

20V N-Channel Enhancement Mode MOSFET

VDS= 20V

RDS(ON), Vgs@ 4.5V, Ids@ 3A <45mΩ

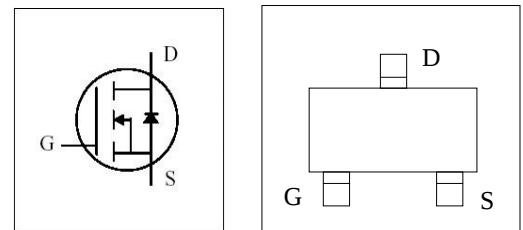
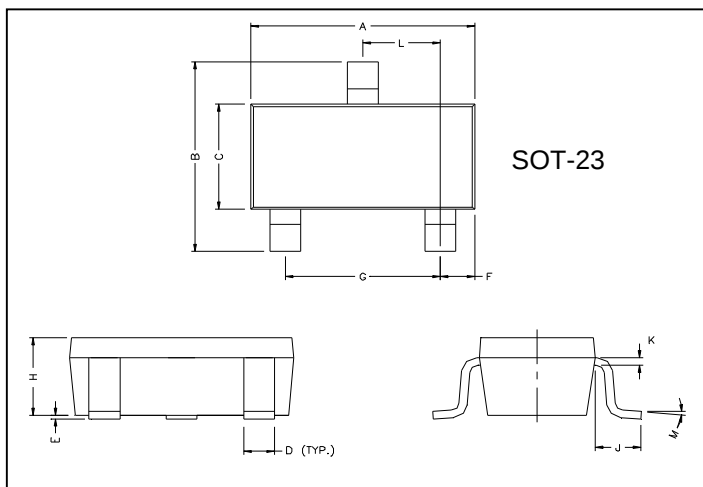
RDS(ON), Vgs@ 2.5V, Ids@ 2.5A < 59mΩ

Features

Advanced trench process technology

High Density Cell Design For Ultra Low On-Resistance

Package Dimensions



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.80	3.00	G	1.80	2.00
B	2.30	2.50	H	0.90	1.1
C	1.20	1.40	K	0.10	0.20
D	0.30	0.50	J	0.35	0.70
E	0	0.10	L	0.92	0.98
F	0.45	0.55	M	0°	10°

Maximum Ratings and Thermal Characteristics (TA = 25°C unless otherwise noted)

Parameter		Symbol	Limit	Unit
Drain-Source Voltage		V _{DS}	20	V
Gate-Source Voltage		V _{GS}	±10	
Continuous Drain Current		I _D	3	A
Pulsed Drain Current ¹⁾		I _{DM}	12	
Maximum Power Dissipation ²⁾	TA = 25°	P _D	1.25	W
	TA = 75°C		0.8	
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55 to 150	°C
Junction-to-Ambient Thermal Resistance (PCB mounted) ²⁾		R _{thJA}	100	°C/W
Junction-to-Ambient Thermal Resistance (PCB mounted) ³⁾			166	

Notes

¹⁾ Pulse width limited by maximum junction temperature.

²⁾ Surface Mounted on FR4 Board, t ≤ 5 sec.

³⁾ Surface Mounted on FR4 Board.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Test Condition	Min.	Typ.	Miax.	Unit
Static						
Drain-Source Breakdown Voltage	BV _{DSS}	V _{GS} = 0V, I _D = 250uA	20			V
Drain-Source On-State Resistance ¹⁾	R _{DS(on)}	V _{GS} = 4.5V, I _D = 3A		30	45	mΩ
		V _{GS} = 2.5V, I _D = 2.5A		37	59	
Gate Threshold Voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D = 250uA	0.6			V
Zero Gate Voltage Drain Current 0	I _{DSS}	V _{DS} = 16V, V _{GS} = 0V		1		uA
		V _{DS} = 16V, V _{GS} = 0V TJ=55°C			10	
Gate Body Leakage	I _{GSS}	V _{GS} = ± 10V, V _{DS} = 0V			±100	nA
Forward Transconductance ¹⁾	g _{fs}	V _{DS} = 5V, I _D = 3A		10	—	S
Dynamic						
Total Gate Charge	Q _g	V _{DS} = 10V, I _D = 3A V _{GS} = 4.5V		5.4		nC
Gate-Source Charge	Q _{gs}			0.65		
Gate-Drain Charge	Q _{gd}			1.6		
Turn-On Delay Time	t _{d(on)}	V _{DD} = 10V, RL=5.5 Ω I _D ≅ 3A,V _{GEN} = 4.5V R _G = 6Ω		12		ns
Turn-On Rise Time	t _r			36		
Turn-Off Delay Time	t _{d(off)}			34		
Turn-Off Fall Time	t _f			10		
Input Capacitance	C _{iss}	V _{DS} = 10V, V _{GS} = 0V f = 1.0 MHz		340		pF
Output Capacitance	C _{oss}			115		
Reverse Transfer Capacitance	C _{rss}			33		
Source-Drain Diode						
Max. Diode Forward Current	I _S				1.6	A
Diode Forward Voltage	V _{SD}	I _S = 1.0A, V _{GS} = 0V			1.2	V

