

**Description**
**N-channel Enhancement MOSFET**
**Features**

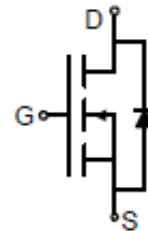
- $V_{DS}=60V$ ,  $I_D=3A$
- $R_{DS(ON)} < 100m\Omega$  @  $V_{GS} = 10V$   
 $R_{DS(ON)} < 115m\Omega$  @  $V_{GS} = 4.5V$
- High Power and Current Handling Capability
- Lead Free Product is Acquired
- Surface Mount Package

**Application**

- Battery Protection
- Load Switch
- Power Management

**Package**


SOT-23


**Absolute Maximum Ratings** ( $T_C=25^\circ C$  unless otherwise specified)

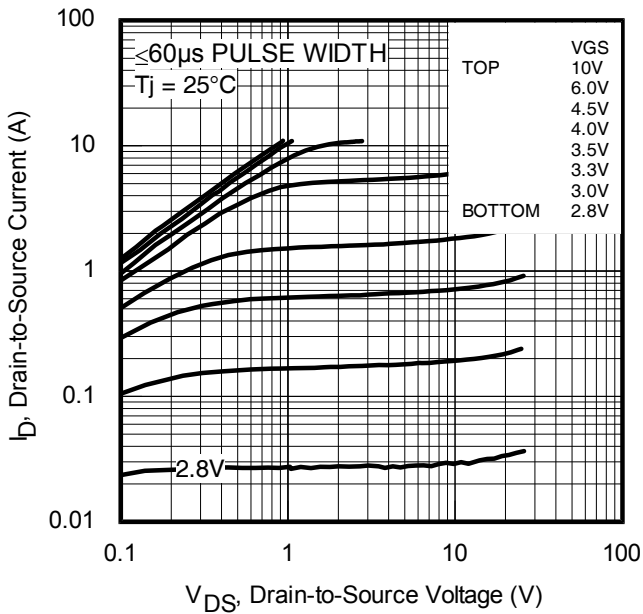
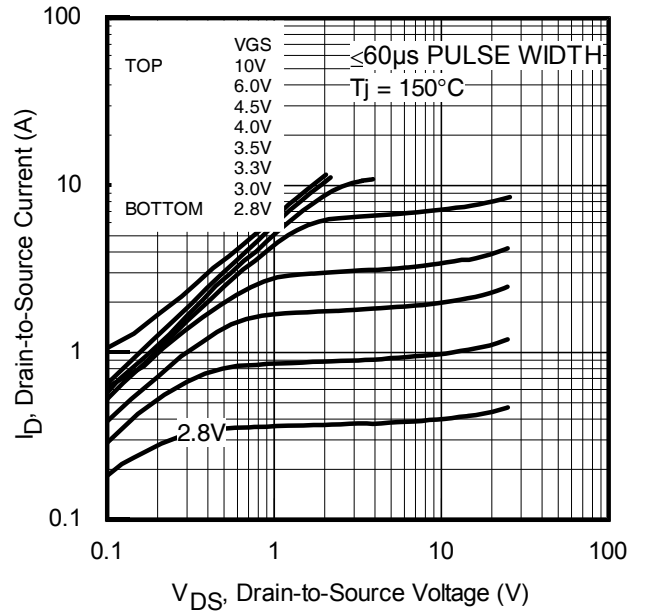
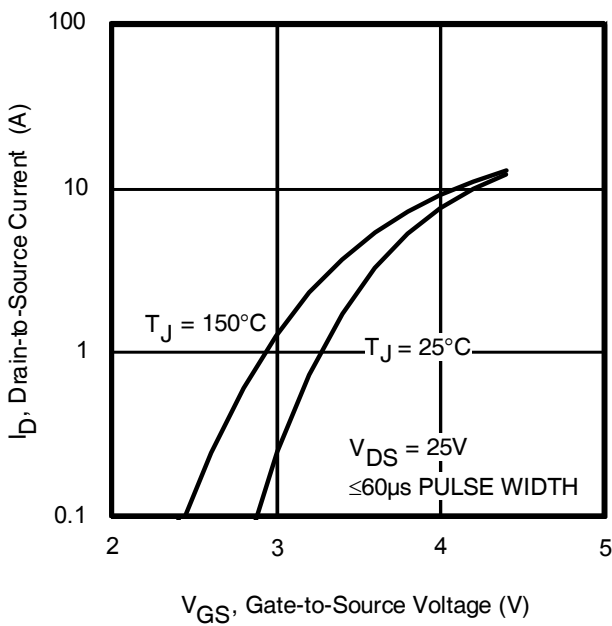
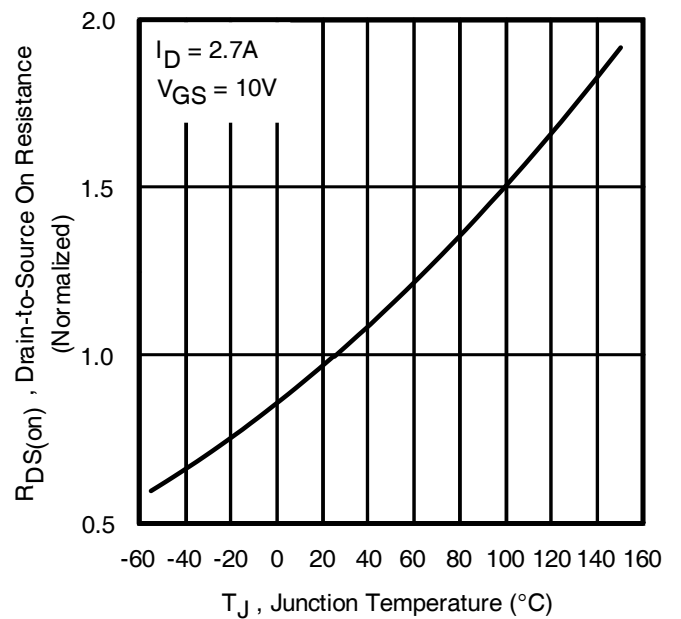
Symbol	Parameter	Max.	Units
$V_{DSS}$	Drain-Source Voltage	60	V
$V_{GSS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Continuous Drain Current	$T_C = 25^\circ C$	3
		$T_C = 100^\circ C$	2
$I_{DM}$	Pulsed Drain Current <sup>note1</sup>	10	A
$P_D$	Power Dissipation	$T_A = 25^\circ C$	0.35
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	$^\circ C/W$
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$

