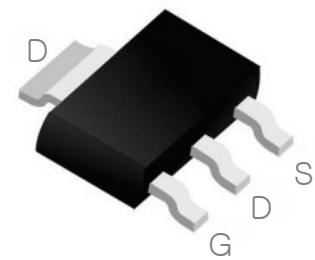
60V, 11A, 90mΩ N-Channel Power MOSFET

FEATURES

- 100% UIS and Rg tested
- Logic-level gate drive
- Fast switching
- RoHS Compliant
- Halogen-Free according to IEC 61249-2-21

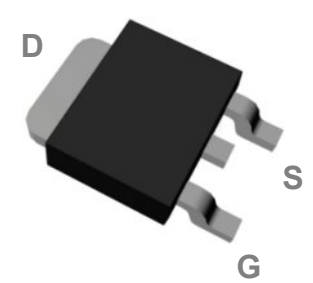
APPLICATIONS

- DC-DC Converters
- Solenoid and Motor Drivers



FTK900N06T

SOT-223



FTK900N06D

D-PAK (TO-252)

PRODUCT SUMMARY			
PARAMETER		**VALUE**	**UNIT**
V_{DS}		60	V
$R_{DS(on)}$ (max)	V_{GS} = 10V	110	mΩ
	V_{GS} = 4.5V	130	
Q_g	V_{GS} = 10V	11	nC

Note: MSL 3 (Moisture Sensitivity Level) per J-STD-020

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)					
PARAMETER			**SYMBOL**	**LIMIT**	**UNIT**
Drain-Source Voltage			V_{DS}	60	V
Gate-Source Voltage			V_{GS}	±20	V
Continuous Drain Current (Note 1)	T_C = 25°C		I_D	22	A
	T_C = 100°C			7	
Pulsed Drain Current (Note 2)			I_{DM}	44	A
Single Pulse Avalanche Current (Note 3)			I_{AS}	7	A
Single Pulse Avalanche Energy (Note 3)			E_{AS}	25	mJ
Total Power Dissipation	T_C = 25°C	P_D	SOT-223	7.8	W
			TO-252	20	W
Operating Junction and Storage Temperature Range			T_J, T_{STG}	- 55 to +150	°C

THERMAL RESISTANCE				
PARAMETER		**SYMBOL**	**MAXIMUM**	**UNIT**
Thermal Resistance – Junction to Case	SOT-223	$R_{\theta JC}$	16	°C/W
	TO-252	$R_{\theta JC}$	6	°C/W
Thermal Resistance – Junction to Ambient	SOT-223	$R_{\theta JA}$	70	°C/W
	TO-252	$R_{\theta JC}$	62	°C/W

Note: $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistances. The case-thermal reference is defined at the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)						
PARAMETER	**CONDITIONS**	**SYMBOL**	**MIN**	**TYP**	**MAX**	**UNIT**
Static						
Drain-Source Breakdown Voltage	V_{GS} = 0V, I_D = 250μA	BV_{DSS}	60	--	--	V
Gate Threshold Voltage	V_{GS} = V_{DS}, I_D = 250μA	$V_{GS(TH)}$	0.8	1.4	2.5	V
Gate-Source Leakage Current	V_{GS} = ±20V, V_{DS} = 0V	I_{GSS}	--	--	±100	nA
Drain-Source Leakage Current	V_{GS} = 0V, V_{DS} = 60V	I_{DSS}	--	--	1	μA
	V_{GS} = 0V, V_{DS} = 48V T_J = 125°C		--	--	10	
Drain-Source On-State Resistance (Note 4)	V_{GS} = 10V, I_D = 3A	$R_{DS(on)}$	--	90	110	mΩ
	V_{GS} = 4.5V, I_D = 1.5A		--	110	130	
Dynamic						
Total Gate Charge	V_{GS} = 10V, V_{DS} = 30V, I_D = 3A	Q_g	--	11	--	nC
Gate-Source Charge		Q_{gs}	--	1.4	--	
Gate-Drain Charge		Q_{gd}	--	1.8	--	
Input Capacitance	V_{GS} = 0V, V_{DS} = 30V, f = 1.0MHz	C_{iss}	--	525	--	pF
Output Capacitance		C_{oss}	--	30	--	
Reverse Transfer Capacitance		C_{rss}	--	24	--	
Gate Resistance	f = 1.0MHz	R_g	--	1.7	--	Ω
Switching (Note 5)						
Turn-On Delay Time	V_{GS} = 10V, V_{DS} = 30V, I_D = 3A, R_G = 1.5Ω	$t_{d(on)}$	--	6.5	--	ns
Rise Time		t_r	--	12	--	
Turn-Off Delay Time		$t_{d(off)}$	--	16	--	
Fall Time		t_f	--	1.8	--	
Source-Drain Diode						
Diode Forward Voltage (Note 4)	V_{GS} = 0V, I_S = 3A	V_{SD}	--	--	1.2	V
Reverse Recovery Time	I_S = 3A, V_{GS} = 30V di/dt = 100A/μs	t_{rr}	--	14	--	ns
Reverse Recovery Charge		Q_{rr}	--	10	--	nC

