

FDT55AN06LA0

N-Channel PowerTrench® MOSFET

60V, 11A, 55mΩ

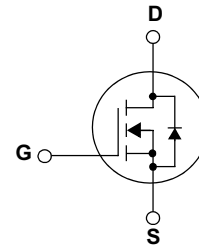
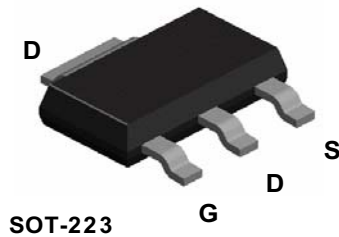
Features

- $R_{DS(on)} = 44m\Omega$ (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	± 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

$B_{V_{DSS}}$	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	μA
		$V_{DS} = 50\text{V}$, $T_C = 150^\circ\text{C}$	-	-	250	
I_{GSS}	Gate to Body Leakage Current	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	-	-	± 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 Ω
		$V_{DS} = 5\text{V}$, $I_D = 11\text{A}$	-	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 5V	-	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: $I_{SD} \leq 11\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq B_{V_{DSS}}$, 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

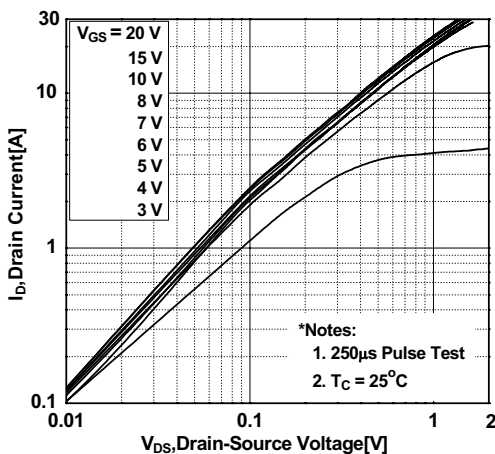


Figure 2. Transfer Characteristics

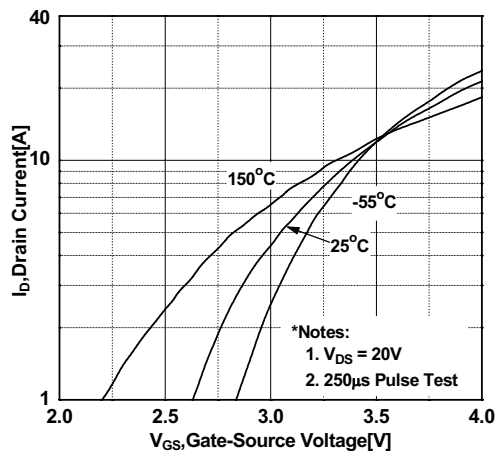


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

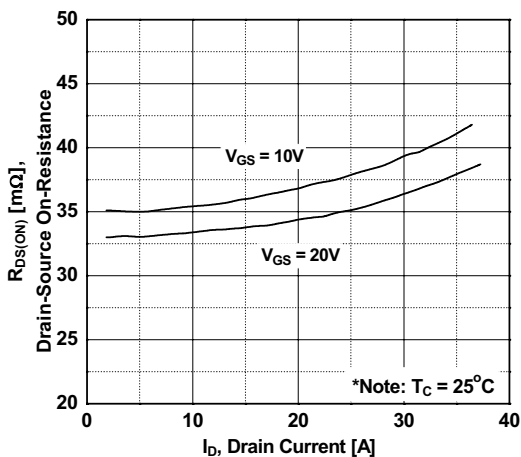


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

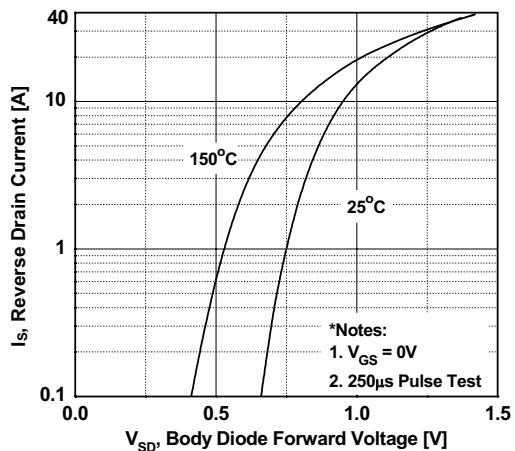


Figure 5. Capacitance Characteristics

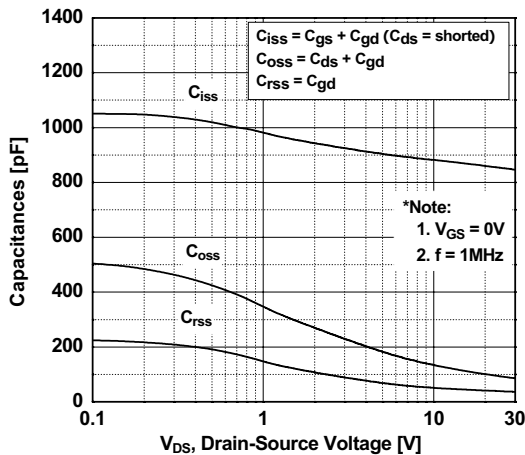
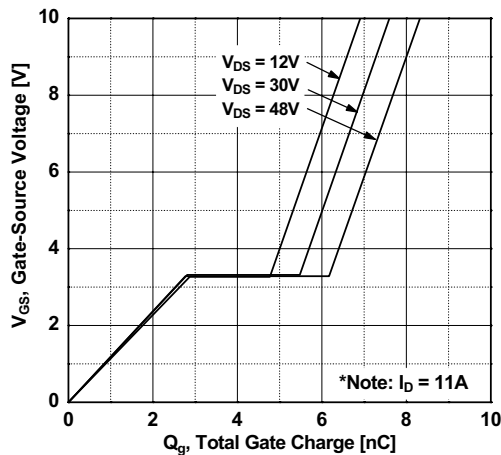


Figure 6. Gate Charge Characteristics



Typical Performance Characteristics (Continued)