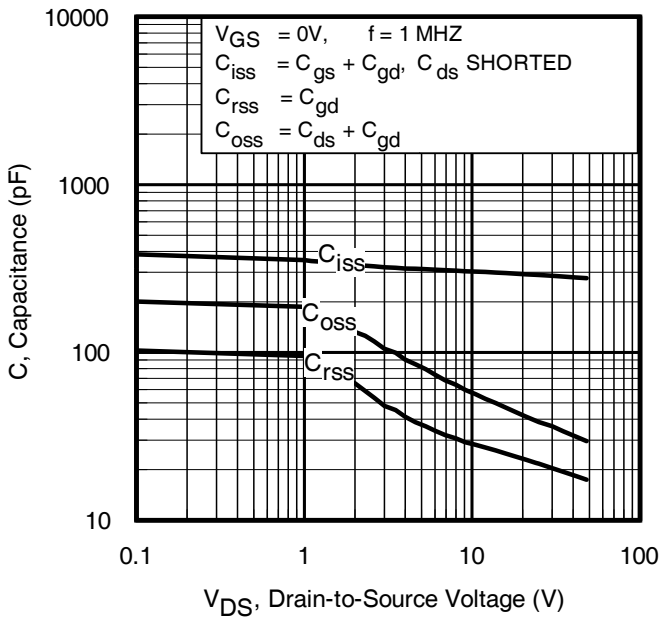
**Electrical Characteristics** ( $T_C=25^\circ\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
<b>Off Characteristic</b>						
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V,$	-	-	1	$\mu A$
$I_{GSS}$	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	$\pm 100$	nA
<b>On Characteristics</b>						
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	-	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance <small>note2</small>	$V_{GS}=10V, I_D=2A$	-	-	100	m $\Omega$
		$V_{GS}=4.5V, I_D=1A$	-	-	115	
<b>Dynamic Characteristics</b>						
$C_{iss}$	Input Capacitance	$V_{DS}=30V, V_{GS}=0V,$ $f=1.0MHz$	-	250	-	pF
$C_{oss}$	Output Capacitance		-	26	-	pF
$C_{rss}$	Reverse Transfer Capacitance		-	20	-	pF
$Q_g$	Total Gate Charge	$V_{DS}=30V, I_D=3A,$ $V_{GS}=4.5V$	-	7	-	nC
$Q_{gs}$	Gate-Source Charge		-	1.2	-	nC
$Q_{gd}$	Gate-Drain("Miller") Charge		-	1.5	-	nC
<b>Switching Characteristics</b>						
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=30V, I_D=1.5A,$ $R_{GEN}=1\Omega, V_{GS}=10V,$	-	6.5	-	ns
$t_r$	Turn-on Rise Time		-	15.2	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	15.2	-	ns
$t_f$	Turn-off Fall Time		-	10.3	-	ns
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	3	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	10	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=1A$	-	-	1.2	V

