



N-Channel 30-V (D-S), Reduced Q_g Fast Switching MOSFET with Schottky Diode

PRODUCT SUMMARY

V _{DS} (V)	r _{DS(on)} (Ω)	I _D (A)
30	0.0185 @ V _{GS} = 10 V	9
	0.033 @ V _{GS} = 4.5 V	7

SCHOTTKY PRODUCT SUMMARY

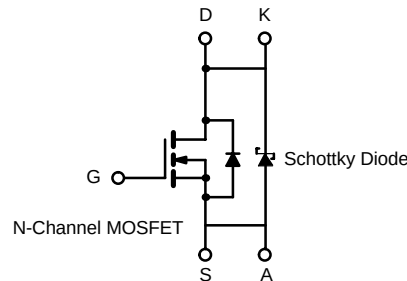
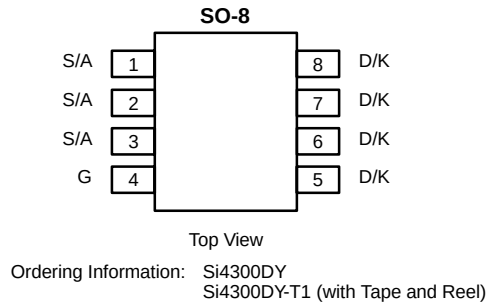
V _{DS} (V)	V _{SD} (V) Diode Forward Voltage	I _F (A)
30	0.5 V @ 1 A	2.0

FEATURES

- TrenchFET® Power MOSFET
- LITTLE FOOT Plus™ Integrated Schottky
- PWM Optimized

APPLICATIONS

- Low Power Synchronous Rectification



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

Parameter		Symbol	10 secs	Steady State	Unit
Drain-Source Voltage (MOSFET)		V _{DS}	30		V
Reverse Voltage (Schottky)		V _{DA}	30		
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 150°C) (MOSFET) ^a	T _A = 25°C	I _D	9	6.4	A
	T _A = 70°C		7	5.1	
Pulsed Drain Current (MOSFET)		I _{DM}	40		
Continuous Source Current (MOSFET Diode Conduction) ^a		I _S	2.3	1.25	
Average Forward Current (Schottky)		I _F	2.3	1.25	
Pulsed Forward Current (Schottky)		I _{FM}	20		
Maximum Power Dissipation (MOSFET) ^a	T _A = 25°C	P _D	2.5	1.38	W
	T _A = 70°C		1.6	0.88	
Maximum Power Dissipation (Schottky) ^a	T _A = 25°C		2.2	1.25	
	T _A = 70°C		1.4	0.80	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150		°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	MOSFET		Schottky		Unit
			Typ	Max	Typ	Max	
Maximum Junction-to-Ambient ^a	t ≤ 10 sec	R _{thJA}	40	50	45	55	°C/W
	Steady-State		70	90	78	100	
Maximum Junction-to-Foot (Drain)	Steady-State	R _{thJF}	18	23	25	30	

Notes

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

MOSFET SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED).

Parameter	Symbol	Test Condition	Min	Typ ^a	Max	Unit
Static						
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$	0.8			V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 20\ \text{V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 24\ \text{V}$, $V_{GS} = 0\ \text{V}$			100	μA
		$V_{DS} = 24\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_J = 85^\circ\text{C}$			2000	
On-State Drain Current ^b	$I_{D(on)}$	$V_{DS} \geq 5\ \text{V}$, $V_{GS} = 10\ \text{V}$	30			A
Drain-Source On-State Resistance ^b	$r_{DS(on)}$	$V_{GS} = 10\ \text{V}$, $I_D = 9\ \text{A}$		0.0155	0.0185	Ω
		$V_{GS} = 4.5\ \text{V}$, $I_D = 7\ \text{A}$		0.0275	0.033	
Forward Transconductance ^b	g_{fs}	$V_{DS} = 15\ \text{V}$, $I_D = 9\ \text{A}$		16		S
Schottky Diode Forward Voltage ^b	V_{SD}	$I_S = 1.0\ \text{A}$, $V_{GS} = 0\ \text{V}$		0.47	0.5	V
Dynamic^a						
Total Gate Charge	Q_g	$V_{DS} = 15\ \text{V}$, $V_{GS} = 5\ \text{V}$, $I_D = 9\ \text{A}$		8.7	13	nC
Gate-Source Charge	Q_{gs}			2.25		
Gate-Drain Charge	Q_{gd}			4.2		
Gate Resistance	R_g		0.5		2.7	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 15\ \text{V}$, $R_L = 15\ \Omega$ $I_D \cong 1\ \text{A}$, $V_{GEN} = 10\ \text{V}$, $R_G = 6\ \Omega$		11	16	ns
Rise Time	t_r			8	15	
Turn-Off Delay Time	$t_{d(off)}$			22	30	
Fall Time	t_f			9	15	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 2.3\ \text{A}$, $di/dt = 100\ \text{A}/\mu\text{s}$		32	60	

