

N- and P-Channel 60 V (D-S) MOSFET

PRODUCT SUMMARY			
	V _{DS} (V)	R _{DS(on)} (Ω)	I _D (A)
N-Channel	60	1.6 at V _{GS} = 10 V	0.45
		1.8 at V _{GS} = 4.5 V	0.4
P-Channel	- 60	4.5 at V _{GS} = - 10 V	- 0.25
		6.3 at V _{GS} = - 4.5 V	- 0.2

FEATURES

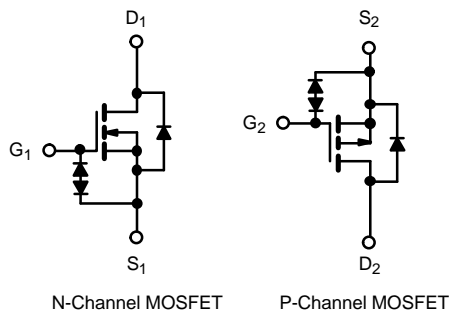
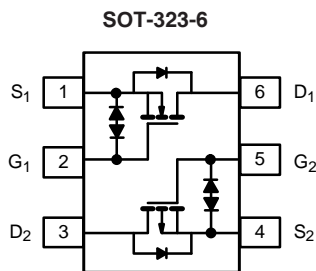
- DT-Trench Power MOSFET
- Very Small Footprint
- 100 % Rg and UIS Tested
- Gate-Source ESD Protected



RoHS
COMPLIANT

APPLICATIONS

- LED Inverter Circuits
- DC/DC Conversion Circuits
- Motor drives



ABSOLUTE MAXIMUM RATINGS (T _A = 25 °C, unless otherwise noted)				
Parameter	Symbol	N-Channel	P-Channel	Unit
Drain-Source Voltage	V _{DS}	60	- 60	V
Gate-Source Voltage	V _{GS}	± 20		
Continuous Drain Current (T _J = 150 °C) ^a	I _D	T _A = 25 °C	- 0.25	A
		T _A = 85 °C	- 0.19	
Pulsed Drain Current ^b	I _{DM}	1.8	- 1	
Continuous Source Current (Diode Conduction) ^a	I _S	0.45	- 0.25	
Maximum Power Dissipation ^a	P _D	T _A = 25 °C	0.3	W
		T _A = 85 °C	0.16	
Operating Junction and Storage Temperature Range	T _J , T _{stg}	- 55 to 150		°C

Notes:

- a. Surface mounted on FR4 board.
b. Pulse width limited by maximum junction temperature.