Notes:

1. Limited by maximum junction temperature.
2. Pulsed width limited by maximum junction temperature.
3. L = 1mH , V_{GS} = 10V, R_G = 25Ω , Starting T_J = 25°C.
4. Pulse test: Pulse Width ≤ 300μs, duty cycle ≤ 2%.
5. Switching time is essentially independent of operating temperature.

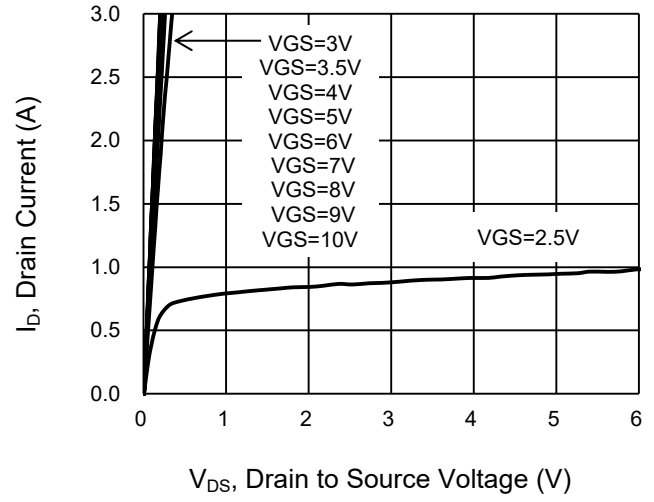
ORDERING INFORMATION

ORDERING CODE	PACKAGE	PACKING
FTK900N06T	SOT-223	4.0kpcs / 13 ” Reel
FTK900N06D	TO-252	2.5kpcs / 13 ” Reel

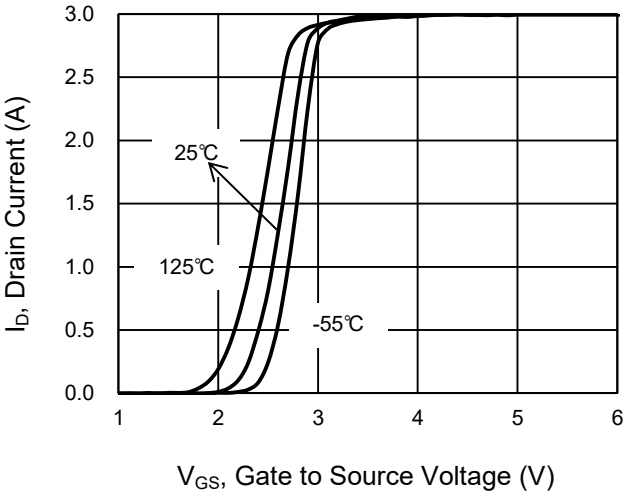
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