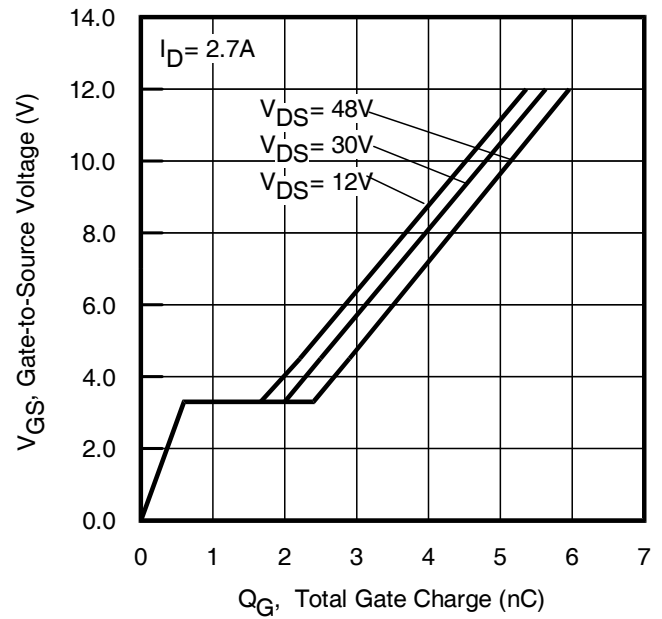
Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