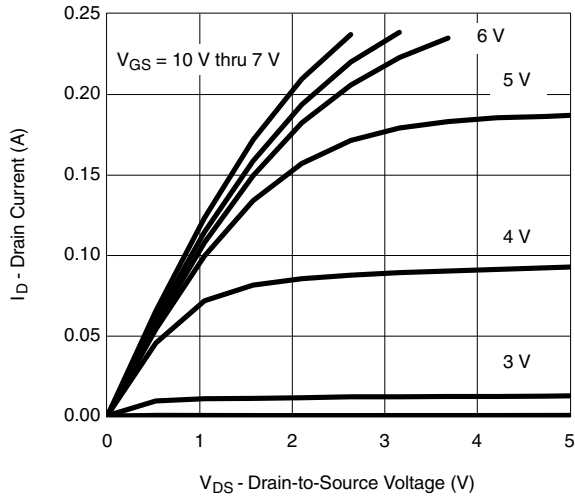
SPECIFICATIONS (T _J = 25 °C, unless otherwise noted)							
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Static							
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 10 μA	N-Ch	60			V
		V _{GS} = 0 V, I _D = - 10 μA	P-Ch	- 60			
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	N-Ch	1		3.0	V
		V _{DS} = V _{GS} , I _D = - 250 μA	P-Ch	- 1		- 3.0	
Gate-Body Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 5 V	N-Ch			± 50	nA
			P-Ch			± 100	
		V _{DS} = 0 V, V _{GS} = ± 10 V	N-Ch			± 150	
			P-Ch			± 200	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 50 V, V _{GS} = 0 V	N-Ch			10	nA
		V _{DS} = - 50 V, V _{GS} = 0 V	P-Ch			- 25	
		V _{DS} = 50 V, V _{GS} = 0 V, T _J = 85 °C	N-Ch			100	
		V _{DS} = - 50 V, V _{GS} = 0 V, T _J = 85 °C	P-Ch			- 250	
On-State Drain Current ^a	I _{D(on)}	V _{DS} = 10 V, V _{GS} = 4.5 V	N-Ch	1.5			A
		V _{DS} = - 10 V, V _{GS} = - 4.5 V	P-Ch	- 0.85			
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 4.5 V, I _D = 0.25 A	N-Ch		1.8	3.9	Ω
		V _{GS} = - 4.5 V, I _D = - 0.16 A	P-Ch		6.3	9.2	
		V _{GS} = 10 V, I _D = 0.3 A	N-Ch		1.6	2.2	
		V _{GS} = - 10 V, I _D = - 0.2 A	P-Ch		4.5	5.3	
Forward Transconductance ^a	g _{fs}	V _{DS} = 10 V, I _D = 0.2 A	N-Ch		12		ms
		V _{DS} = - 10 V, I _D = - 0.1A	P-Ch		10		
Diode Forward Voltage ^a	V _{SD}	I _S = 0.2 A, V _{GS} = 0 V	N-Ch			1.4	V
		I _S = - 0.2 A, V _{GS} = 0 V	P-Ch			- 1.4	
Dynamic^b							
Total Gate Charge	Q _g	N-Channel V _{DS} = 30 V, V _{GS} = 4.5 V, I _D = 0.25 A	N-Ch		1.2		nC
Gate-Source Charge	Q _{gs}		P-Ch		1.2		
Gate-Drain Charge	Q _{gd}	P-Channel V _{DS} = - 30 V, V _{GS} = - 4.5 V, I _D = - 0.2 A	N-Ch		0.2		
			P-Ch		0.4		
Input Capacitance	C _{iss}	N-Channel V _{DS} = 30 V, V _{GS} = 0 V, f = 1 MHz	N-Ch		60		pF
Output Capacitance	C _{oss}		P-Ch		83		
			N-Ch		18		
Reverse Transfer Capacitance	C _{rss}		P-Channel V _{DS} = - 30 V, V _{GS} = 0 V, f = 1 MHz	N-Ch		8	
Turn-On Time ^c	t _{ON}	N-Channel V _{DD} = 30 V, R _L = 150 Ω I _D ≅ 0.2 A, V _{GEN} = 10 V, R _g = 10 Ω	N-Ch		5		ns
			P-Ch		8		
Turn-Off Time ^c	t _{OFF}	P-Channel V _{DD} = - 25 V, R _L = 150 Ω I _D ≅ - 0.2 A, V _{GEN} = - 10 V, R _g = 10 Ω	N-Ch		15		
			P-Ch		13		

Notes:

- a. Pulse test; pulse width ≤ 300 μs, duty cycle ≤ 2 %.
- b. Guaranteed by design, not subject to production testing.
- c. Switching time is essentially independent of operating temperature.

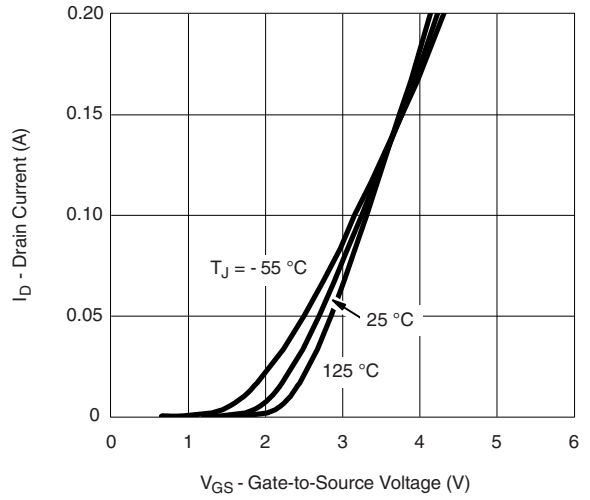
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

N-CHANNEL TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



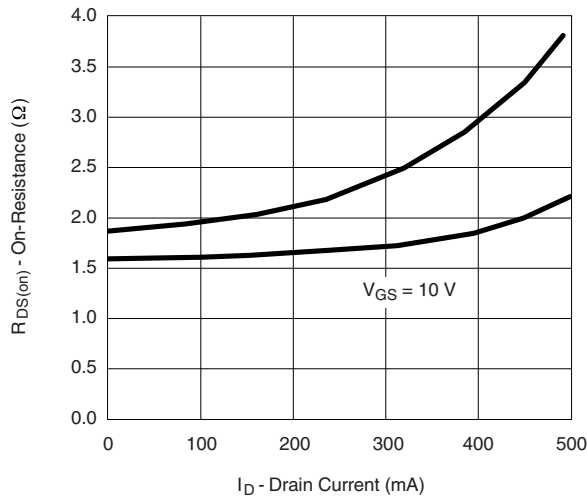
V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics



