Dual P-Channel 30-V (D-S) MOSFET

PRODUCT SUMMARY

V_{DS} (V)	$r_{DS(on)}$ (Ω)	I_D (A)
−30	0.240 @ V_{GS} = −10 V	−1.6
	0.470 @ V_{GS} = −4.5 V	−1.0

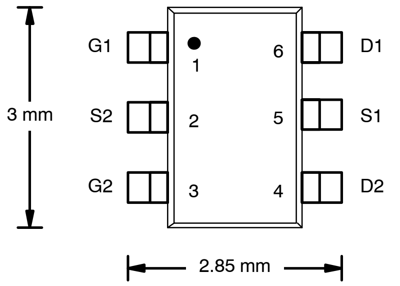
FEATURES

- TrenchFET® Power MOSFET
- Symentrical Dual P-Channel

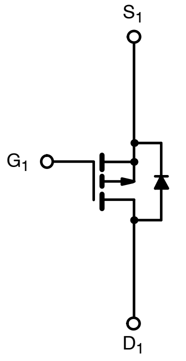
APPLICATIONS

- Battery Switch for Portable Devices
- Computers
  - Bus Switch
  - Load Switch

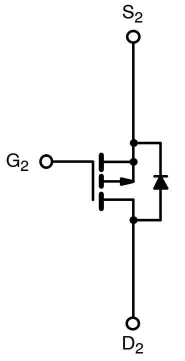
TSOP-6
Top View



Ordering Information: Si3991DV-T1—E3
Marking Code: MExxx



P-Channel MOSFET



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C UNLESS OTHERWISE NOTED)

Parameter		Symbol	5 secs	Steady State	Unit
Drain-Source Voltage		V_{DS}	−30		V
Gate-Source Voltage		V_{GS}	± 20		
Continuous Drain Current (T_J = 150°C)[a]	T_A = 25°C	I_D	−1.6	−1.4	A
	T_A = 70°C		−1.3	−1.1	
Pulsed Drain Current		I_{DM}	−7		
Continuous Diode Current (Diode Conduction)[a]		I_S	−1	−0.72	
Maximum Power Dissipation[a]	T_A = 25°C	P_D	1.08	0.80	W
	T_A = 70°C		0.69	0.51	
Operating Junction and Storage Temperature Range		T_J, T_{stg}	−55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient[a]	t ≤ 5 sec	R_{thJA}	97	115	°C/W
	Steady State		132	155	
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	78	95	

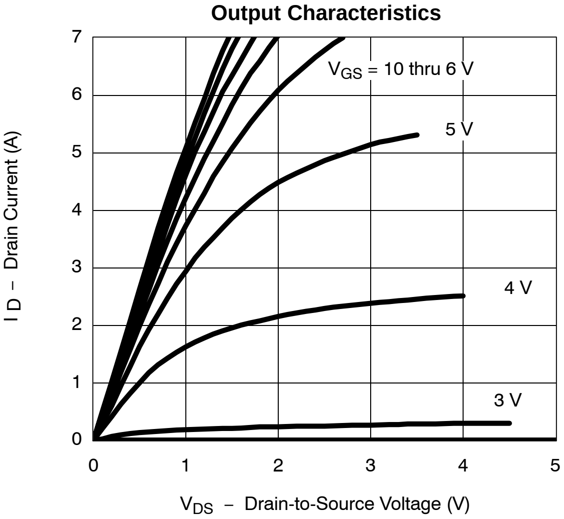
Notes
a. Surface Mounted on 1" x 1" FR4 Board.