Figure 7. Breakdown Voltage Variation vs. Temperature

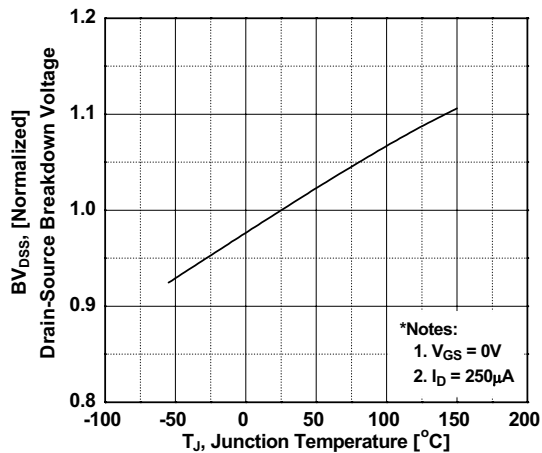


Figure 8. On-Resistance Variation vs. Temperature

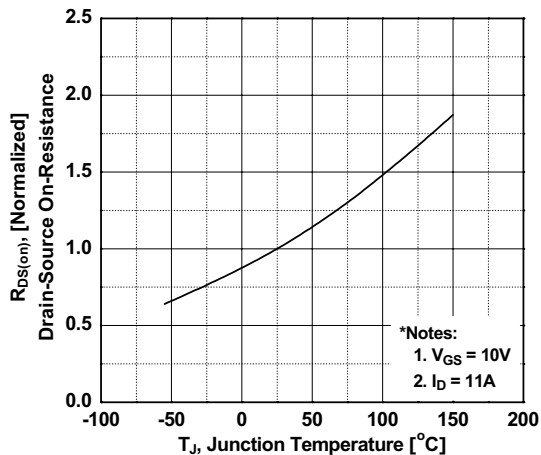


Figure 9. Maximum Safe Operating Area

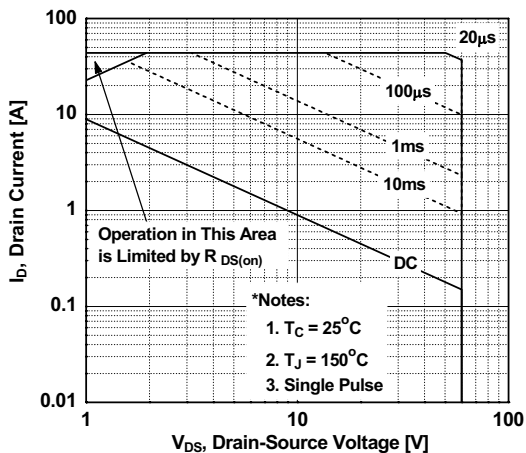