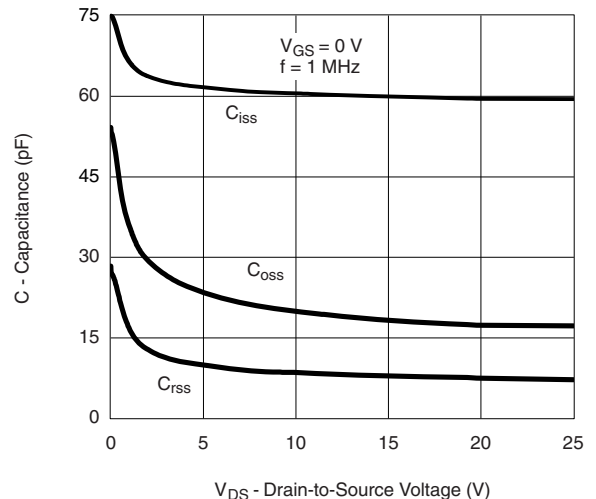
V_{GS} - Gate-to-Source Voltage (V)

Transfer Characteristics



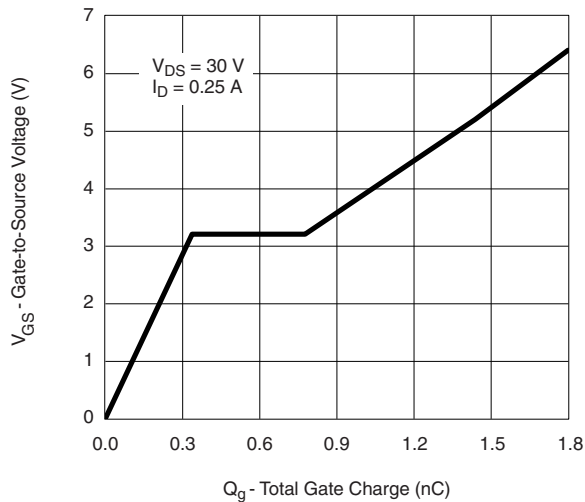
I_D - Drain Current (mA)

On-Resistance vs. Drain Current



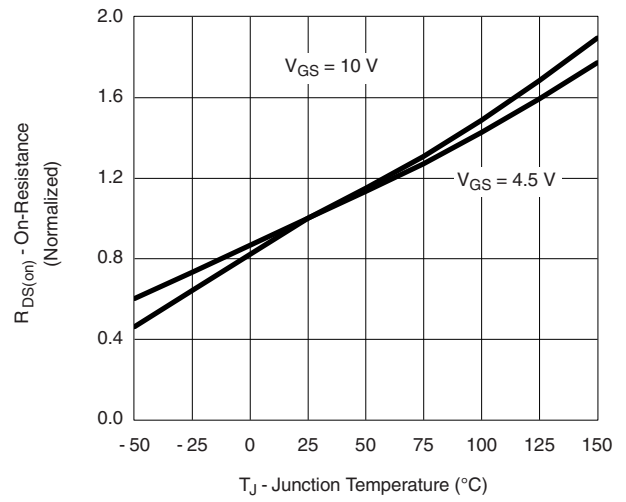
V_{DS} - Drain-to-Source Voltage (V)

Capacitance



Q_g - Total Gate Charge (nC)