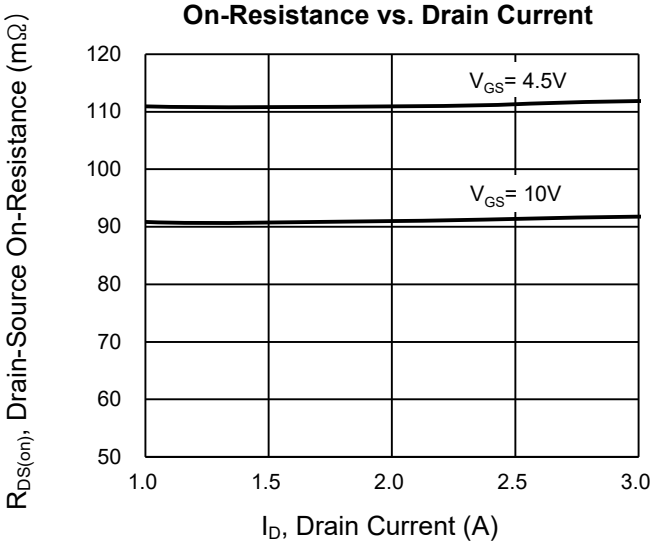
Output Characteristics



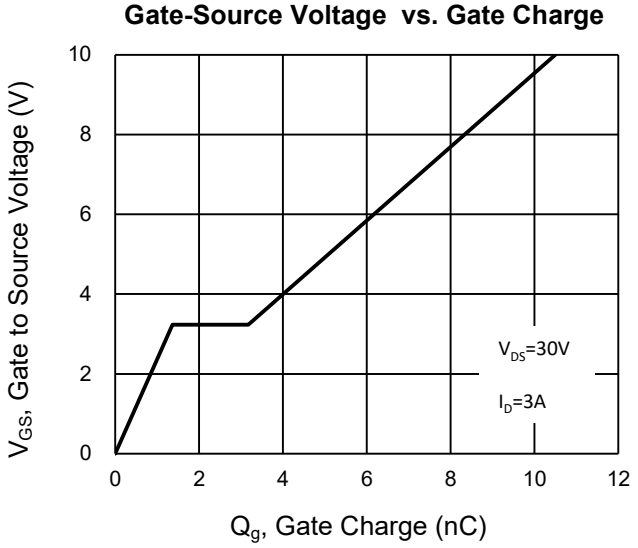
Transfer Characteristics



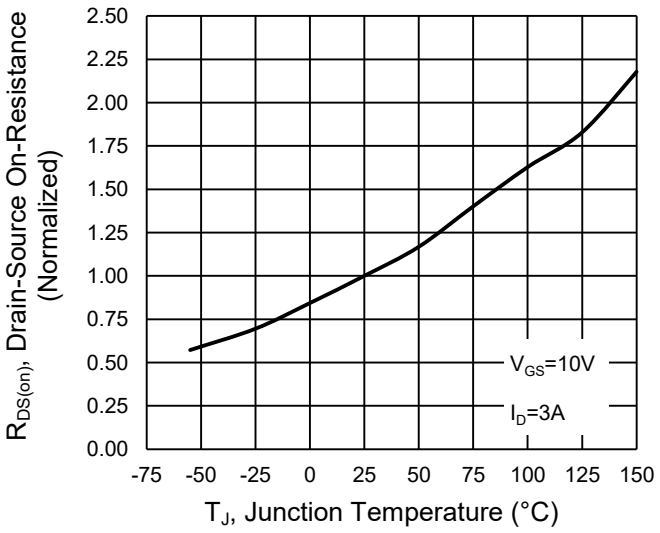
On-Resistance vs. Drain Current



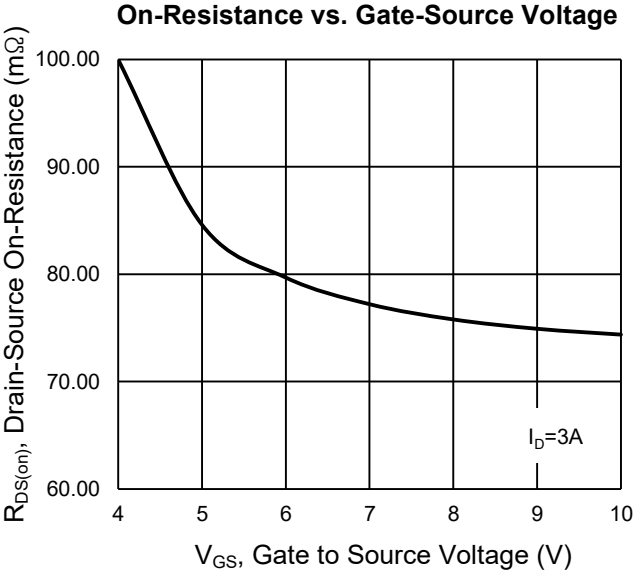
