

# FDT55AN06LA0

## N-Channel PowerTrench® MOSFET

60V, 11A, 55mΩ

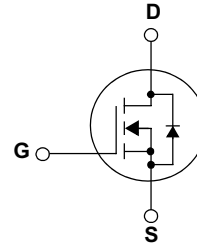
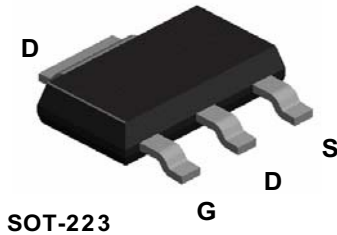
### Features

- $R_{DS(on)} = 44m\Omega$  (Typ.)@  $V_{GS} = 5V, I_D = 11A$
- $Q_{g(tot)} = 7.6nC$  (Typ.)@  $V_{GS} = 5V$ .
- Low Miller Charge
- Low  $Q_{RR}$  Body Diode
- UIS Capability
- RoHS compliant



### Applications

- Motor / Body load control
- Power train management
- DC-AC converters
- Distributed power architectures and VRMs



### MOSFET Maximum Ratings $T_C = 25^\circ C$ unless otherwise noted

Symbol	Parameter	Ratings	Units
$V_{DSS}$	Drain to Source Voltage	60	V
$V_{GSS}$	Gate to Source Voltage	$\pm 20$	V
$I_D$	Drain Current	-Continuous ( $T_C = 25^\circ C, V_{GS} = 10V$ )	12.1
		-Continuous ( $T_C = 25^\circ C, V_{GS} = 5V$ )	11
		-Continuous ( $T_C = 10^\circ C, V_{GS} = 5V$ )	7
$I_{DM}$	Drain Current	- Pulsed (Note 1)	36
$E_{AS}$	Single Pulsed Avalanche Energy	(Note 2)	34
$P_D$	Power Dissipation	( $T_C = 25^\circ C$ )	8.9
		- Derate above $25^\circ C$	0.071
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering Purpose, 1/8" from Case for 5 Seconds	300	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case	14	$^\circ C/W$
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	100	

\*When mounted on the minimum pad size recommended (PCB Mount)

**Package Marking and Ordering Information**  $T_C = 25^\circ\text{C}$  unless otherwise noted

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDT55AN06LA0	FDT55AN06LA0	SOT-223	330mm	12mm	4000

**Electrical Characteristics**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
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**Off Characteristics**

$BV_{DSS}$	Drain to Source Breakdown Voltage	$I_D = 250\mu\text{A}, V_{GS} = 0\text{V}, T_J = 25^\circ\text{C}$	60	-	-	V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$	-	-	1	$\mu\text{A}$
		$V_{DS} = 50\text{V}, T_C = 150^\circ\text{C}$	-	-	250	
$I_{GSS}$	Gate to Body Leakage Current	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$	-	-	$\pm 100$	nA

**On Characteristics**

$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 250\mu\text{A}$	1.0	-	3.0	V
$R_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 10\text{V}, I_D = 11\text{A}$	-	36	46	m $\Omega$
		$V_{DS} = 5\text{V}, I_D = 11\text{A}$	-	44	55	

**Dynamic Characteristics**

$C_{iss}$	Input Capacitance	$V_{DS} = 25\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$	-	849	1130	pF
$C_{oss}$	Output Capacitance		-	88	115	pF
$C_{rss}$	Reverse Transfer Capacitance		-	37	55	pF