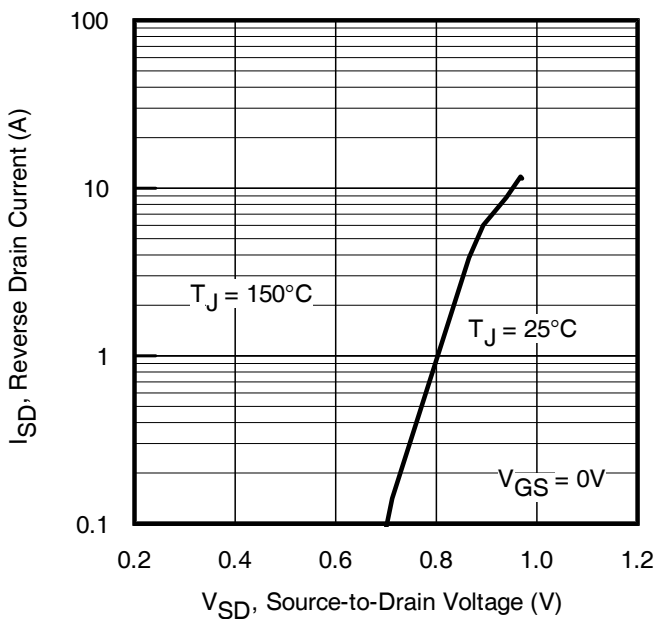

**Fig. 1** Typical Output Characteristics

**Fig. 2** Typical Output Characteristics

**Fig. 3** Typical Transfer Characteristics

**Fig. 4** Normalized On-Resistance vs. Temperature



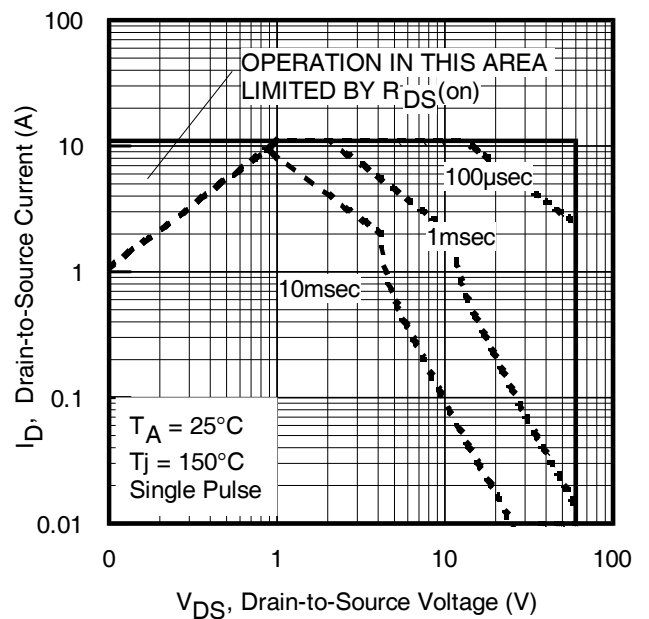