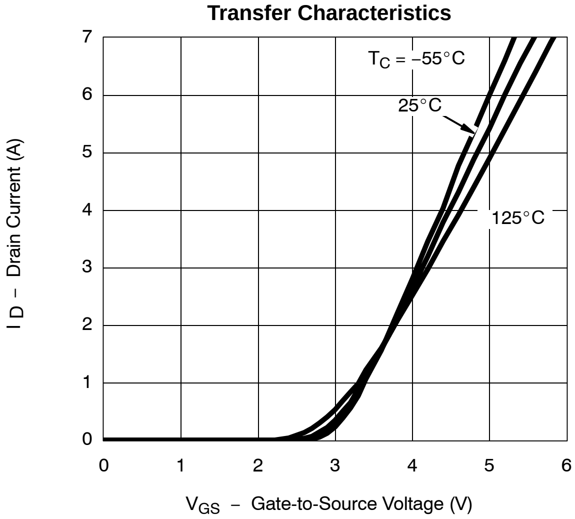
SPECIFICATIONS (T_J = 25°C UNLESS OTHERWISE NOTED)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = −250 µA	−1		−3	V
Gate-Body Leakage	I_{GSS}	V_{DS} = 0 V, V_{GS} = ±20 V			±100	nA
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = −30 V, V_{GS} = 0 V			−1	µA
		V_{DS} = −30 V, V_{GS} = 0 V, T_J = 55°C			−5	
On-State Drain Current[a]	$I_{D(on)}$	V_{DS} = ≤−5 V, V_{GS} = −10 V	−5			A
Drain-Source On-State Resistance[a]	$r_{DS(on)}$	V_{GS} = −10 V, I_D = −1.6 A		0.190	0.240	Ω
		V_{GS} = −4.5 V, I_D = −1.0 A		0.375	0.470	
Forward Transconductance[a]	g_{fs}	V_{DS} = −5 V, I_D = −1.6 A		2.4		S
Diode Forward Voltage[a]	V_{SD}	I_S = −1.0 A, V_{GS} = 0 V		−0.88	−1.10	V
Dynamic[b]						
Total Gate Charge	Q_g	V_{DS} = −15 V, V_{GS} = −4.5 V, I_D = −1.6 A		2	3	nC
Gate-Source Charge	Q_{gs}			0.75		
Gate-Drain Charge	Q_{gd}			1.0		
Gate Resistance	R_g	f = 1 MHz		7.6		Ω
Turn-On Delay Time	$t_{d(on)}$	V_{DD} = −15 V, R_L = 15 Ω I_D ≅ −1 A, V_{GEN} = −10 V, R_g = 6 Ω		8	13	ns
Rise Time	t_r			16	25	
Turn-Off Delay Time	$t_{d(off)}$			10	16	
Fall Time	t_f			12	20	
Source-Drain Reverse Recovery Time	t_{rr}	I_F = −1.00 A, di/dt = 100 A/µs		18	39	

Notes
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2%.
b. Guaranteed by design, not subject to production testing.

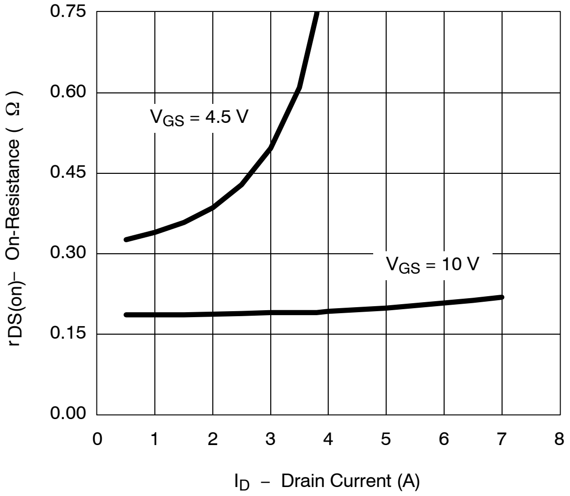
TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)