**Switching Characteristics**

$t_{ON}$	Turn-On Time	$V_{DD} = 30\text{V}, I_D = 11\text{A}$ $V_{GS} = 5\text{V}, R_{GS} = 18\Omega$	-	34	78	ns
$t_{d(on)}$	Turn-On Delay Time		-	10	30	ns
$t_r$	Turn-On Rise Time		-	24	58	ns
$t_{d(off)}$	Turn-Off Delay Time		-	23	56	ns
$t_f$	Turn-Off Fall Time		-	12	34	ns
$t_{OFF}$	Turn-Off Time		-	35	80	ns
$Q_{g(tot)}$	Total Gate Charge at 10V	$V_{DS} = 30\text{V}, I_D = 11\text{A}$	-	7.6	10	nC
$Q_{gs}$	Gate to Source Gate Charge	$V_{GS} = 0\text{V to } 5\text{V}$	-	2.8	-	nC
$Q_{gd}$	Gate to Drain "Miller" Charge		-	2.7	-	nC

**Drain-Source Diode Characteristics**

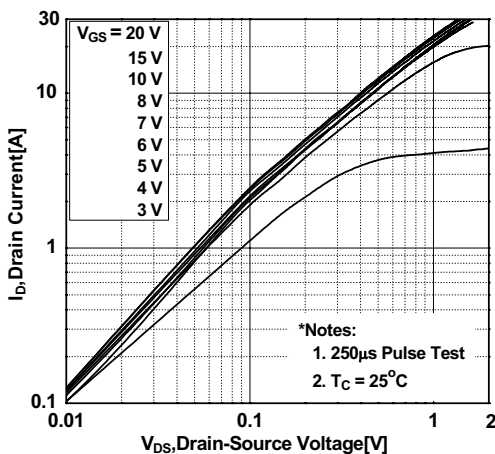
$I_S$	Maximum Continuous Drain to Source Diode Forward Current		-	-	12	A
$I_{SM}$	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
$V_{SD}$	Drain to Source Diode Forward Voltage	$V_{GS} = 0\text{V}, I_{SD} = 11\text{A}$	-	-	1.25	V
$t_{rr}$	Reverse Recovery Time	$V_{GS} = 0\text{V}, I_{SD} = 11\text{A}$	-	25	-	ns
$Q_{rr}$	Reverse Recovery Charge	$dI_F/dt = 100\text{A}/\mu\text{s}$	-	27	-	nC

**Notes:**

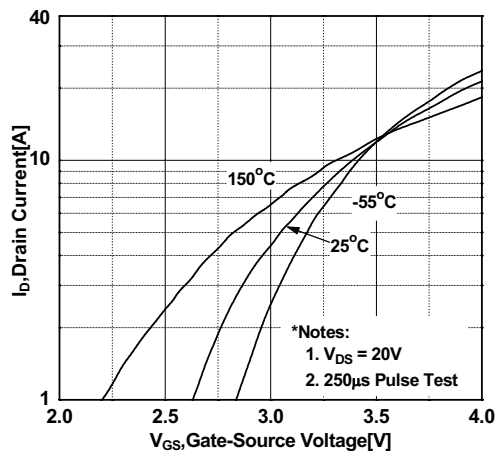
- 1: Repetitive Rating: Pulse width limited by maximum junction temperature
- 2:  $L = 0.21\text{mH}, I_{AS} = 18\text{A}, V_{DD} = 50\text{V}, R_G = 25\Omega$ , Starting  $T_J = 25^\circ\text{C}$
- 3:  $I_{SD} \leq 11\text{A}, di/dt \leq 200\text{A}/\mu\text{s}, V_{DD} \leq BV_{DSS}$ , Starting  $T_J = 25^\circ\text{C}$
- 4: Pulse Test: Pulse width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$
- 5: Essentially Independent of Operating Temperature Typical Characteristics