Gate-Source Voltage vs. Gate Charge



On-Resistance vs. Junction Temperature



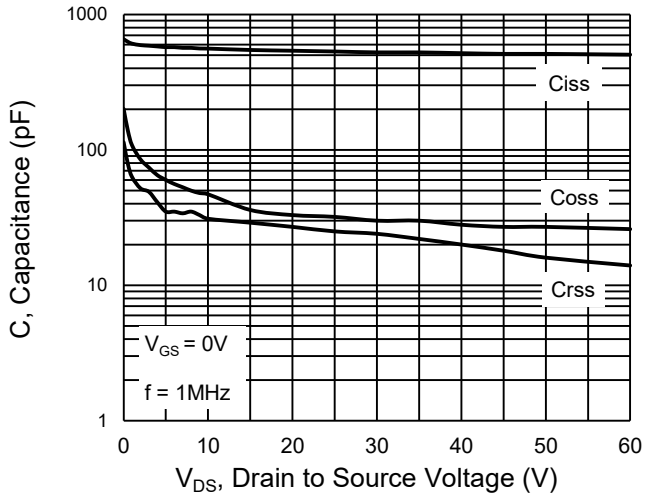
On-Resistance vs. Gate-Source Voltage



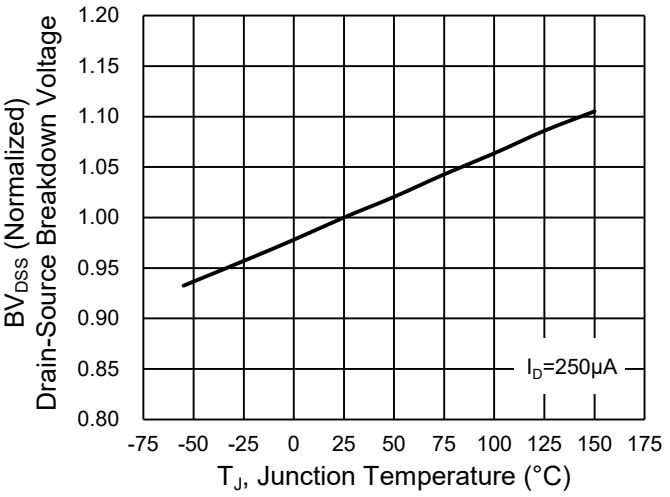
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