Figure 10. Maximum Drain Current vs. Case Temperature

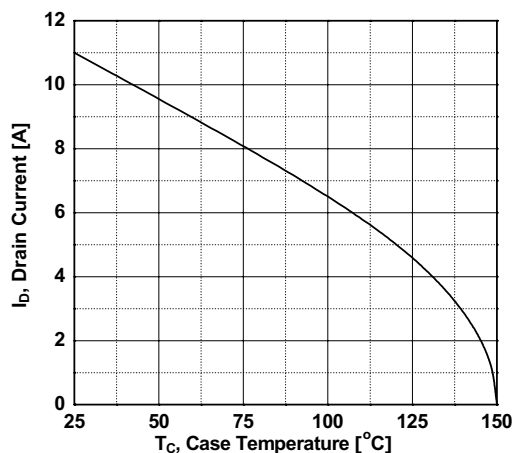
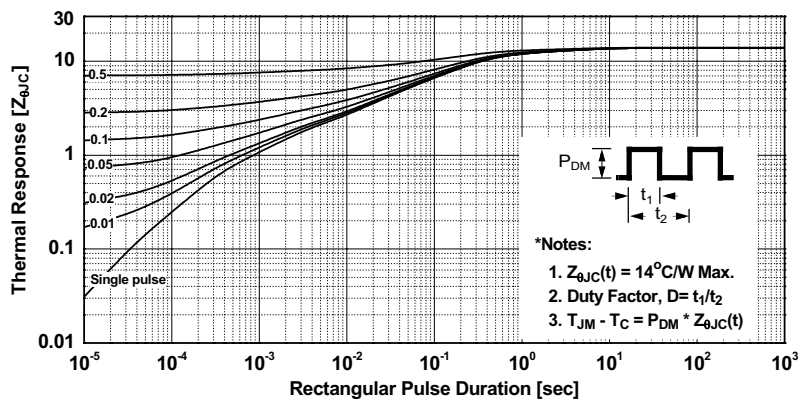
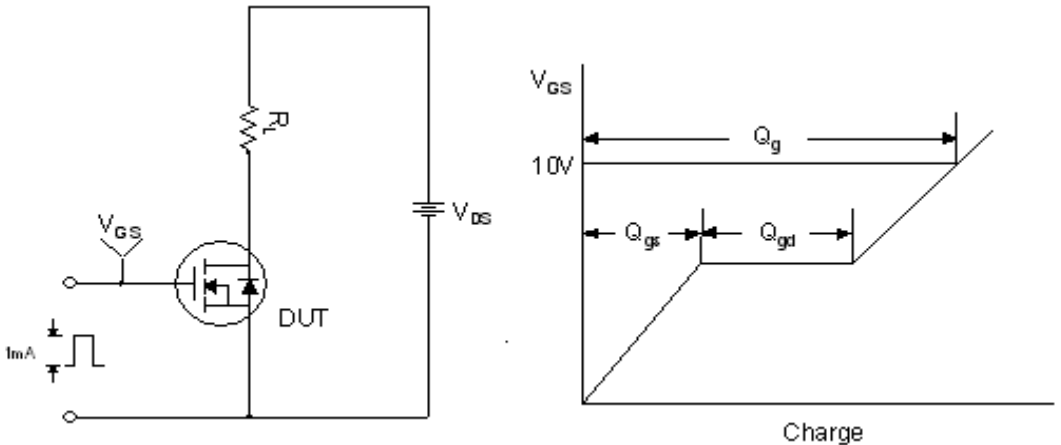


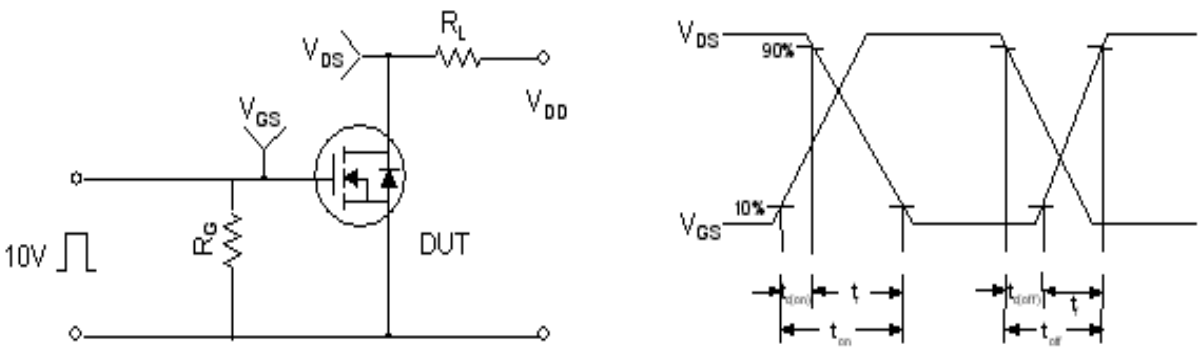
Figure 11. Transient Thermal Response Curve