## Typical Performance Characteristics

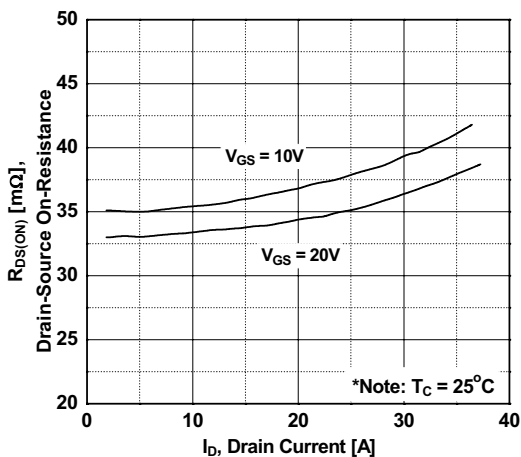
**Figure 1. On-Region Characteristics**



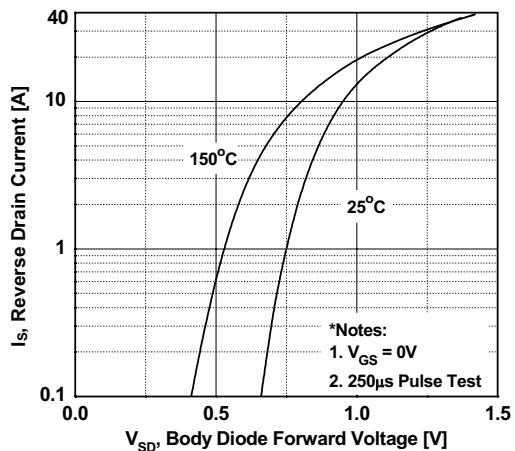
**Figure 2. Transfer Characteristics**



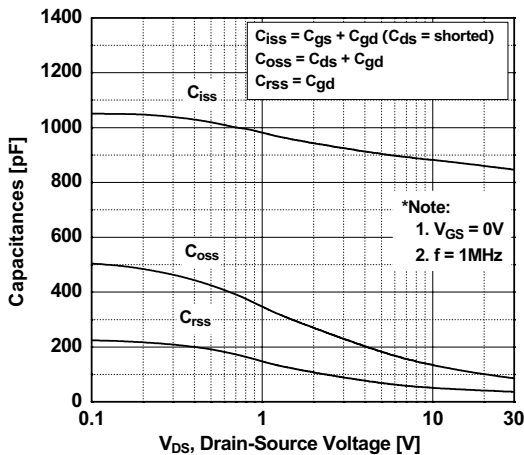
**Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage**



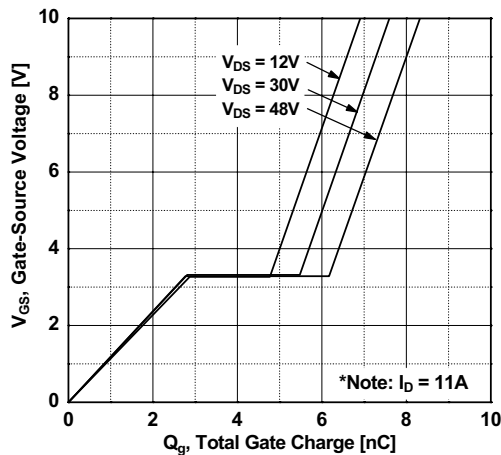
**Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature**