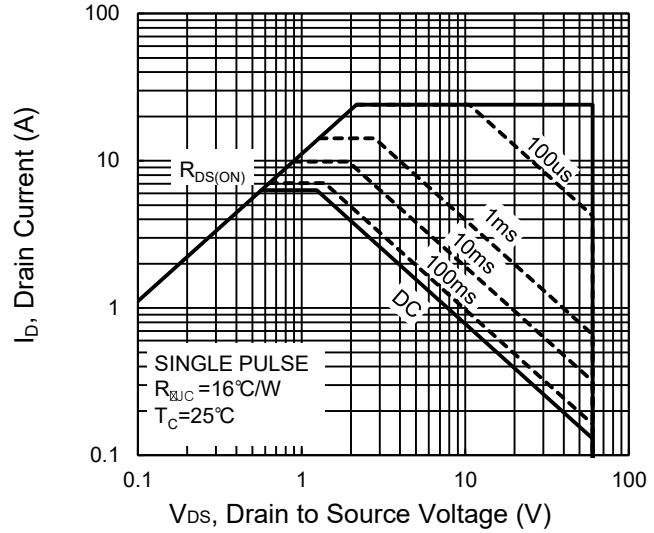
Capacitance vs. Drain-Source Voltage



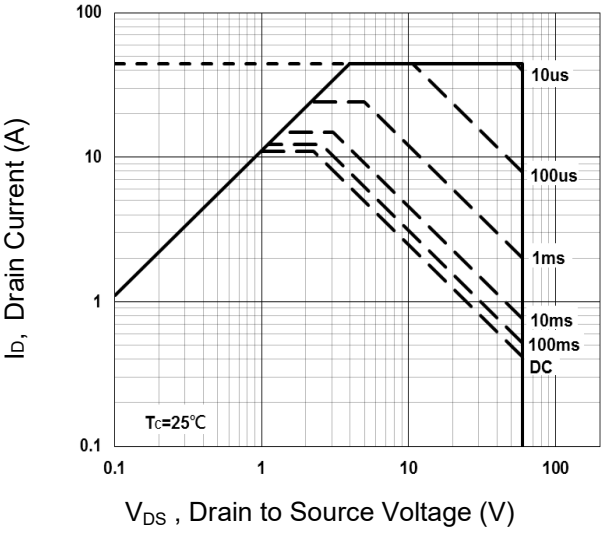
BV_{DSS} vs. Junction Temperature



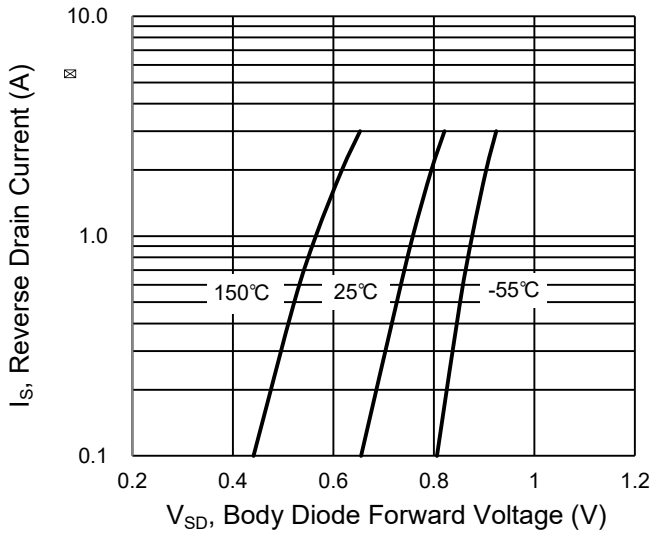
Maximum Safe Operating Area, Junction-to-Case(SOT-223)



Maximum Safe Operating Area, Junction-to-Case(TO-252)



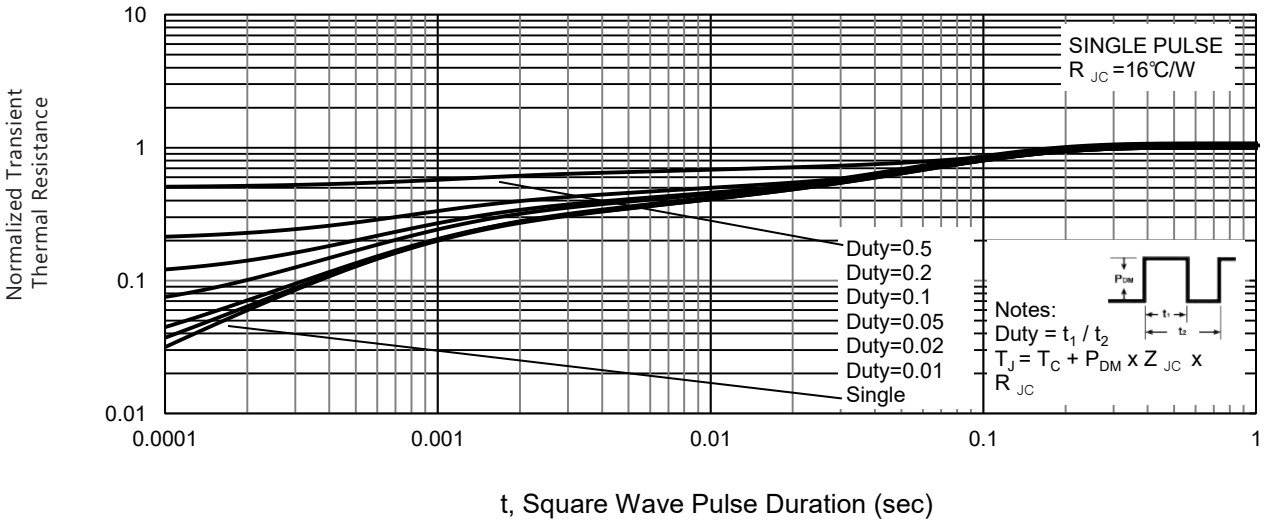
Source-Drain Diode Forward Current vs. Voltage