¹⁾ Pulse test: pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$

Typical Electrical and Thermal Characteristics

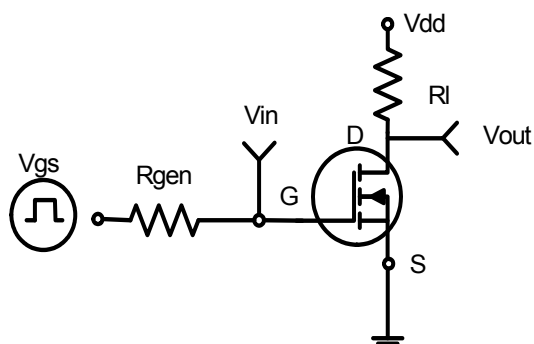


Figure 1: Switching Test Circuit

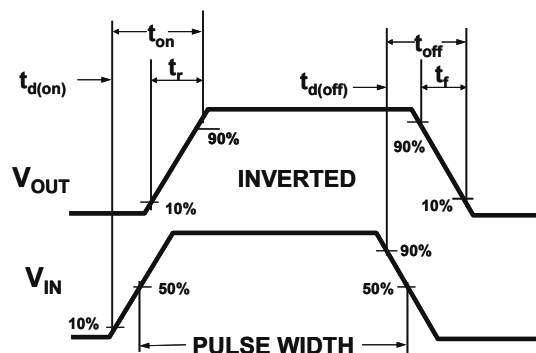
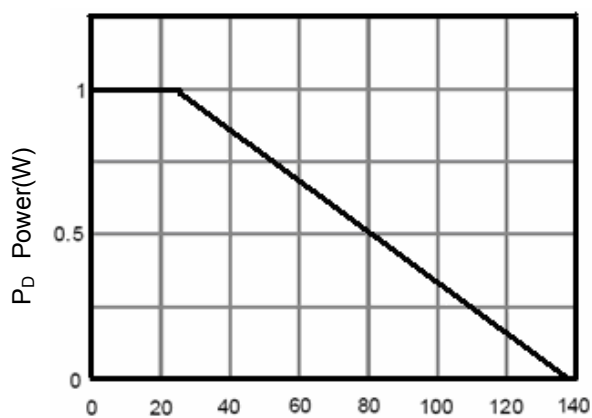
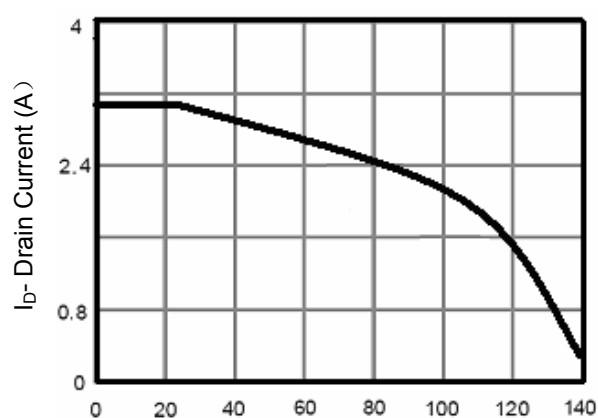


Figure 2: Switching Waveforms



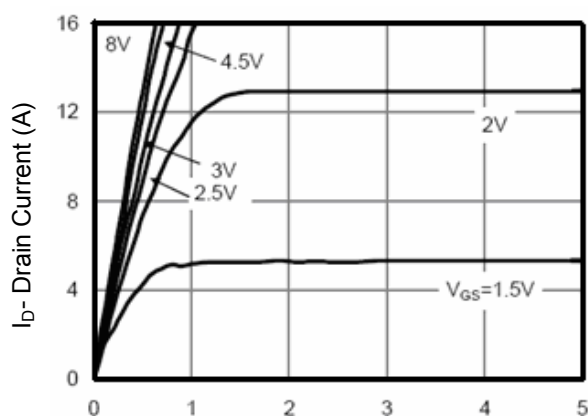
T_J -Junction Temperature(°C)