**Figure 5. Capacitance Characteristics**

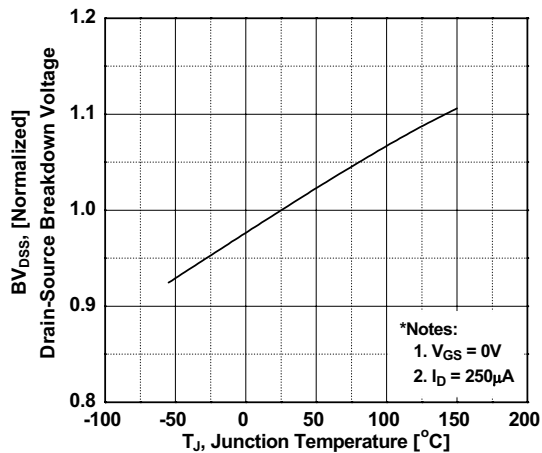


**Figure 6. Gate Charge Characteristics**

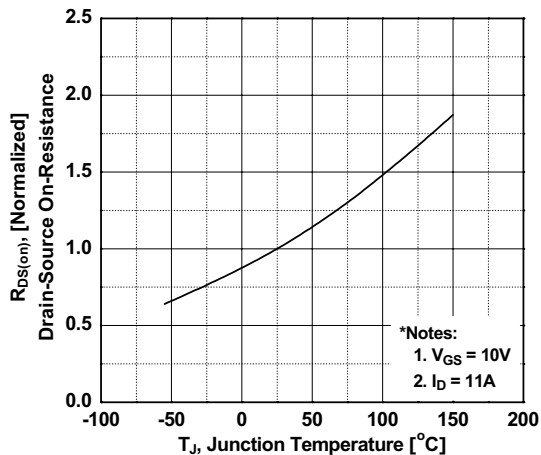


**Typical Performance Characteristics** (Continued)

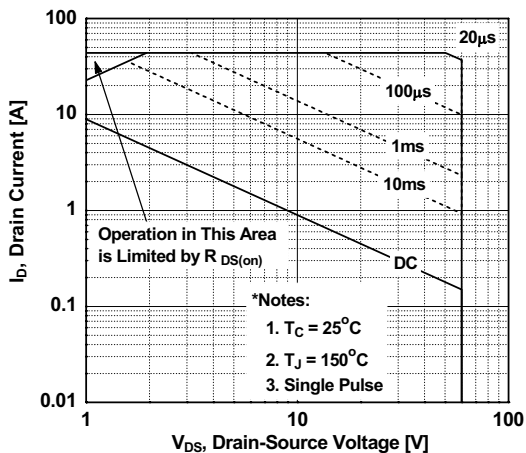
**Figure 7. Breakdown Voltage Variation vs. Temperature**



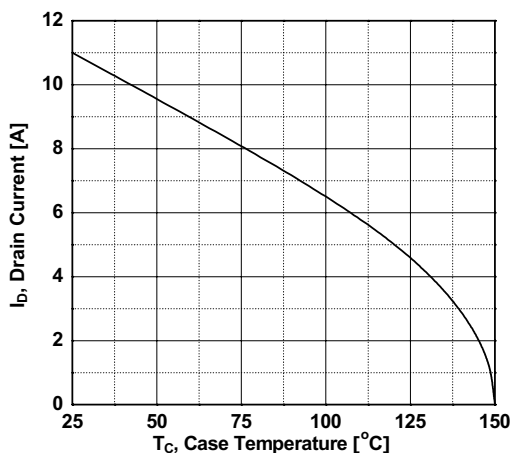
**Figure 8. On-Resistance Variation vs. Temperature**



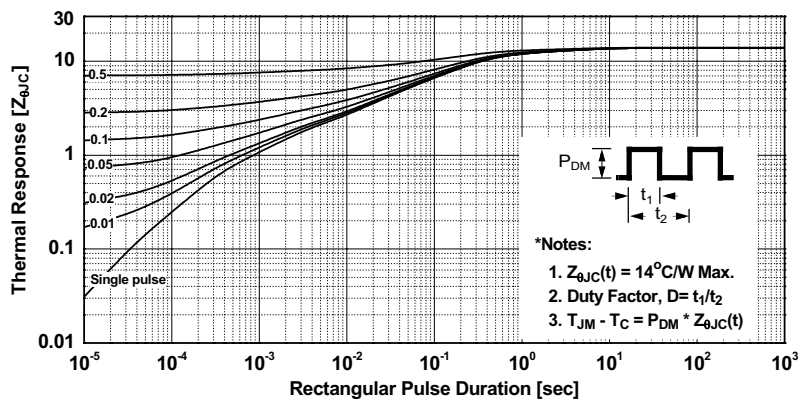
**Figure 9. Maximum Safe Operating Area**