Notes

- a. Guaranteed by design, not subject to production testing.
b. Pulse test; pulse width $\leq 300\ \mu\text{s}$, duty cycle $\leq 2\%$.

SCHOTTKY SPECIFICATIONS ($T_J = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

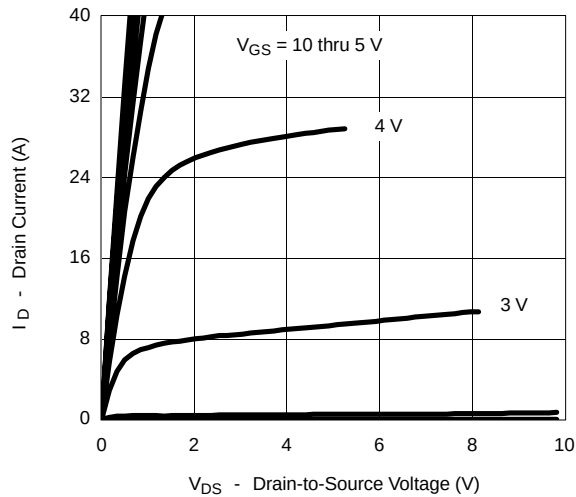
Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Forward Voltage Drop	V_F	$I_F = 1.0\ \text{A}$		0.47	0.5	V
		$I_F = 1.0\ \text{A}$, $T_J = 125^\circ\text{C}$		0.36	0.42	
Maximum Reverse Leakage Current	I_{rm}	$V_r = 24\ \text{V}$		0.004	0.100	mA
		$V_r = 24\ \text{V}$, $T_J = 100^\circ\text{C}$		0.7	10	
		$V_r = -24\ \text{V}$, $T_J = 125^\circ\text{C}$		3.0	20	
Junction Capacitance	C_T	$V_r = 10\ \text{V}$		50		pF



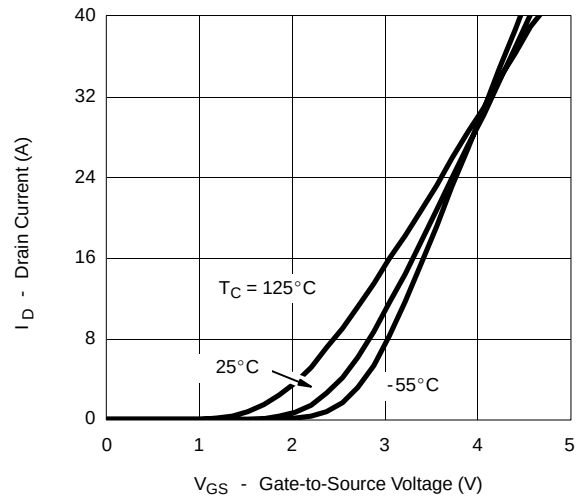
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