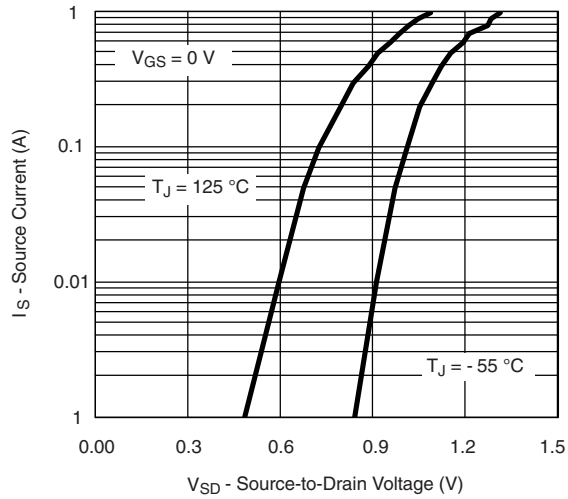
Gate Charge



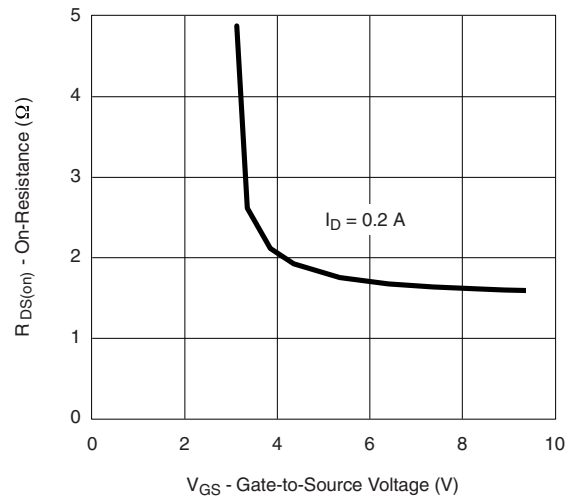
T_J - Junction Temperature ($^\circ\text{C}$)

On-Resistance vs. Junction Temperature

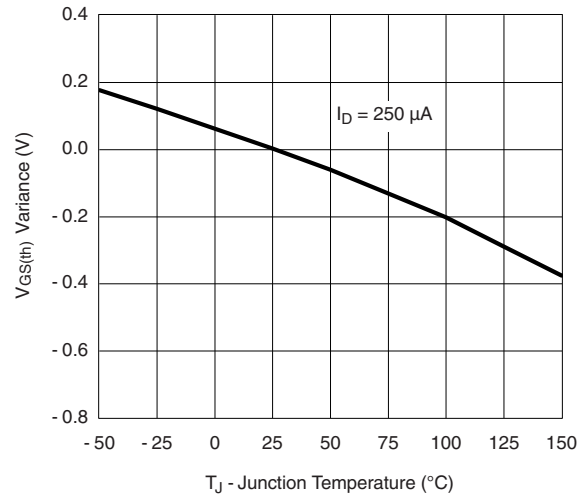
N-CHANNEL TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Source-Drain Diode Forward Voltage