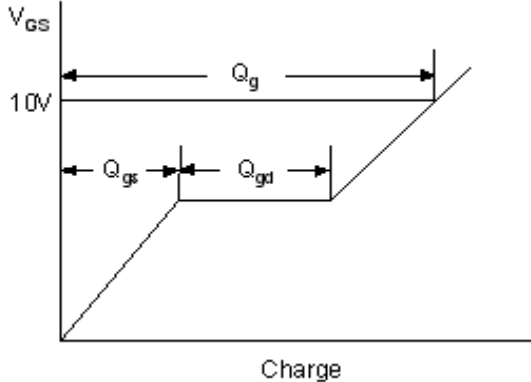
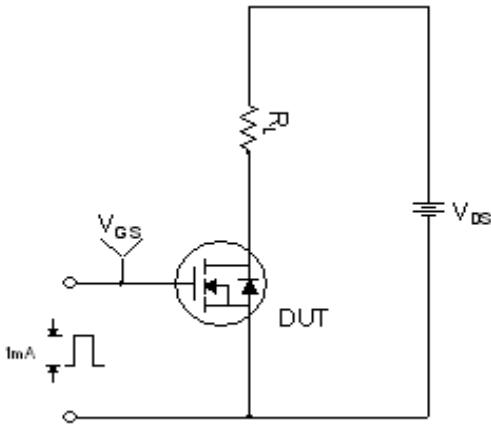
**Figure 10. Maximum Drain Current vs. Case Temperature**



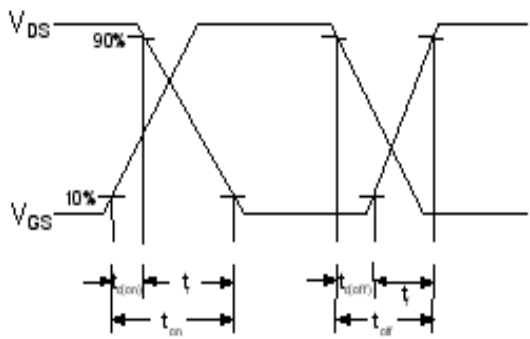
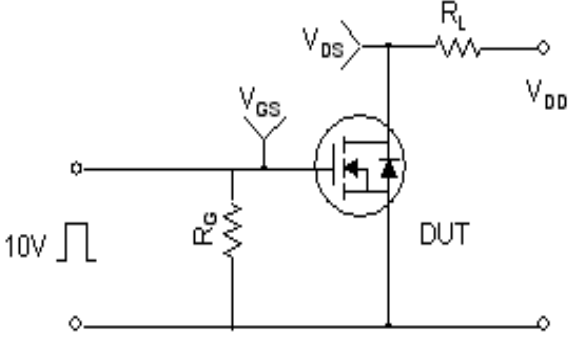
**Figure 11. Transient Thermal Response Curve**



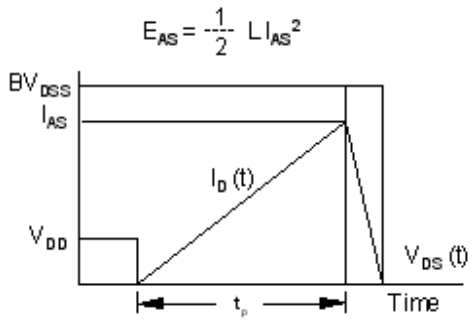
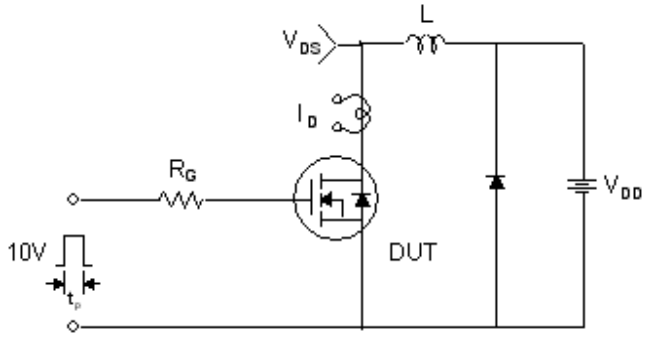
**Gate Charge Test Circuit & Waveform**