MOSFET

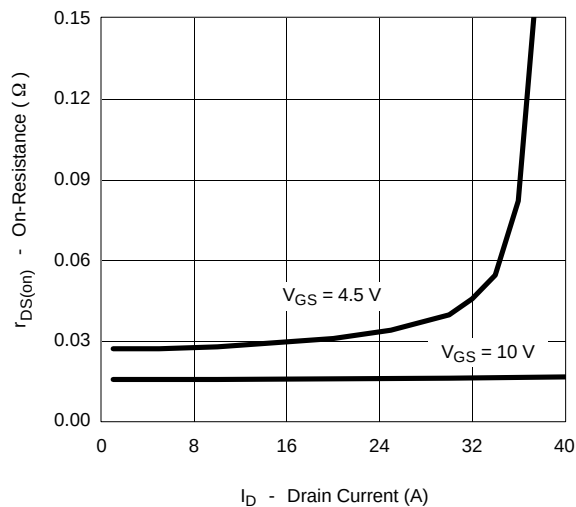
Output Characteristics



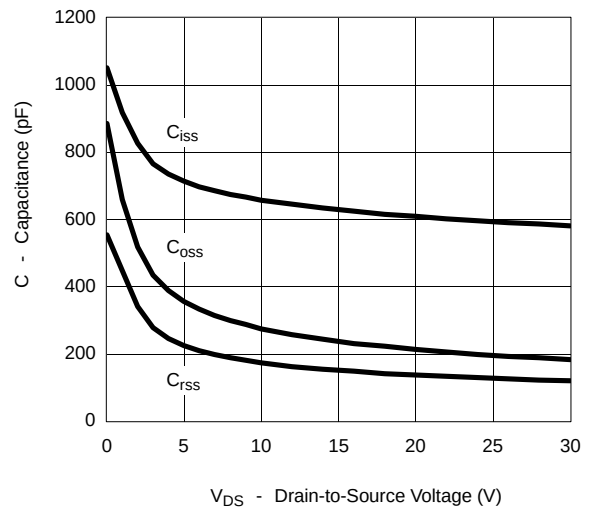
Transfer Characteristics



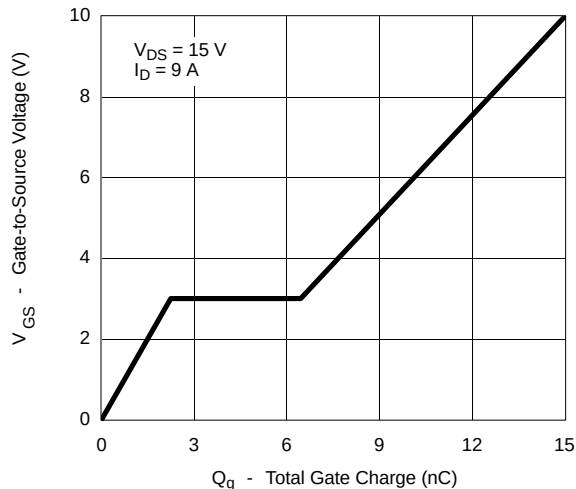
On-Resistance vs. Drain Current



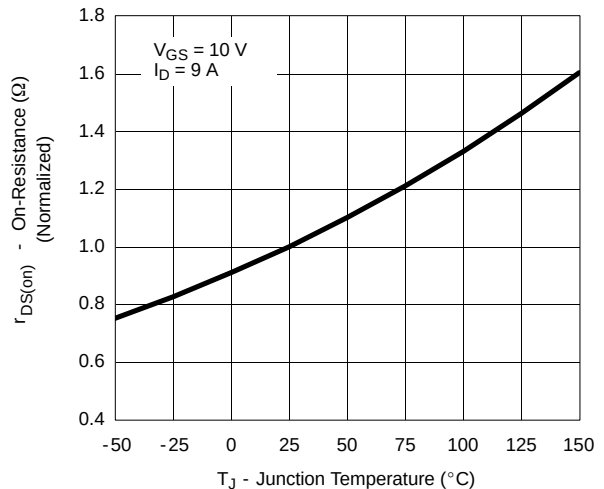
Capacitance



Gate Charge



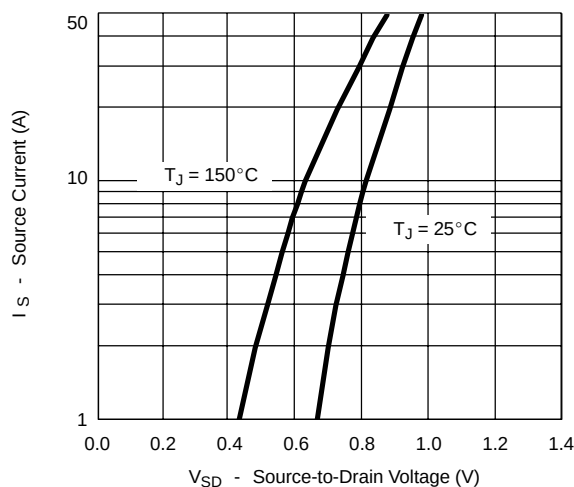