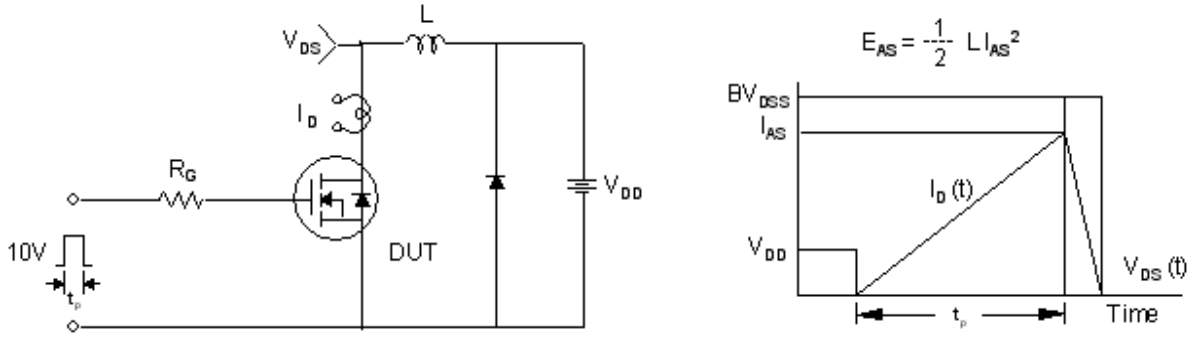
Gate Charge Test Circuit & Waveform



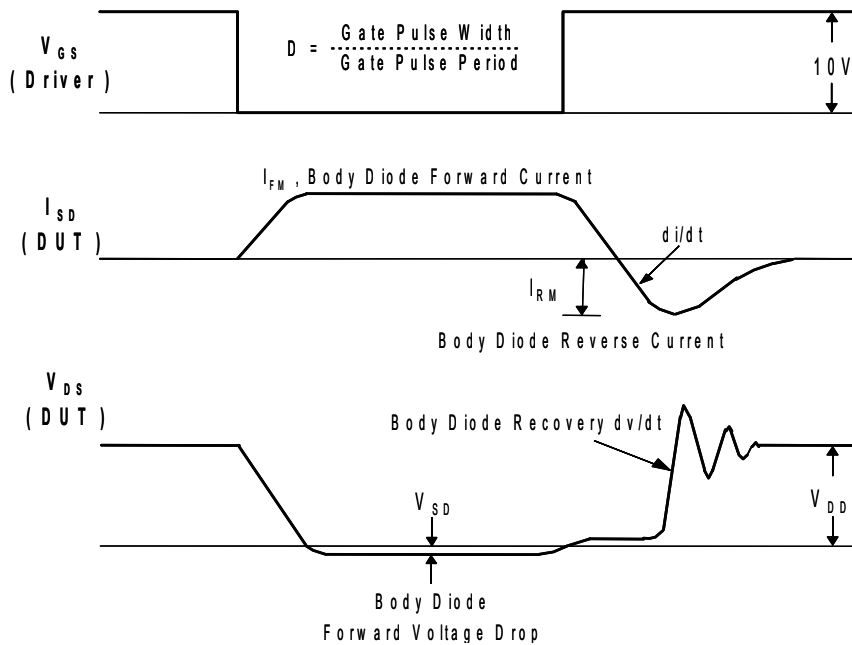
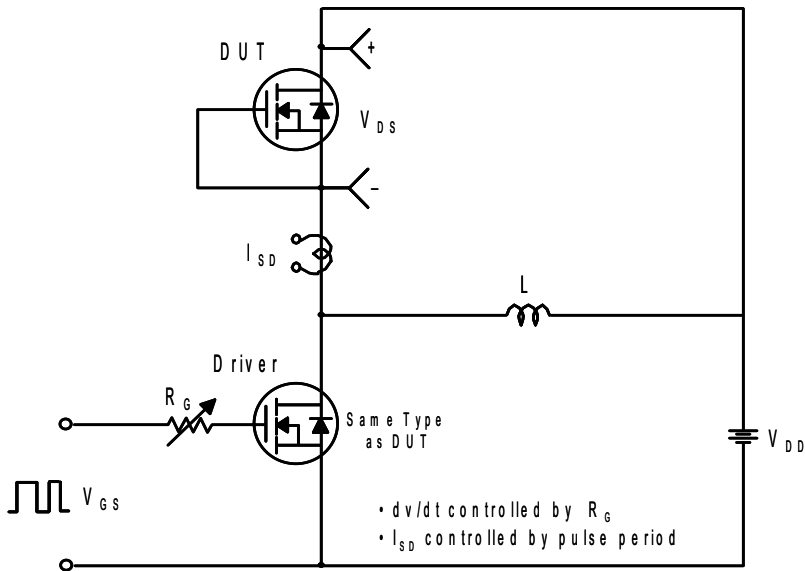
Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching Test Circuit & Waveforms