Figure 3 Power Dissipation



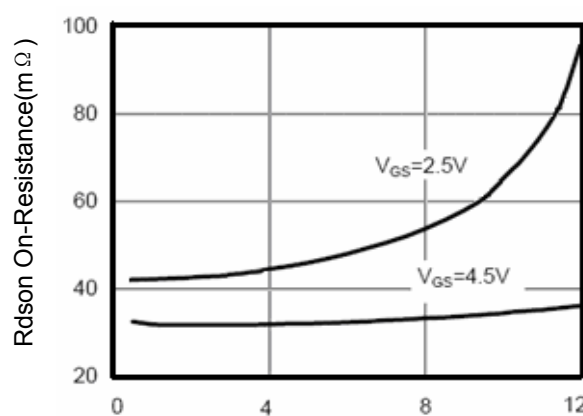
T_J -Junction Temperature(°C)

Figure 4 Drain Current



V_{DS} Drain-Source Voltage (V)

Figure 5 Output Characteristics



I_D - Drain Current (A)

Figure 6 Drain-Source On-Resistance

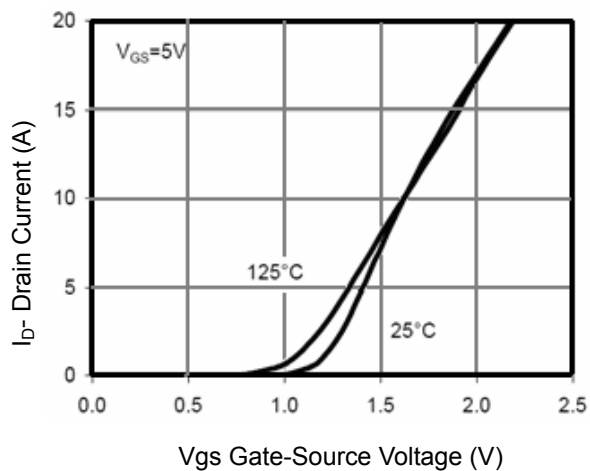


Figure 7 Transfer Characteristics

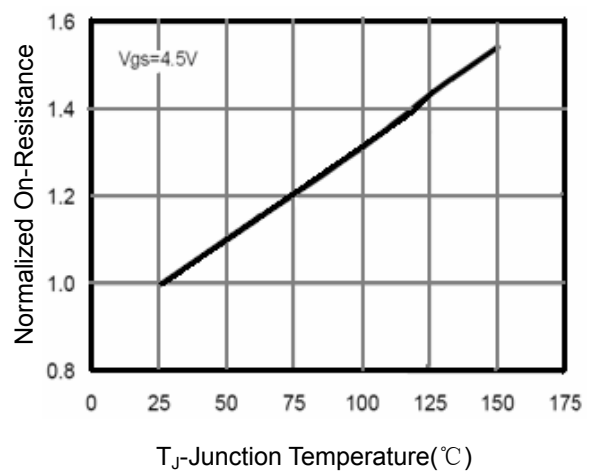


Figure 8 Drain-Source On-Resistance

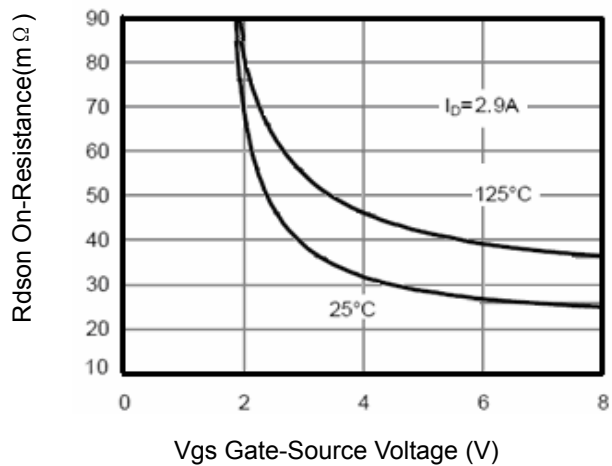
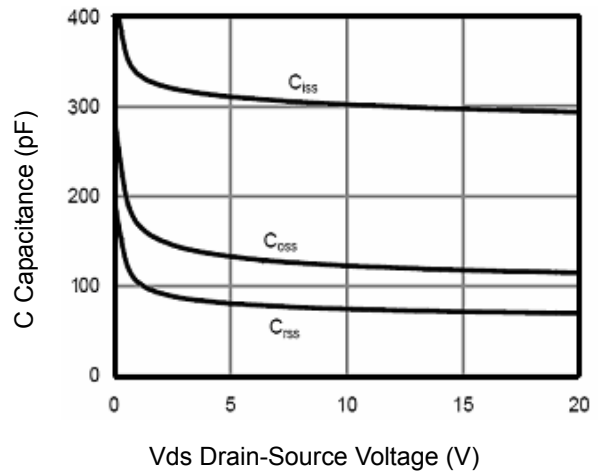
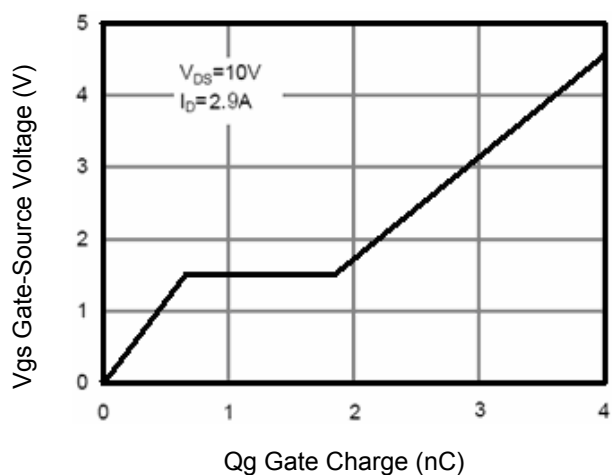
Figure 9 $R_{DS(on)}$ vs V_{GS} Figure 10 Capacitance vs V_{DS} 

