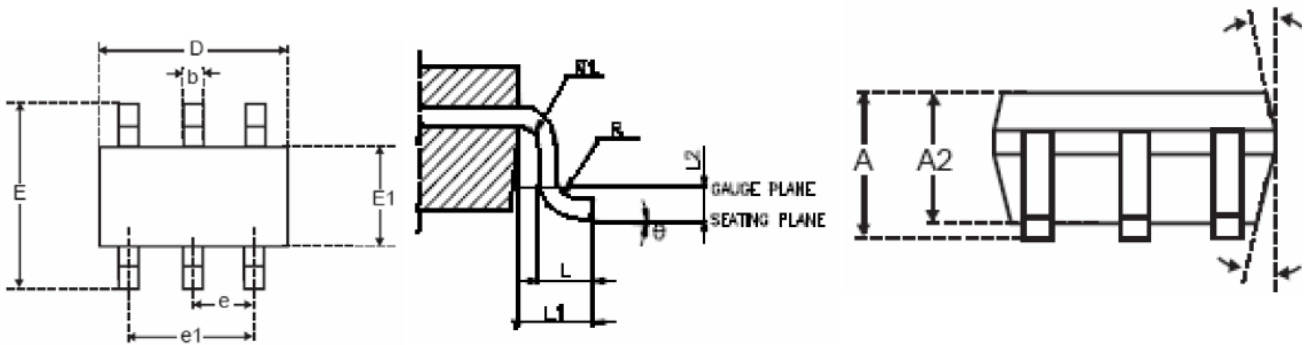


Figure 13: Normalized Maximum Transient Thermal Impedance

**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)	$T_j=125^{\circ}\text{C}$ or $150^{\circ}\text{C}$ @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=125^{\circ}\text{C}$ or $150^{\circ}\text{C}$ @ 100% of Max $V_{GSS}$	168 hours 500 hours 1000 hours	3 lots x 77 devices



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