**Fig 5.** Typical Capacitance vs. Drain-to-Source Voltage



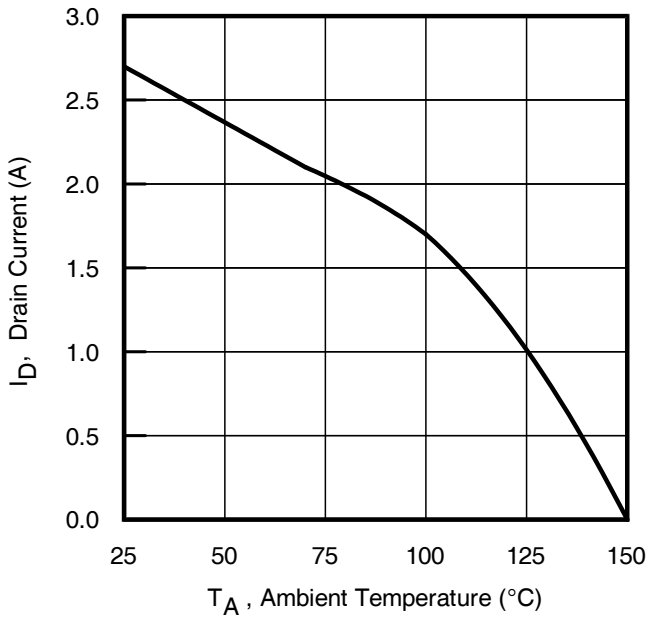
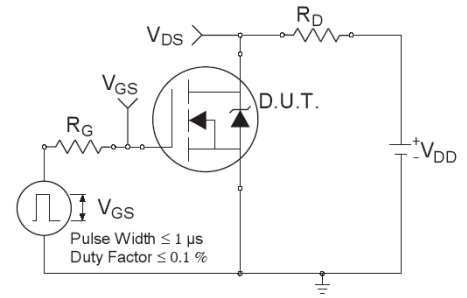
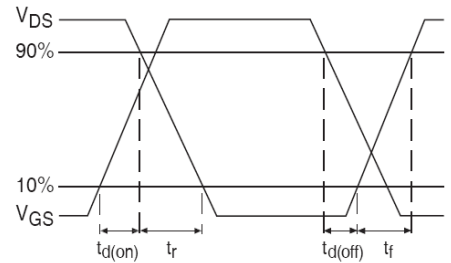
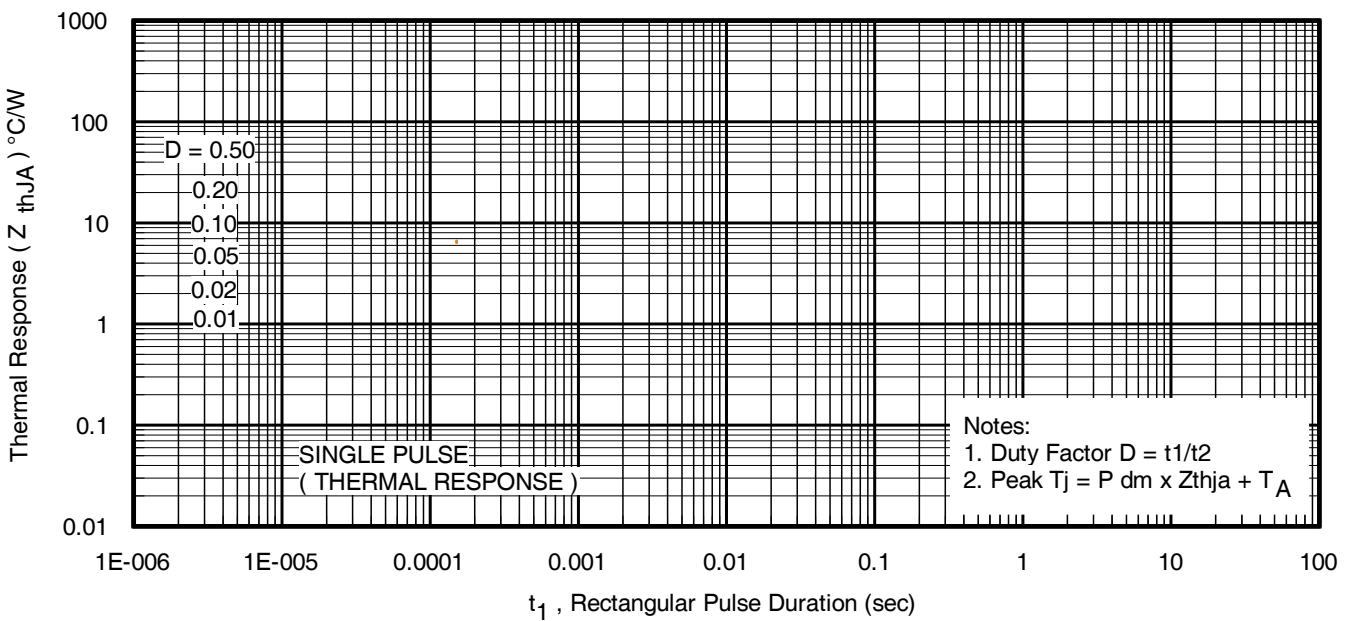
**Fig 6.** Typical Gate Charge vs. Gate-to-Source Voltage