On-Resistance vs. Junction Temperature



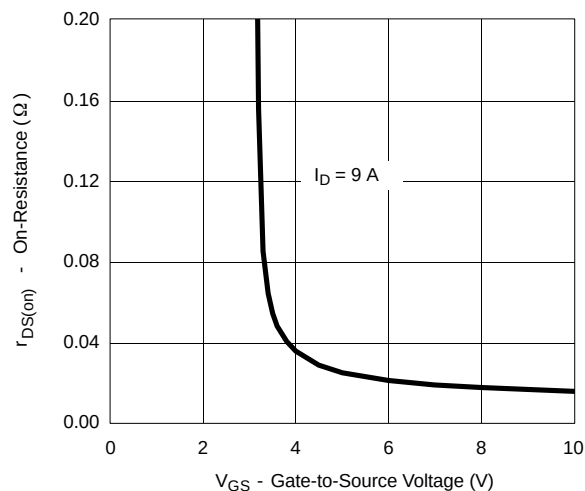
TYPICAL CHARACTERISTICS (25 °C UNLESS NOTED)

MOSFET

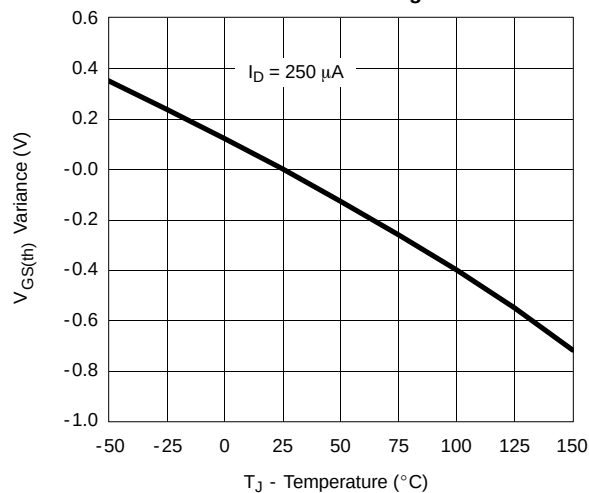
Source-Drain Diode Forward Voltage



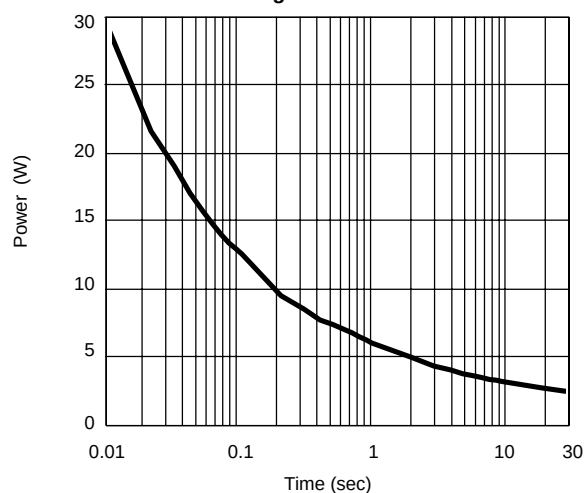
On-Resistance vs. Gate-to-Source Voltage



