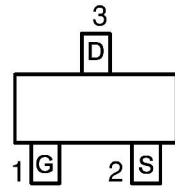
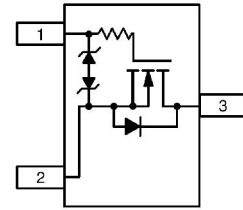


**Main Product Characteristics:**

$V_{DSS}$	20V
$R_{DS(on)}$	3 $\Omega$
$I_D$	238mA


**Pin Assignment**

**Schematic diagram**
**Features and Benefits:**

- Low Gate Charge for Fast Switching
- Small 1.6 x 1.6 mm Footprint
- ESD Protected Gate
- Pb-Free Package is Available
- 150°C operating temperature


**Description:**

It utilizes the latest trench processing techniques to achieve fast switching speed and short reverse recovery time. These features combine to make this design an extremely efficient and reliable device for use in Power Management Load Switch, Level Shift, Cell Phones, Media Players, Digital Cameras, PDA's, Video Games, Hand Held Computers, etc.

**Absolute max Rating @ $T_A=25^\circ\text{C}$  unless otherwise specified**

Symbol	Parameter	Max.	Units
$I_D$	Continuous Drain Current ①	238	mA
$I_{DM}$	Pulsed Drain Current ( $t_p \leq 10\mu\text{s}$ ) ②	714	
PD	Power Dissipation ③	300	mW
VDS	Drain-Source Voltage	20	V
VGS	Gate-to-Source Voltage	$\pm 10$	V
$T_J$ $T_{STG}$	Operating Junction and Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_L$	Lead Temperature for Soldering Purposes	260	
$I_{SD}$	Continuous Source Current (Body Diode)	238	mA

**Thermal Resistance**

Symbol	Characterizes	Value	Unit
$R_{\theta JA}$	Junction-to-Ambient (steady-state) ④	416	$^\circ\text{C/W}$

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
BVDSS	Drain-to-Source breakdown voltage	20	—	—	V	VGS = 0V, ID = 100 $\mu$ A
RDS(on)	Static Drain-to-Source on-resistance	—	1.5	3.0	$\Omega$	VGS = 4.5V, ID = 10mA
		—	2.2	3.5		VGS = 2.5V, ID = 10mA
VGS(th)	Gate threshold voltage	0.5	1.0	1.5	V	VDS = 3V, ID = 100 $\mu$ A
IDSS	Drain-to-Source leakage current	—	—	1.0	$\mu$ A	VDS = 20V, VGS = 0V
IGSS	Gate-to-Source forward leakage	—	—	100	$\mu$ A	VGS = 10V
	Gate-to-Source reverse leakage	-100	—	—		VGS = -10V
gfs	Forward Transconductance	—	50	—	mS	ID = 10mA, VDS=3V
td(on)	Turn-on delay time	—	13	—	ns	VGS=4.5V, VDS=5V, ID=10mA, RG=10 $\Omega$
tr	Rise time	—	15	—		
td(off)	Turn-Off delay time	—	98	—		
tf	Fall time	—	60	—		
Ciss	Input capacitance	—	11.5	20	pF	VGS = 0V, VDS = 5V, f = 1.0MHz
Coss	Output capacitance	—	10	15		
Crss	Reverse transfer capacitance	—	3.5	6.0		

**Source-Drain Ratings and Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
VSD	Diode Forward Voltage	—	0.66	0.8	V	IS=10mA, VGS=0V

**Notes:**

- ①The maximum current rating is limited by bond-wires.
- ②Repetitive rating; pulse width limited by max. junction temperature.
- ③The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④The value of  $R_{\theta JA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^{\circ}\text{C}$