CHARACTERISTICS CURVES

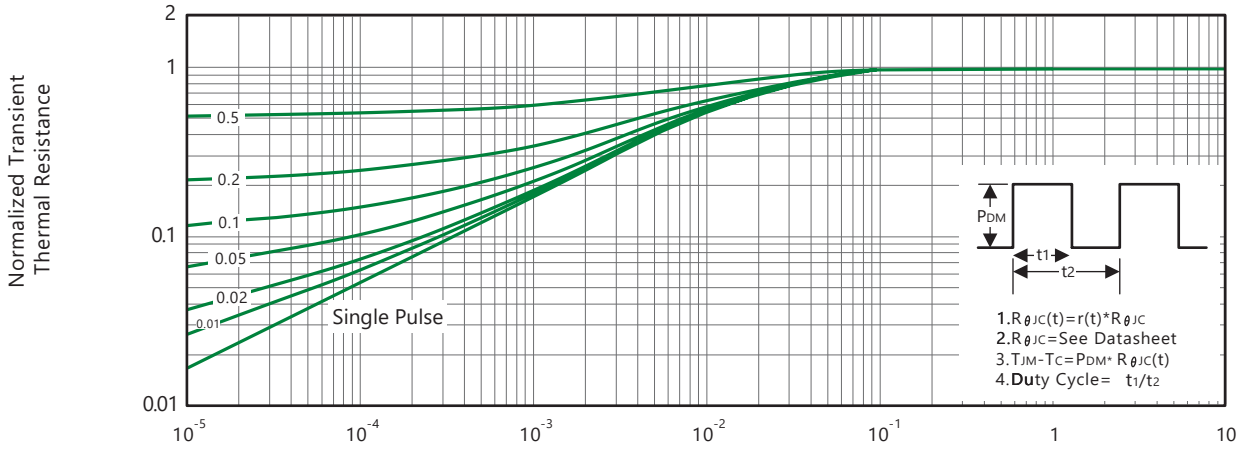
(T_A = 25°C unless otherwise noted)

Normalized Thermal Transient Impedance, Junction-to-Cas (SOT-223)



t, Square Wave Pulse Duration (sec)

Normalized Thermal Transient Impedance, Junction-to-Cas (TO-252)

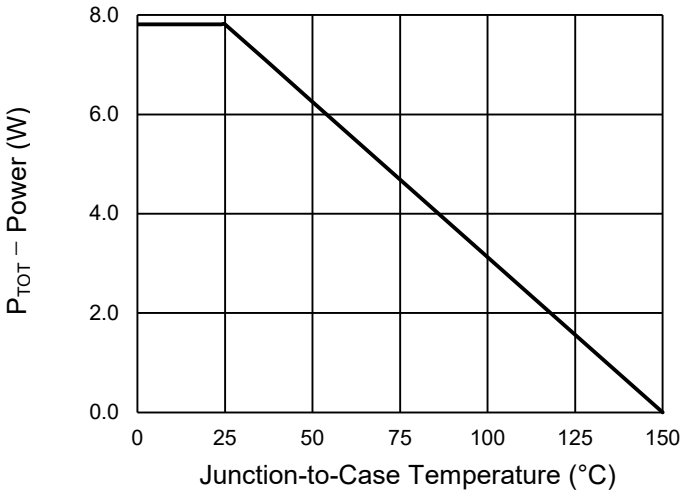


t, Square Wave Pulse Duration (sec)