Output Characteristics

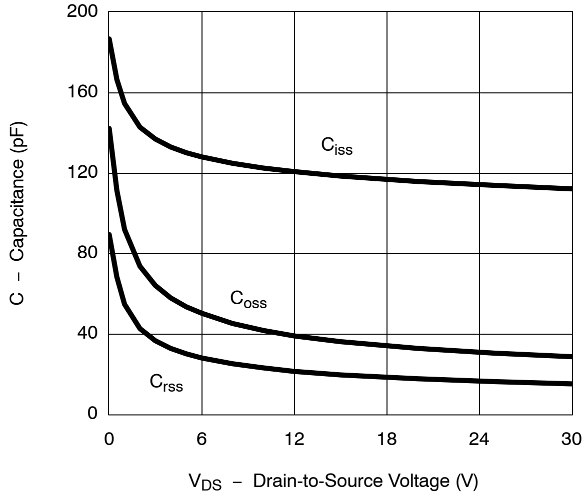

Transfer Characteristics

TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

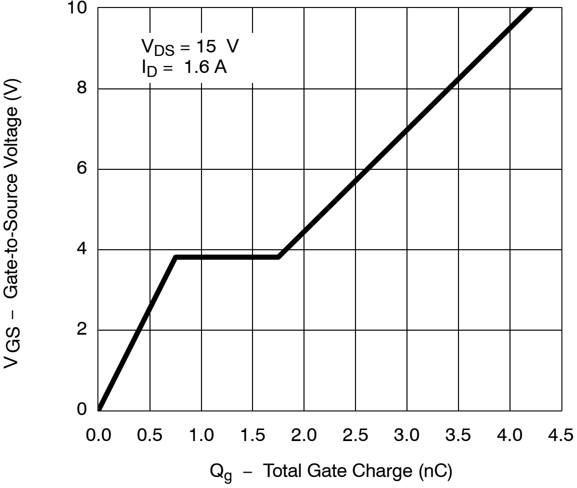
On-Resistance vs. Drain Current



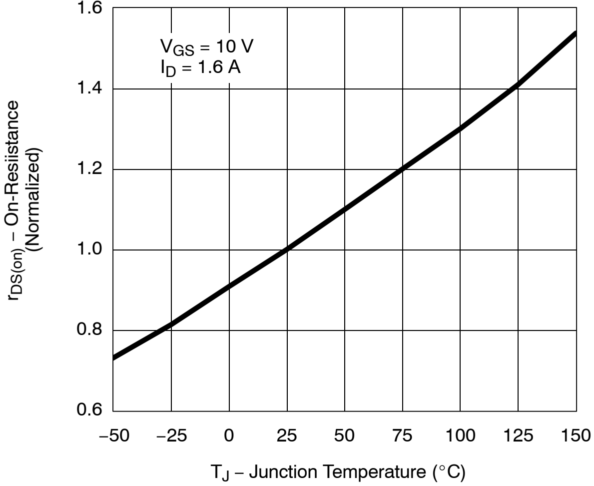
Capacitance



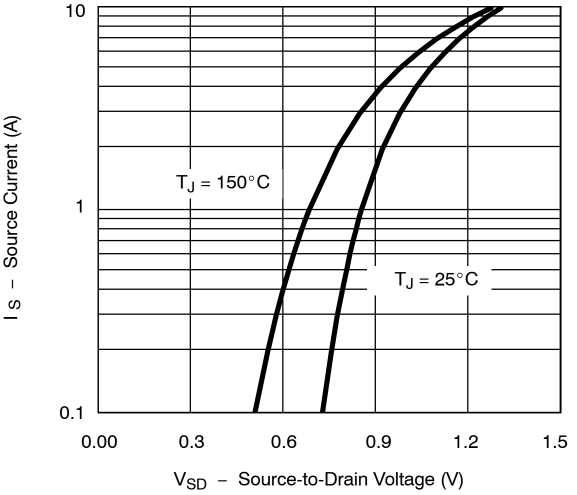
Gate Charge



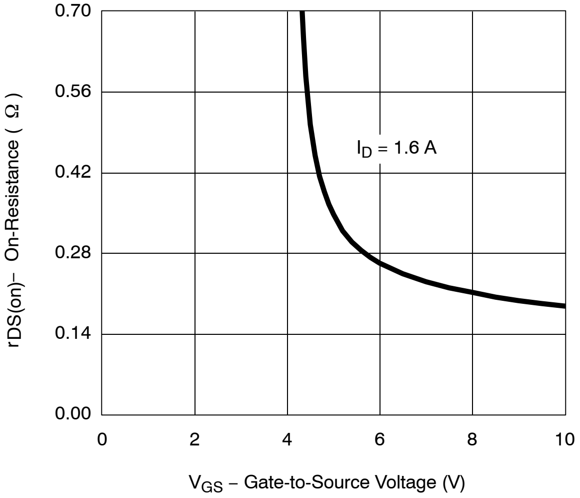
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