Typical electrical and thermal characteristics

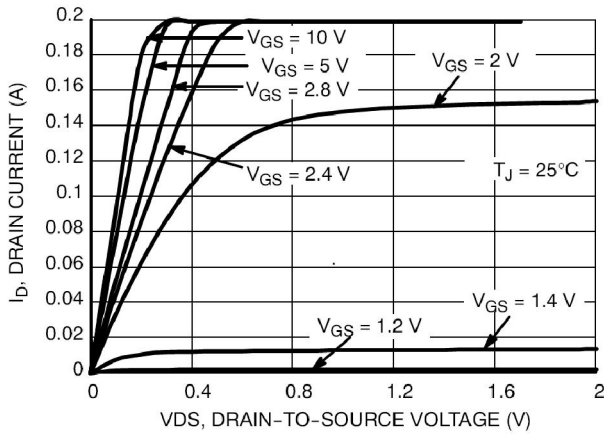


Figure 1. On-region Characteristics

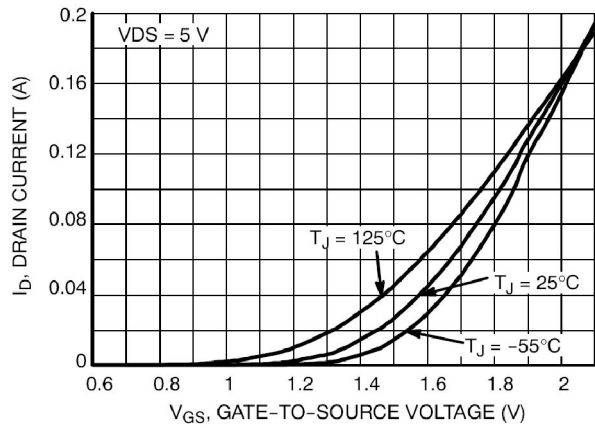


Figure 2. Transfer Characteristics

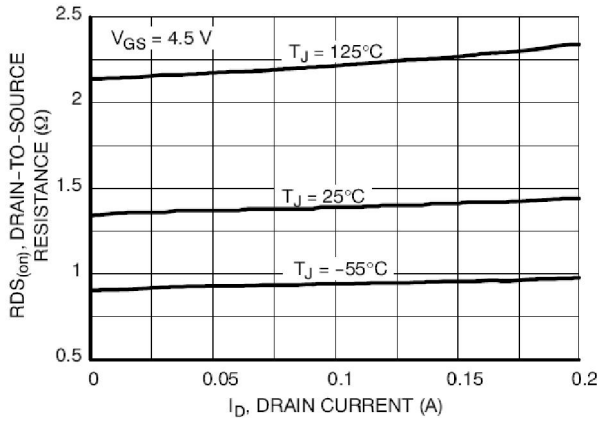


Figure 3. On-resistance versus Drain Current and Temperature

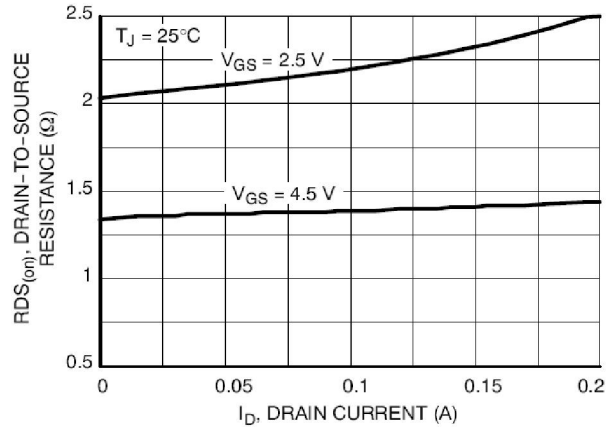