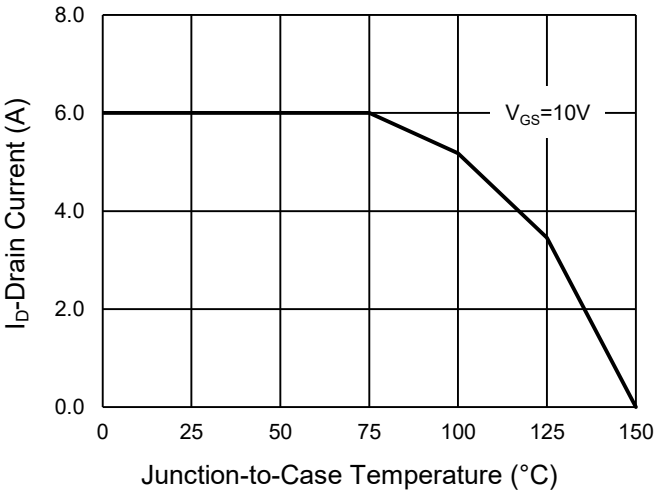
CHARACTERISTICS CURVES

(T_A = 25°C unless otherwise noted)

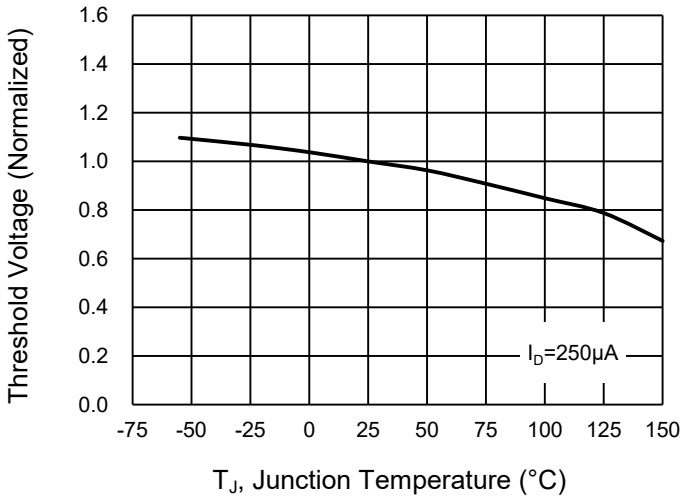
Power Dissipation (SOT-223)



Drain Current (SOT-223)