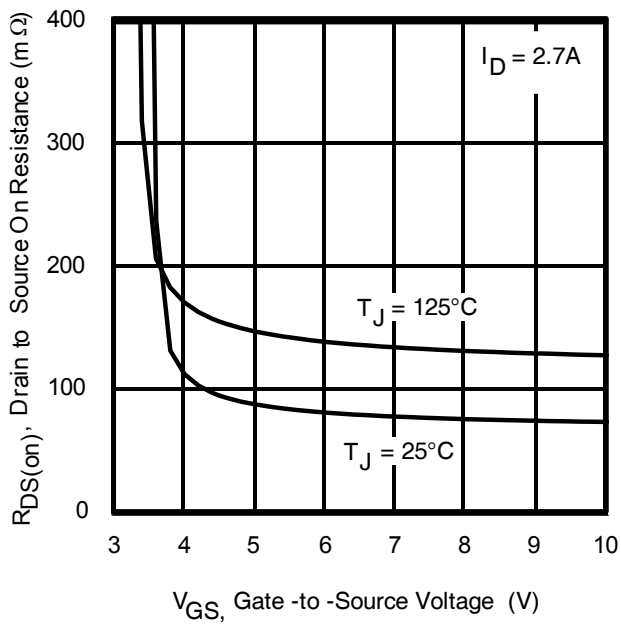


**Fig. 7** Typical Source-to-Drain Diode Forward Voltage

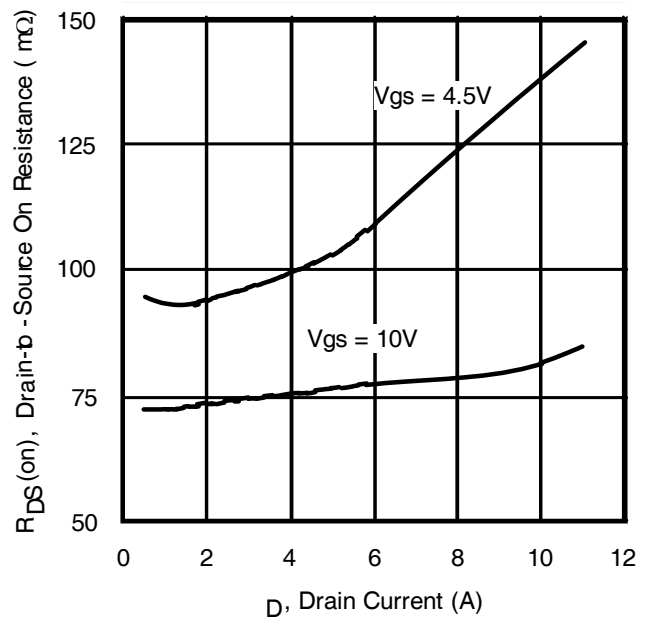


**Fig 8.** Maximum Safe Operating Area  
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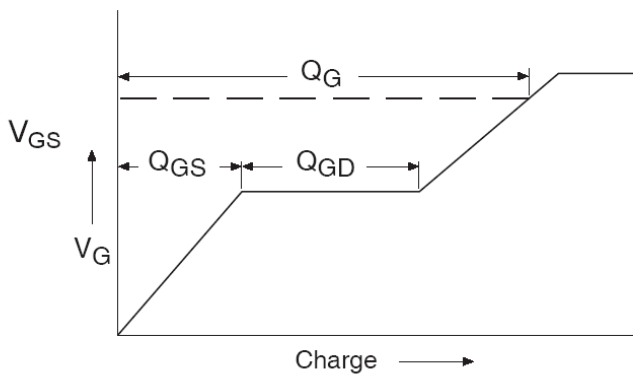

**Fig 9.** Maximum Drain Current vs. Case Temperature

**Fig 10a.** Switching Time Test Circuit

**Fig 10b.** Switching Time Waveforms

**Fig 11.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



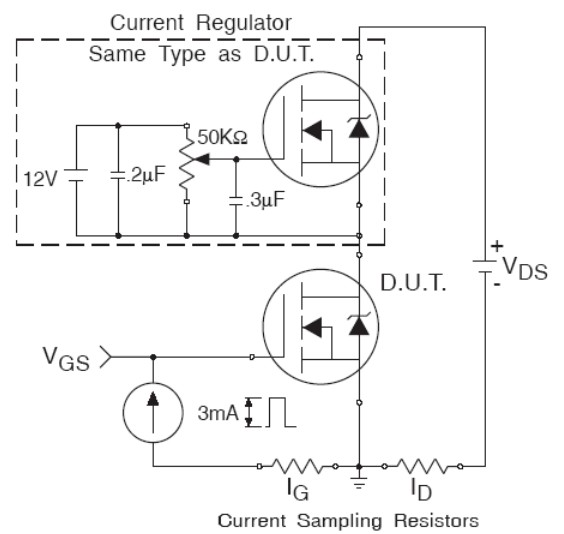
**Fig 12.** Typical On-Resistance Vs. Gate Voltage