Figure 4. On-resistance versus Drain Current and Gate Voltage

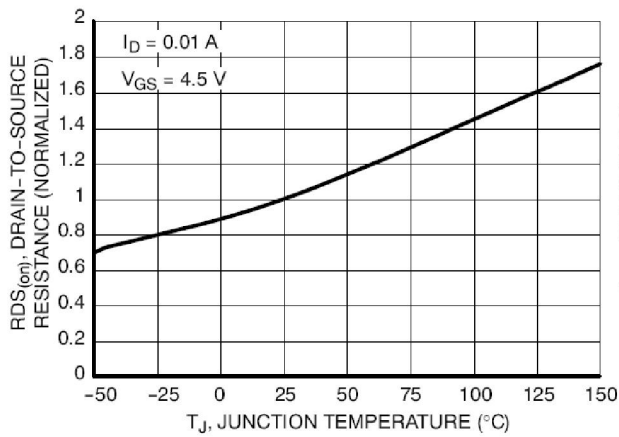


Figure 5. On-resistance Variation with Temperature

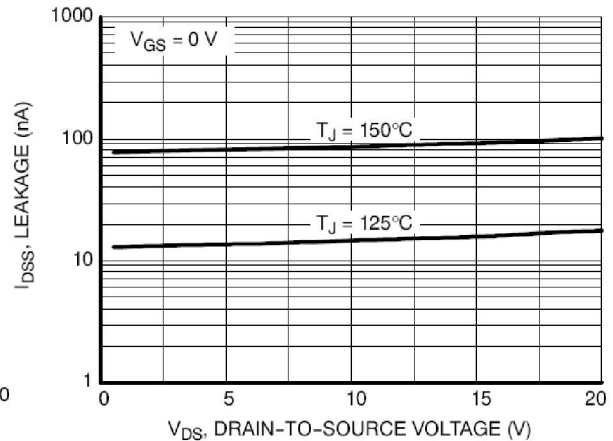
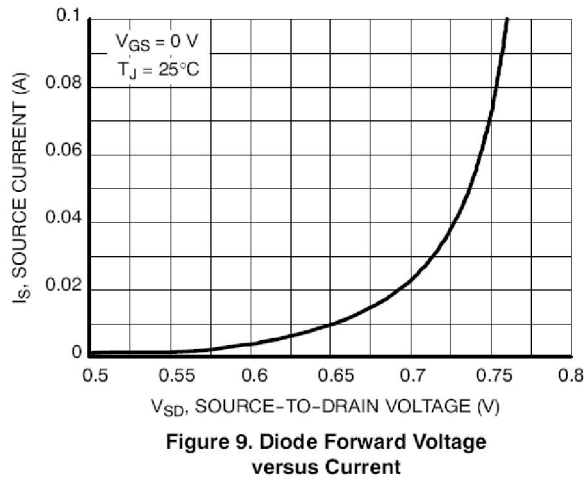
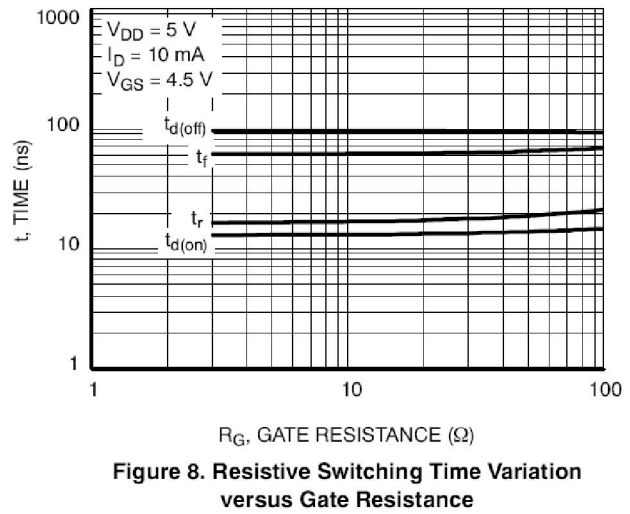
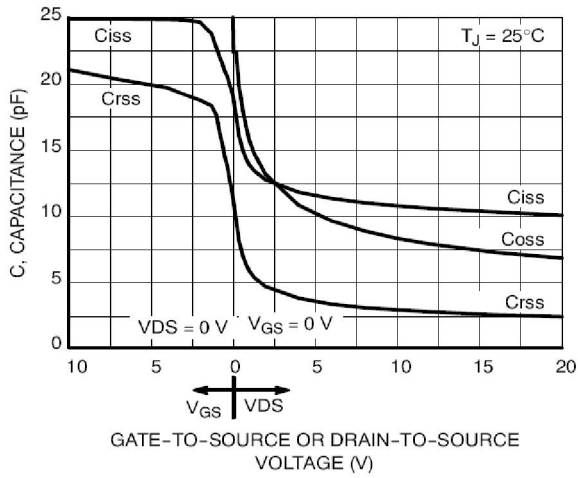