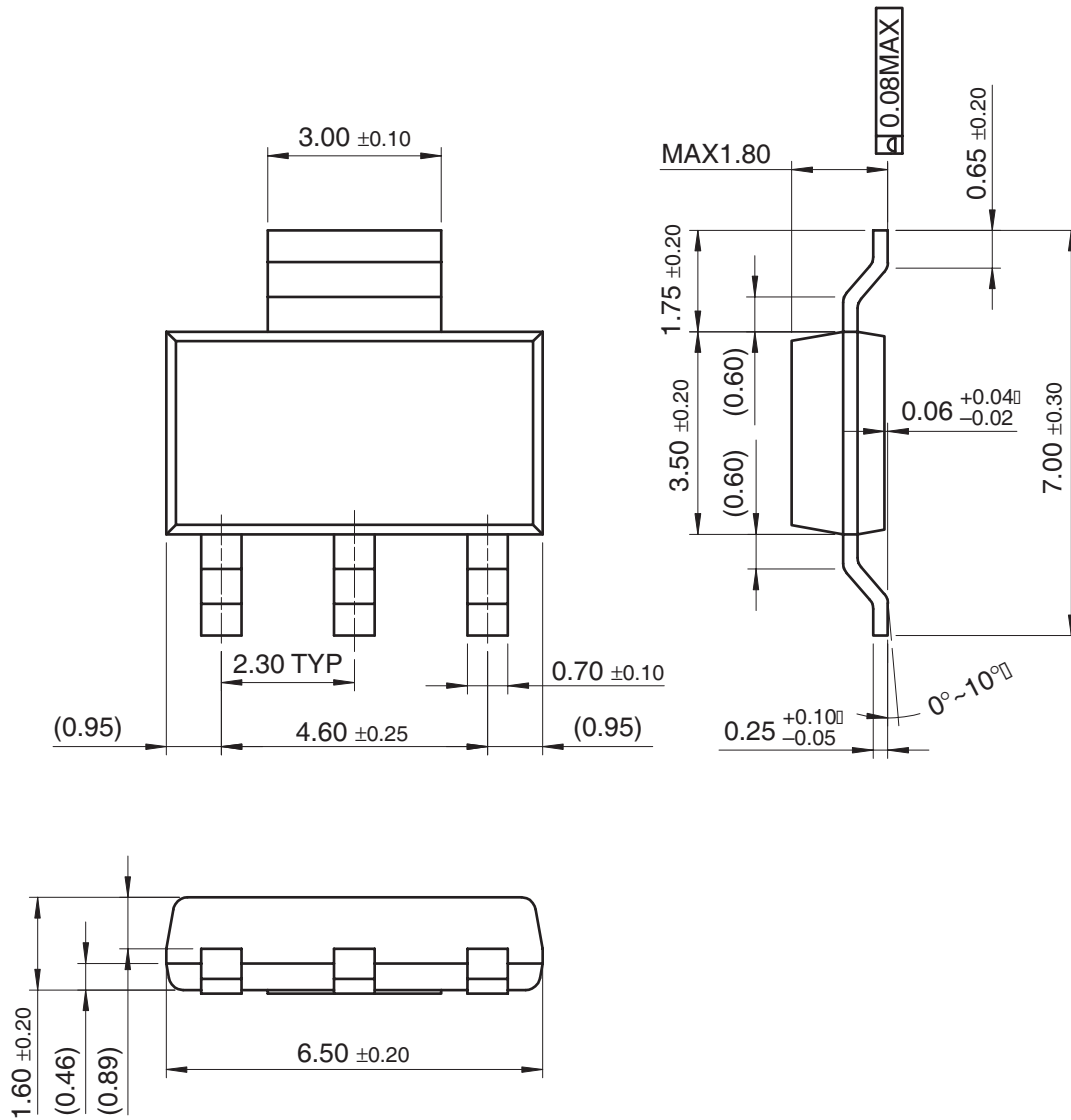


Peak Diode Recovery dv/dt Test Circuit & Waveforms



Mechanical Dimensions






SOT-223





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