Figure 11 Gate Charge

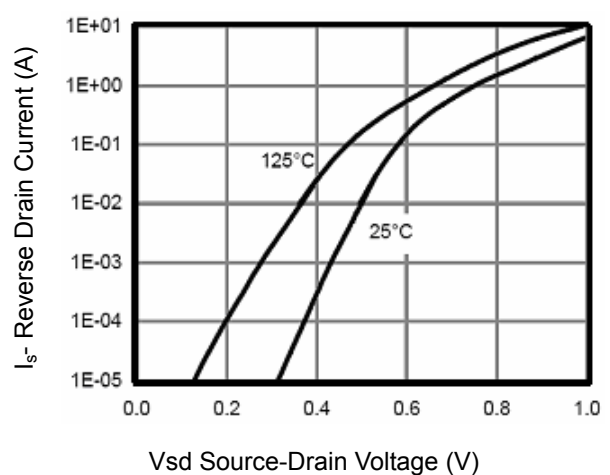


Figure 12 Source-Drain Diode Forward

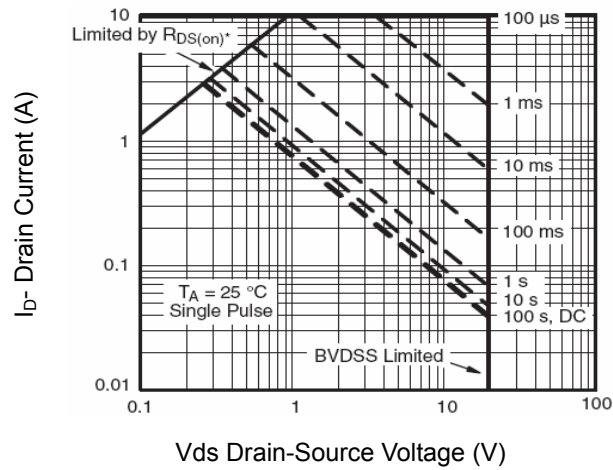


Figure 13 Safe Operation Area

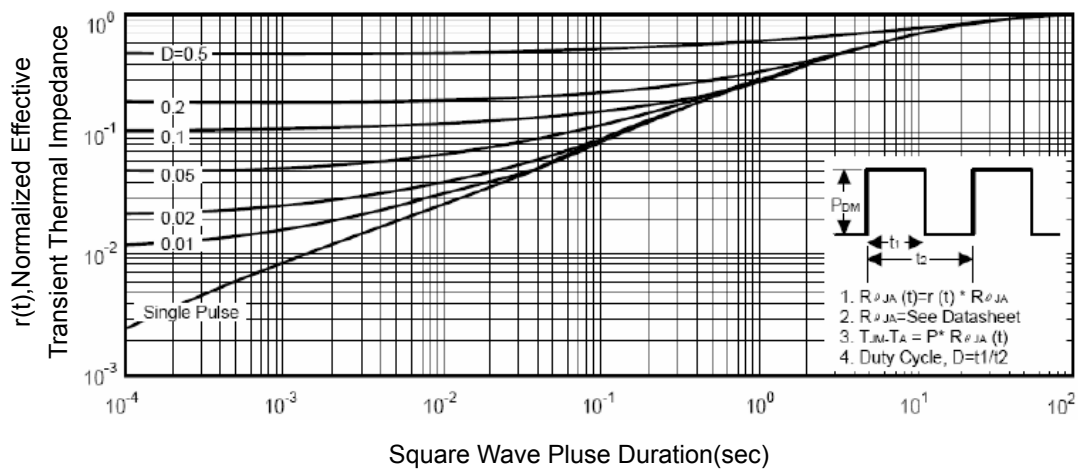


Figure 14 Normalized Maximum Transient Thermal Impedance