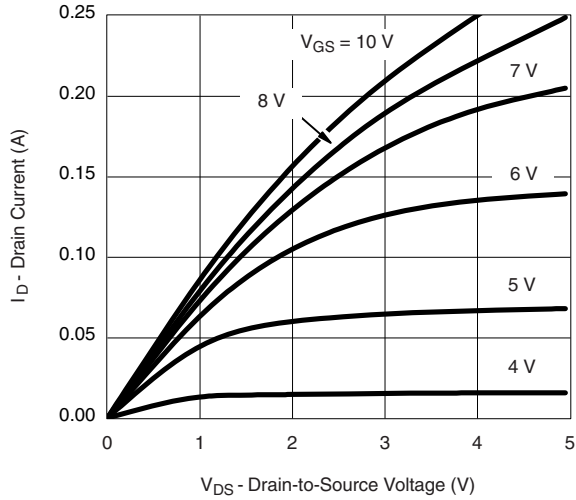


On-Resistance vs. Gate-to-Source Voltage

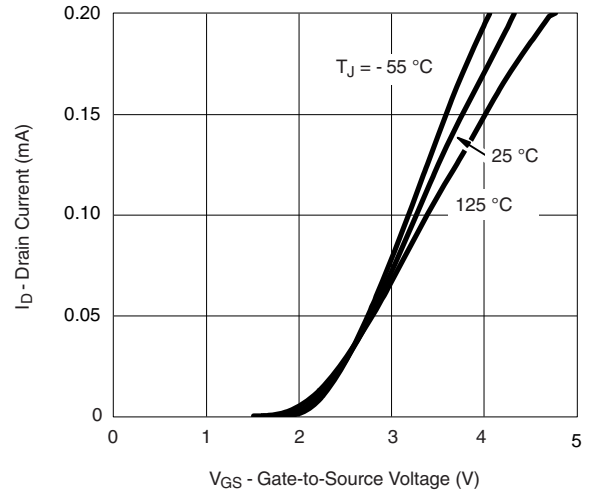


Threshold Voltage Variance Over Temperature

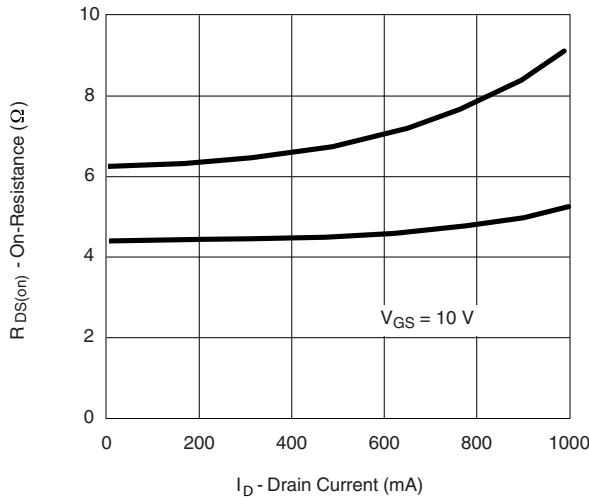
P-CHANNEL TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