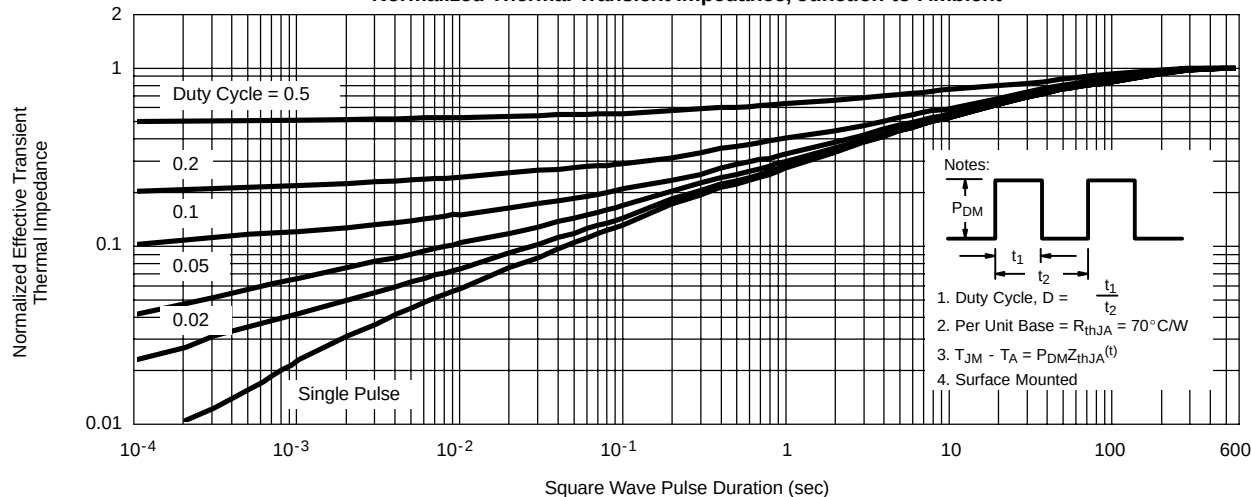
Threshold Voltage



Single Pulse Power



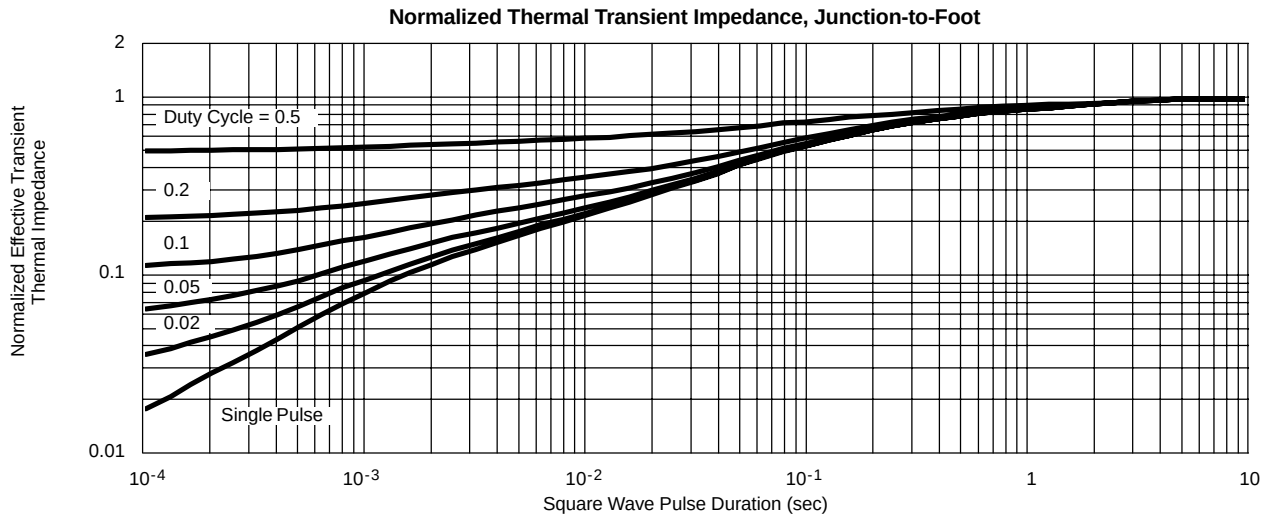
Normalized Thermal Transient Impedance, Junction-to-Ambient





TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

MOSFET



TYPICAL CHARACTERISTICS (25°C UNLESS NOTED)

SCHOTTKY