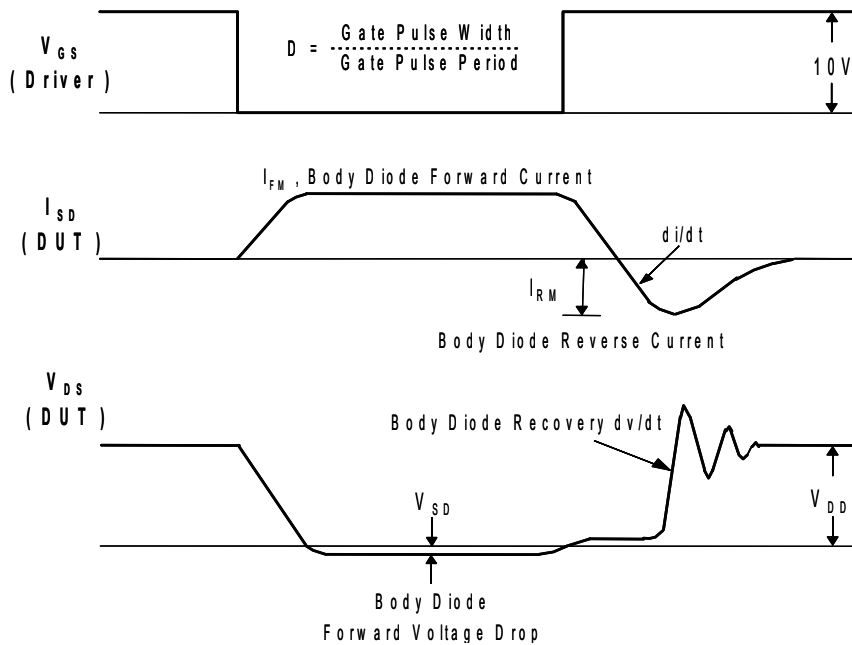
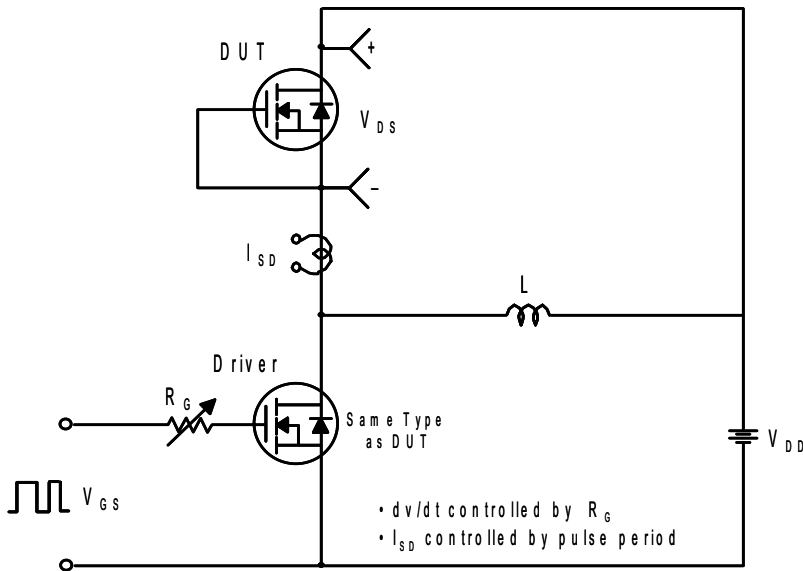
**Resistive Switching Test Circuit & Waveforms**