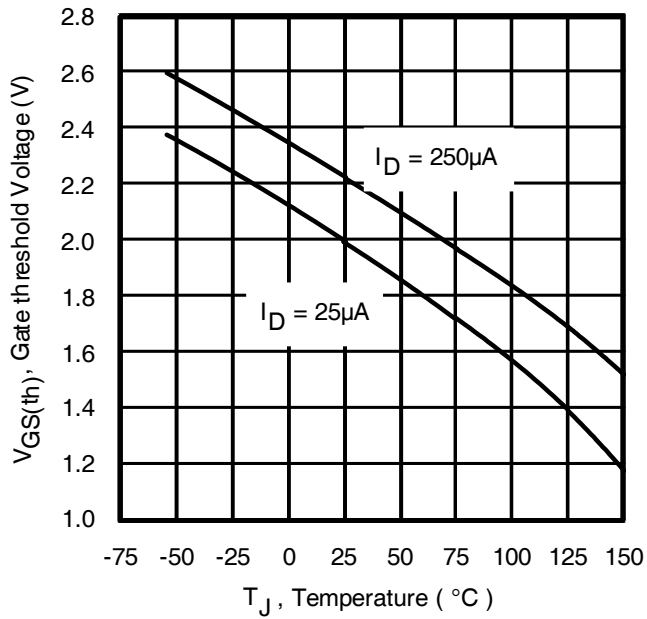
**Fig 13.** Typical On-Resistance Vs. Drain Current



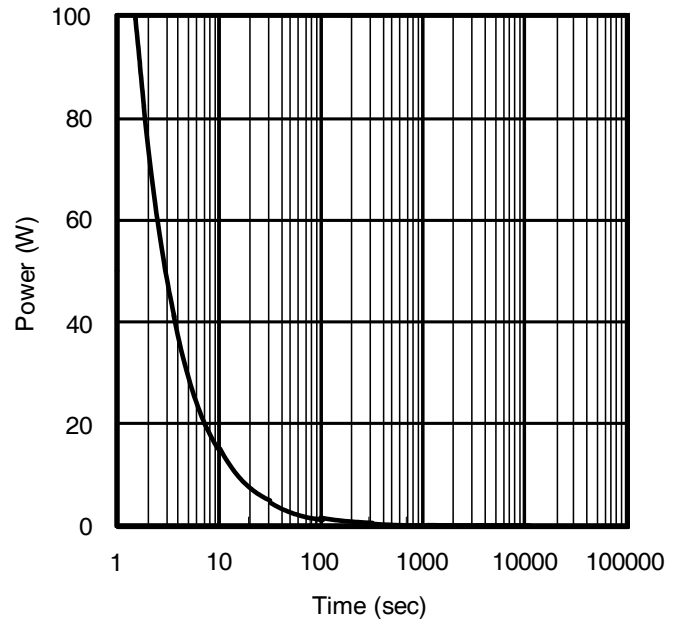
**Fig 14a.** Basic Gate Charge Waveform



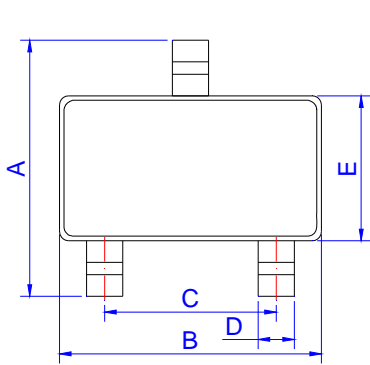
**Fig 14b.** Gate Charge Test Circuit



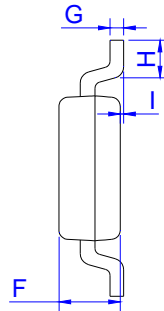
**Fig 15.** Typical Threshold Voltage Vs. Junction Temperature



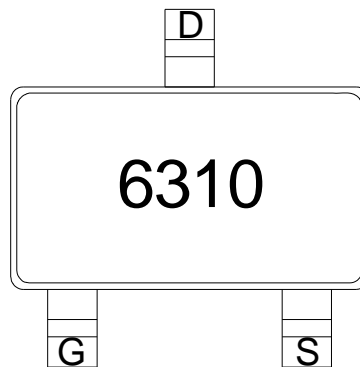
**Fig 16.** Typical Power Vs. Time

**Package Mechanical Data**


SOT-23



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.30	2.40	2.50	0.091	0.095	0.098
B	2.80	2.90	3.00	0.110	0.114	0.118
C	1.90 REF			0.075 REF		
D	0.35	0.40	0.45	0.014	0.016	0.018
E	1.20	1.30	1.40	0.047	0.051	0.055
F	0.90	1.00	1.10	0.035	0.039	0.043
G		0.10	0.15		0.004	0.006
H	0.20			0.008		
I	0		0.10	0		0.004