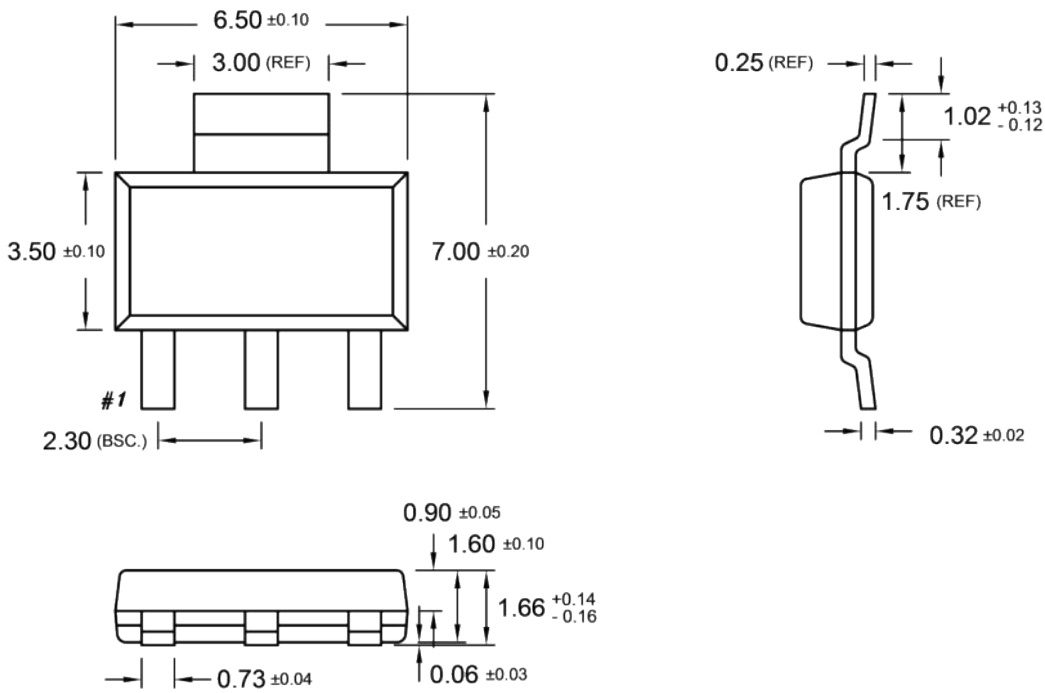


Normalized gate threshold voltage vs Temperature

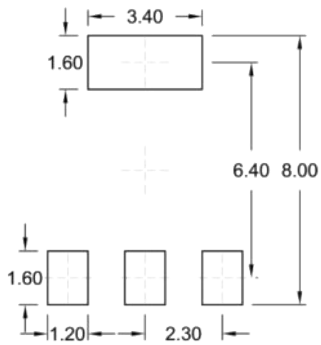


PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

SOT-223

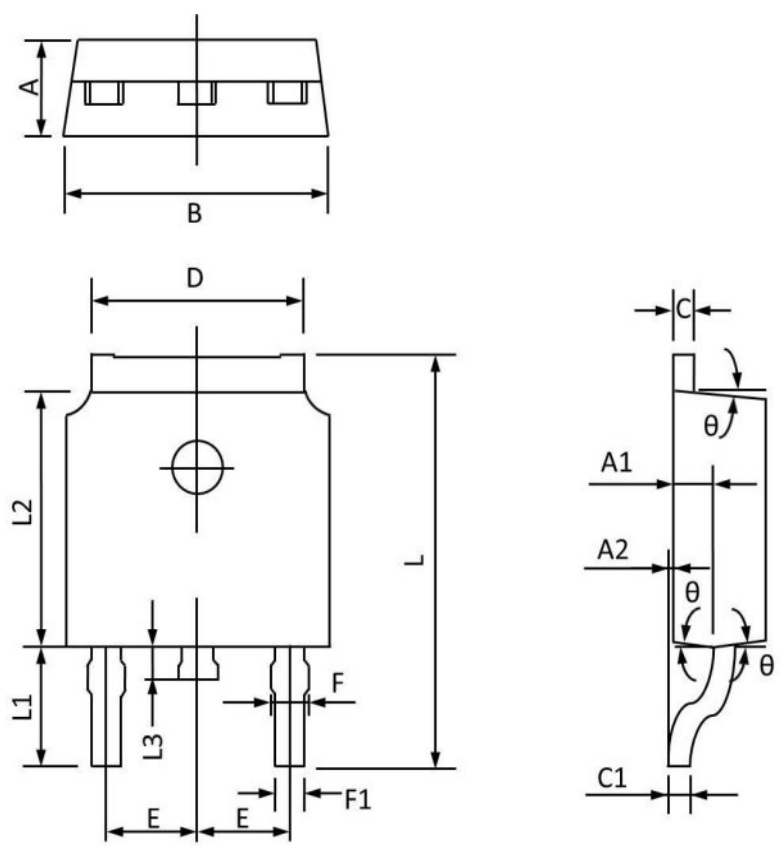


SUGGESTED PAD LAYOUT (Unit: Millimeters)



PACKAGE OUTLINE DIMENSIONS (Unit: Millimeters)

TO-252



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	2.450	2.150	0.096	0.085
A1	1.200	0.910	0.047	0.036
A2	0.150	0.000	0.006	0.000
B	6.800	6.300	0.268	0.248
C	0.580	0.350	0.023	0.014
C1	0.550	0.380	0.022	0.015
D	5.500	5.100	0.217	0.201
E	2.390	2.000	0.094	0.079
F	0.940	0.600	0.037	0.024
F1	0.860	0.500	0.034	0.020
L	10.400	9.400	0.409	0.370
L1	3.000	2.400	0.118	0.094
L2	6.200	5.300	0.244	0.209
L3	1.200	0.600	0.047	0.024
θ	9°	3°	9°	3°