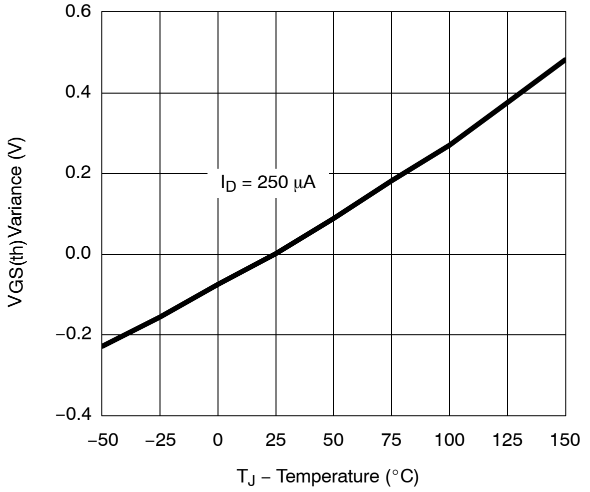


On-Resistance vs. Gate-to-Source Voltage

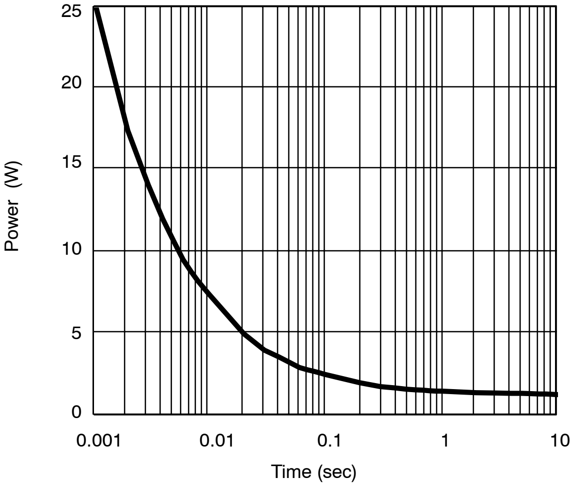


TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

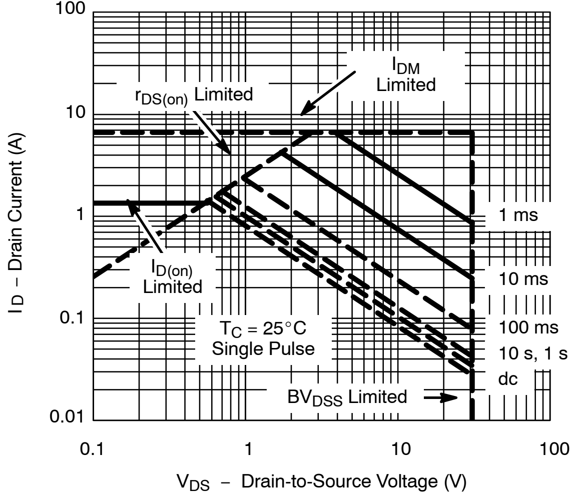
Threshold Voltage



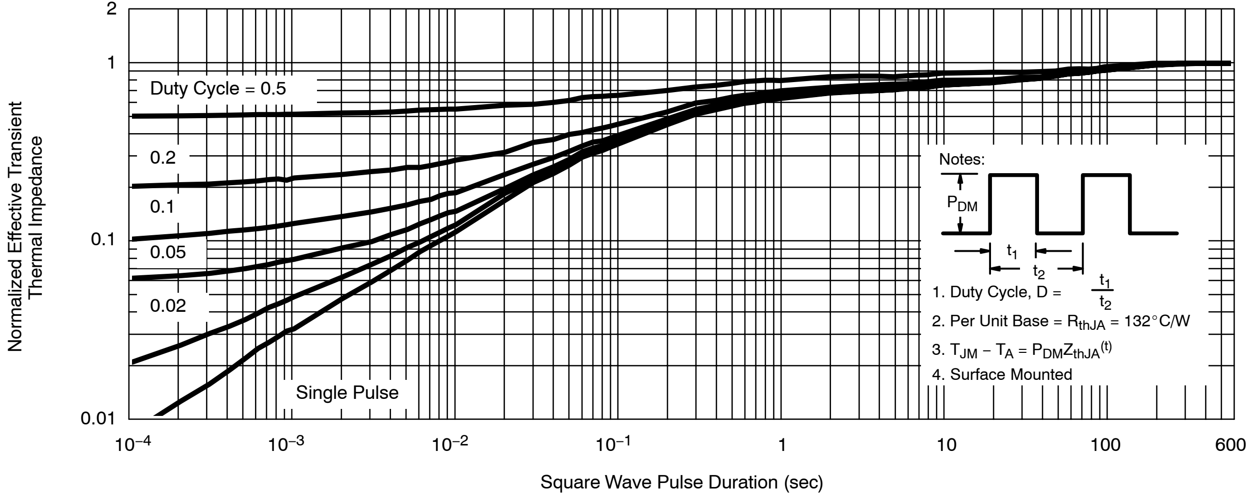
Single Pulse Power, Junction-to-Ambient



Safe Operating Area, Junction-to-Case



Normalized Thermal Transient Impedance, Junction-to-Ambient



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)