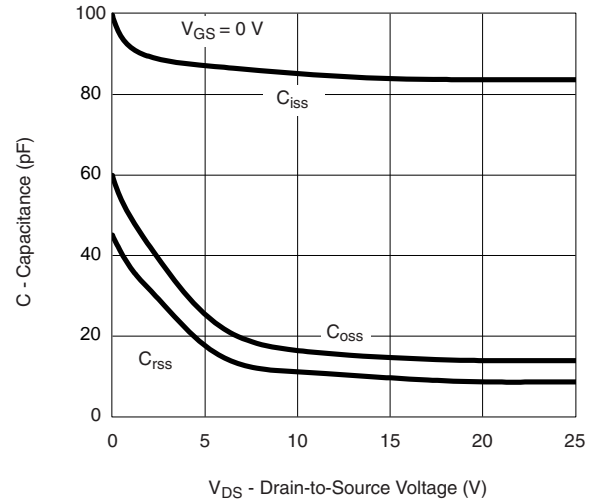
Output Characteristics



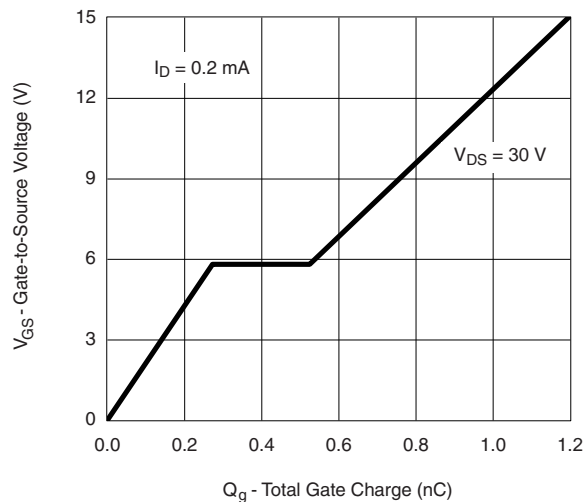
Transfer Characteristics



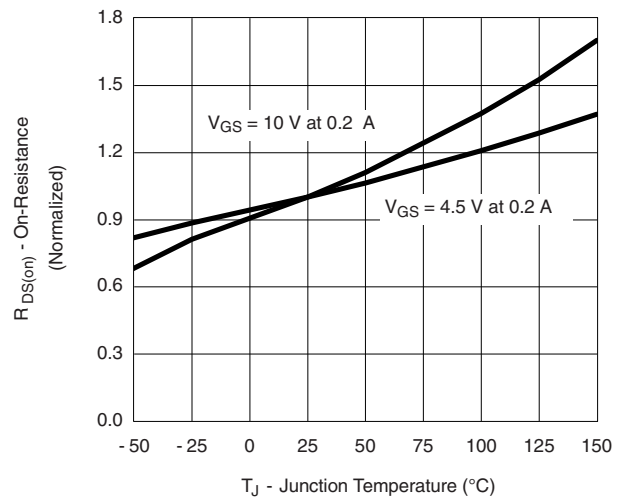
On-Resistance vs. Drain Current



Capacitance

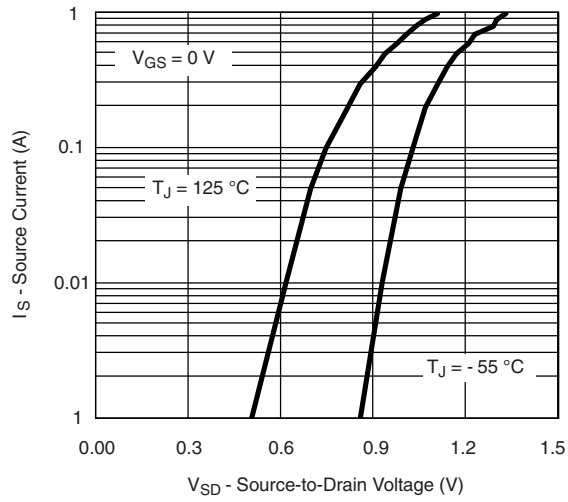


Gate Charge

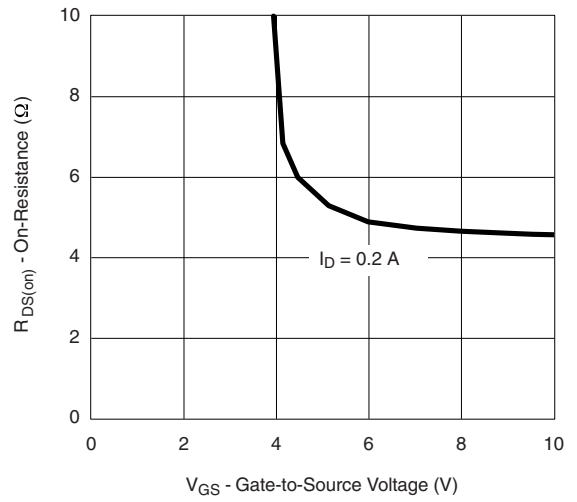


On-Resistance vs. Junction Temperature

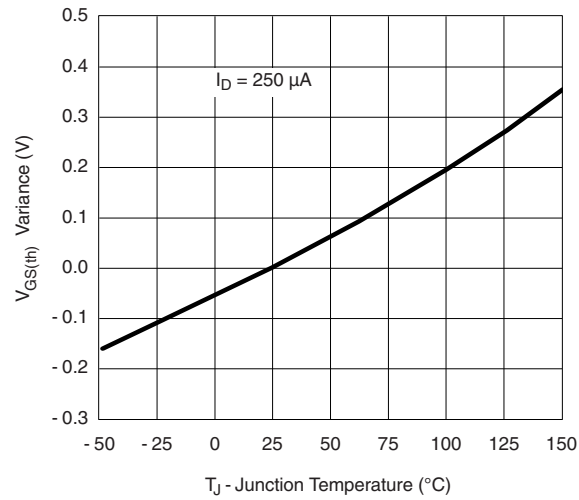
P-CHANNEL TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