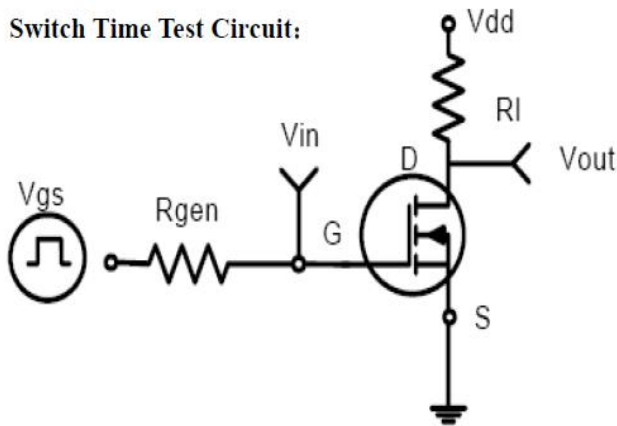
Figure 6. Drain-to-Source Leakage Current versus Voltage

### Typical electrical and thermal characteristics

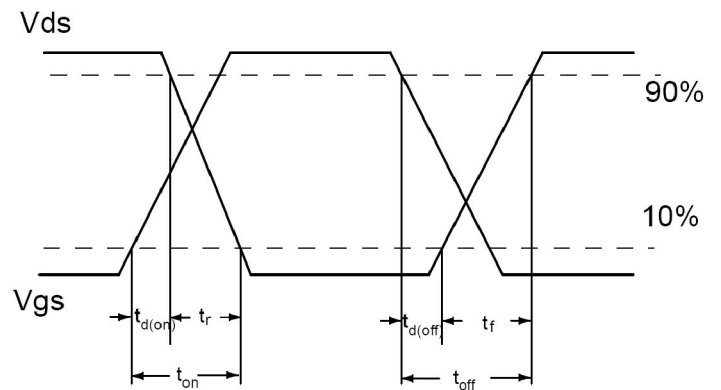


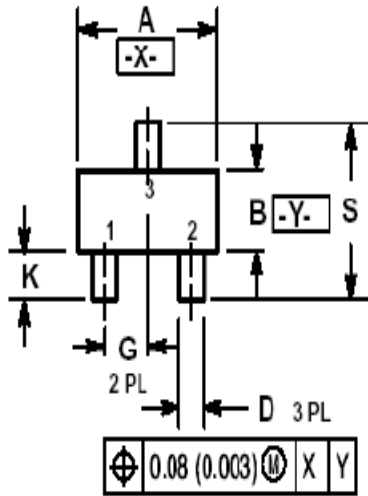
### Test circuits and Waveforms

Switch Time Test Circuit:

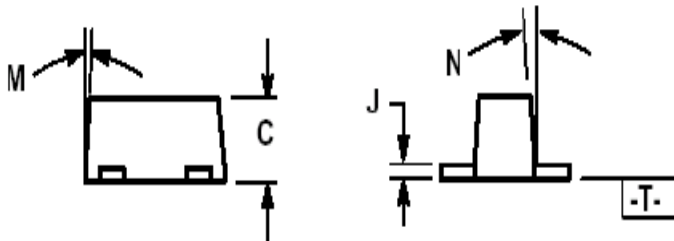


Switch Waveforms:



**Mechanical Data(SC-89):**

**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. 463C-01 OBSOLETE, NEW STANDARD 463C-02.



DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	1.50	1.60	1.70	0.059	0.063	0.067
B	0.75	0.85	0.95	0.030	0.034	0.040
C	0.60	0.70	0.80	0.024	0.028	0.031
D	0.23	0.28	0.33	0.009	0.011	0.013
G	0.50 BSC			0.020 BSC		
H	0.53 REF			0.021 REF		
J	0.10	0.15	0.20	0.004	0.006	0.008
K	0.30	0.40	0.50	0.012	0.016	0.020
L	1.10 REF			0.043 REF		
M	---	---	10 °	---	---	10 °
N	---	---	10 °	---	---	10 °
S	1.50	1.60	1.70	0.059	0.063	0.067