**Marking**


S10: Device Code

**Ordering Information-SOT-23**

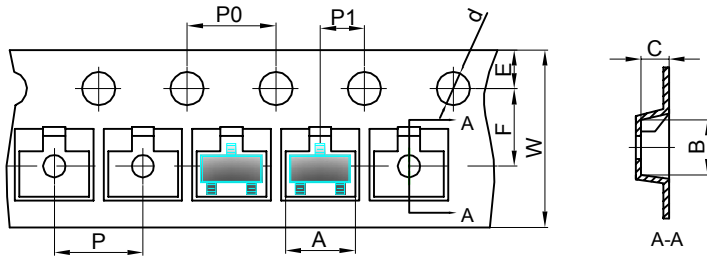
OUTLINE	PACKAGE TYPE	QUANTITY REEL	DESCRIPTION
TAPING	SOT-23	3,000pcs	7 inch reel pack





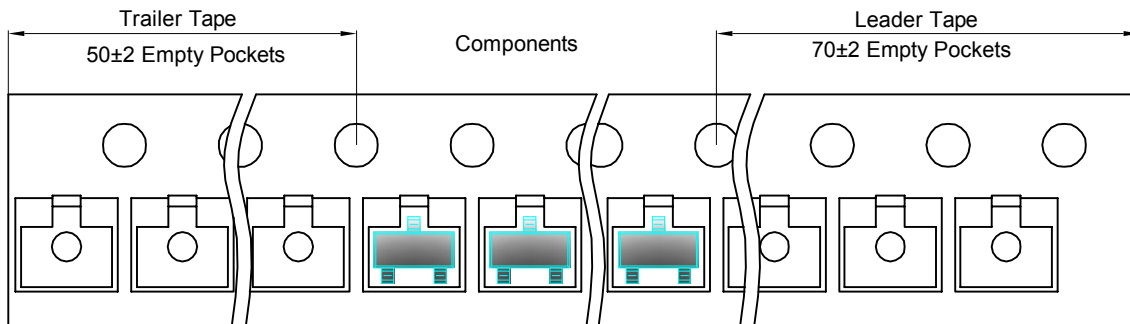
## SOT23 Tape and reel

SOT23 Embossed Carrier Tape



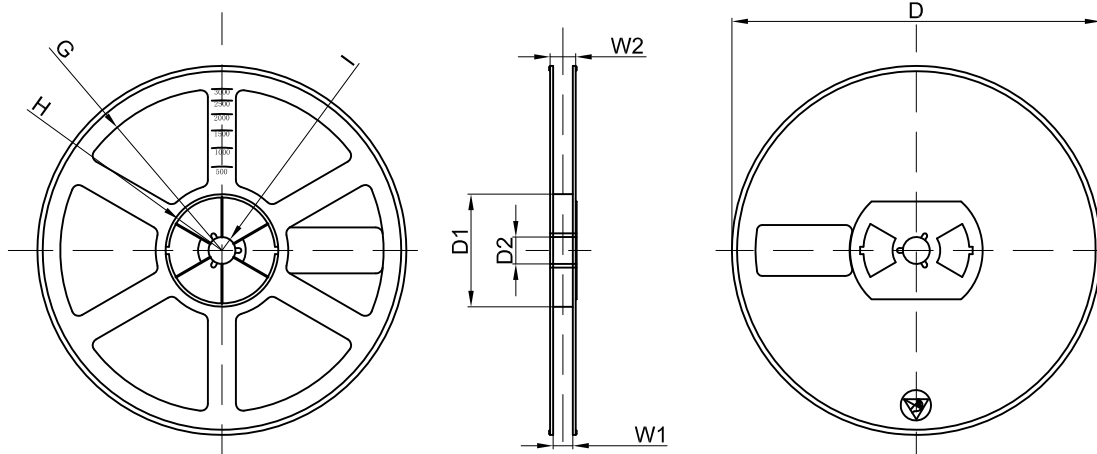
Dimensions are in millimeter										
Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

## SOT23 Tape Leader and Trailer



## SOT23 Reel

3000 pcs



Dimensions are in millimeter								
Reel Option	D	D1	D2	G	H	I	W1	W2
7" Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30