**Unclamped Inductive Switching Test Circuit & Waveforms**

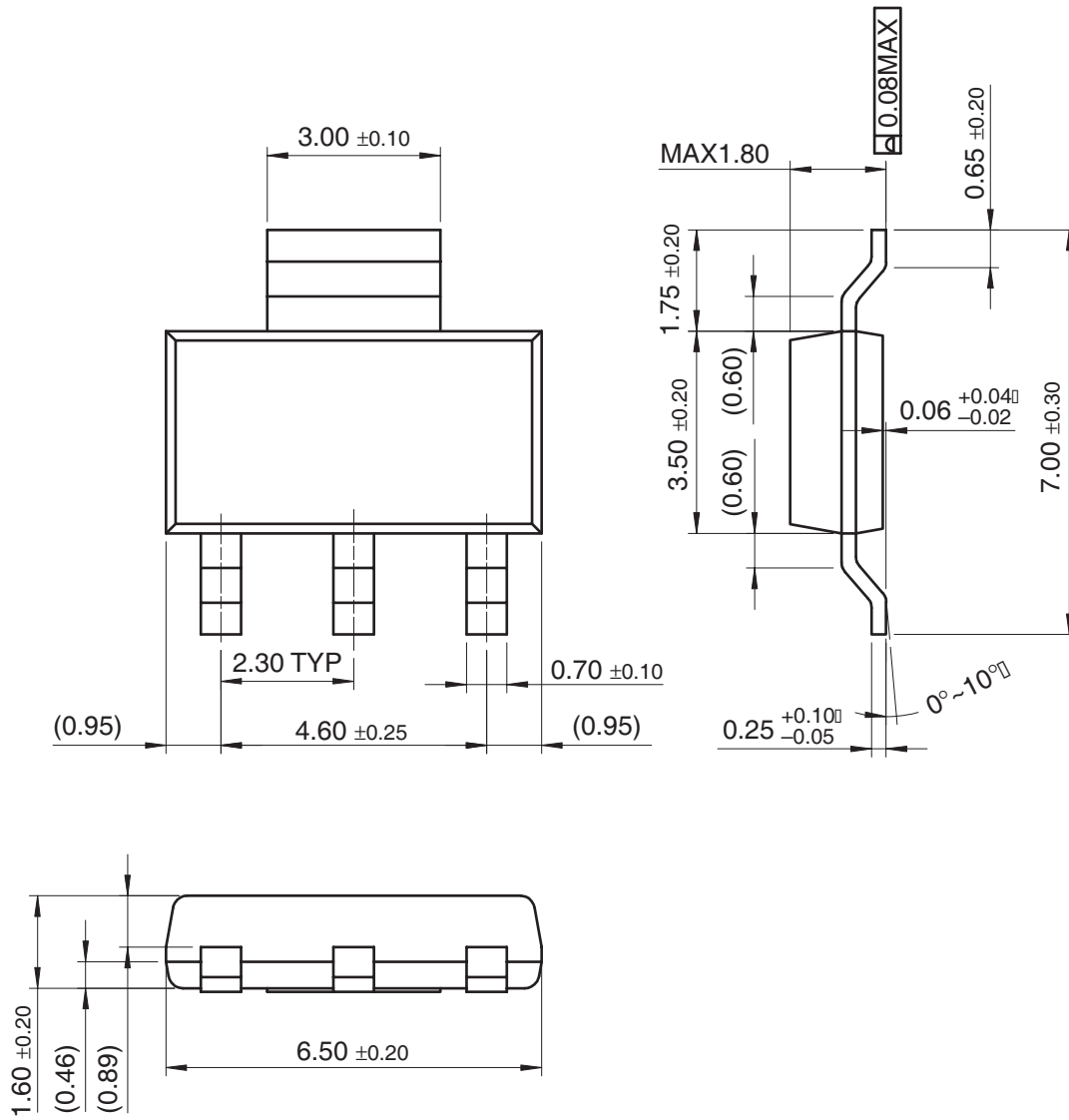


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions






SOT-223





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