Source-Drain Diode Forward Voltage

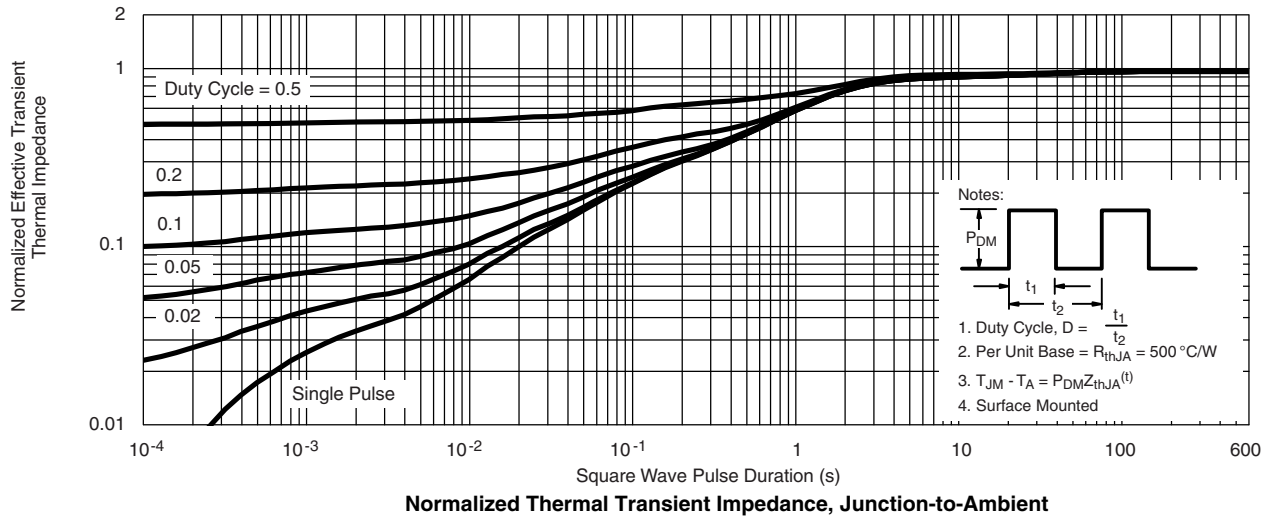


On-Resistance vs. Gate-to-Source Voltage

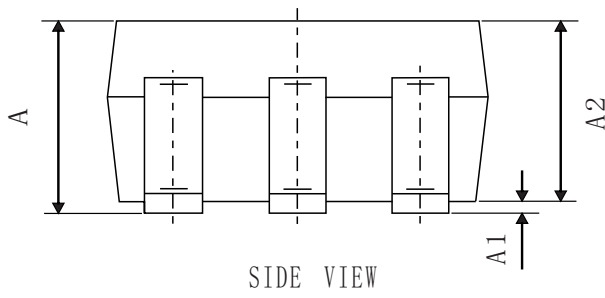
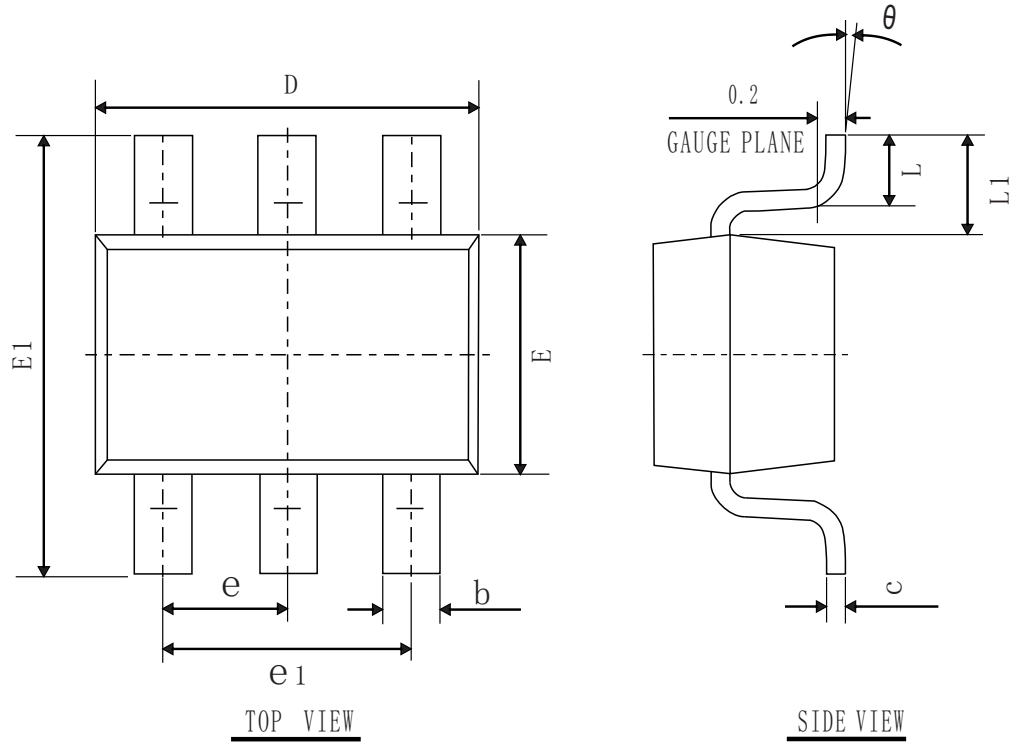


Threshold Voltage Variance Over Temperature

N- OR P-CHANNEL TYPICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)



SOT-323-6L PACKAGE OUTLINE



COMMON DIMENSIONS
(UNITS OF MEASURE=mm)

SYMBOL	MIN	NOM	MAX
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
A2	0.90	0.95	1.00
b	0.20	0.25	0.30
c	0.08	0.10	0.15
e1	1.20	1.30	1.40
D	2.00	2.10	2.20
E	1.15	1.25	1.35
E1	2.15	2.30	2.45
L	0.26	0.36	0.46
θ	0°	4°	8°
L1	0.525 REF		
e	0.65 TYP		

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