

P-Channel Enhancement Mode Field Effect Transistor

with Schottky Diode

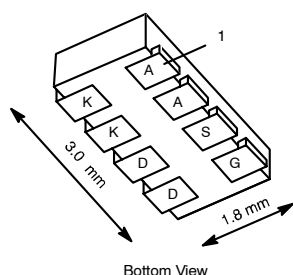
FEATURES

- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- Simple drive requirement
- DFN3X2-8L package

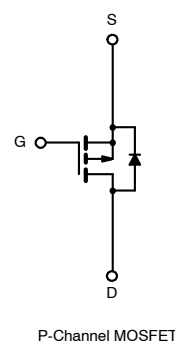
PRODUCT SUMMARY		
V _{DSS}	I _D	R _{DS(ON)} (mΩ) Typ
-20V	-3.6A	75@ V _{GS} =-4.5V
		95 @ V _{GS} =-2.5V
		145 @ V _{GS} =-1.8V
SCHOTTKY		
VKA (V) = 20V, IF = 1A, VF<0.5V@0.5A		



NOTE: The MT5853 is available in a lead-free package



Marking Code
 JA XX
 Lot Traceability and Date Code
 Part # Code



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS ($T_A=25^\circ C$ unless otherwise noted)

Parameter	Symbol	MOSFET	Schottky	Units
Drain-Source Voltage	V_{DS}	-20		V
Gate-Source Voltage	V_{GS}	± 12		V
Continuous Drain Current ^A	I_D	-3.4		A
Pulsed Drain Current ^B	I_{DM}	-15		A
Schottky reverse voltage	V_{KA}		20	V
Continuous Forward Current ^A	I_F		1.9	A
Pulsed Forward Current ^B	I_{FM}		7	A
Power Dissipation	P_D	1.7	0.96	W
Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	-55 to 150	$^\circ C$

THERMAL CHARACTERISTICS MOSFET

Thermal Resistance, Junction-to Ambient ^a	$R_{th JA}$	75	$^\circ C/W$
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THERMAL CHARACTERISTICS SCHOTTKY

Thermal Resistance, Junction-to Ambient ^a	$R_{th JA}$	80	$^\circ C/W$
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ELECTRICAL CHARACTERISTICS (T_A=25 °C unless otherwise noted)

Parameter		Symbol	Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS							
Drain-Source Breakdown Voltage		BV _{DSS}	V _{GS} =0V,I _D =-250μA	-20			V
Zero Gate Voltage Drain Current		I _{DSS}	V _{DS} =-16V,V _{GS} =0V			1	μA
Gate-Body Leakage		I _{GSS}	V _{GS} =±10V,V _{DS} =0V			±100	nA
ON CHARACTERITICS							
Gate Threshold Voltage		V _{GS(th)}	V _{DS} =V _{GS} ,I _D =-250μA	-0.45	-0.63	-1	V
Drain-Source On-State Resistance		R _{DS(ON)}	V _{GS} =-4.5V,I _D =-2.5A		75	80	mΩ
			V _{GS} =-2.5V,I _D =-1.5A		95	98	
Forward Transconductance		g _{FS}	V _{GS} =-5V,I _D =-3.4A	4	7		S
DAYNAMIC CHARACTERISTICS							
Input Capacitance		C _{ISS}	V _{DS} =-10V,V _{GS} =0V f=1.0MHz		540		pF
Output Capacitance		C _{OSS}			72		pF
Reverse Transfer Capacitance		C _{RSS}			49		pF
SWITCHING CHARACTERISISTICS							
Turn-On Delay Time		t _{D(ON)}	V _{DD} =-10V I _D =-2.8A, V _{GEN} =-4.5V R _L =9ohm R _{GEN} =3ohm		10		ns
Rise Time		t _r			12		ns
Turn-Off Delay Time		t _{D(OFF)}			44		ns
Fall Time		t _f			48		ns
Total Gate Charge		Q _g	V _{DS} =-10V,I _D =-3.4A V _{GS} =-4.5V		6.1		nC
Gate-Source Charge		Q _{gs}			0.6		nC
Gate-Drain Charge		Q _{gd}			1.		nC
SCHOTTKY PARAMETERS							
V _F	Forward Voltage Drop		I _F =0.5A		0.39	0.5	V
I _{rm}	Maximum reverse leakage current		VR=16V			0.1	mA
			VR=16V, T _J =125°C			20	
C _T	Junction Capacitance		VR=10V		34		pF
t _{rr}	SchottkyReverse Recovery Time		I _F =1A, dI/dt=100A/μs		5.2	10	ns
Q _{rr}	Schottky Reverse Recovery Charge		I _F =1A, dI/dt=100A/μs		0.8		nC

ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
DRAIN-SOURCE DIODE CHARACTERISTICS						
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-1A$		-0.83	-1	V

Notes

- Surface Mounted on FR4 Board, $t \leq 10\text{sec}$
- Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 2\%$
- Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

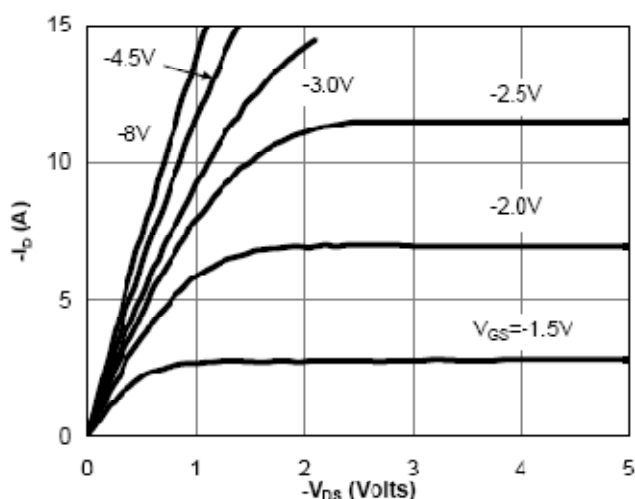


Fig 1: On-Region Characteristics

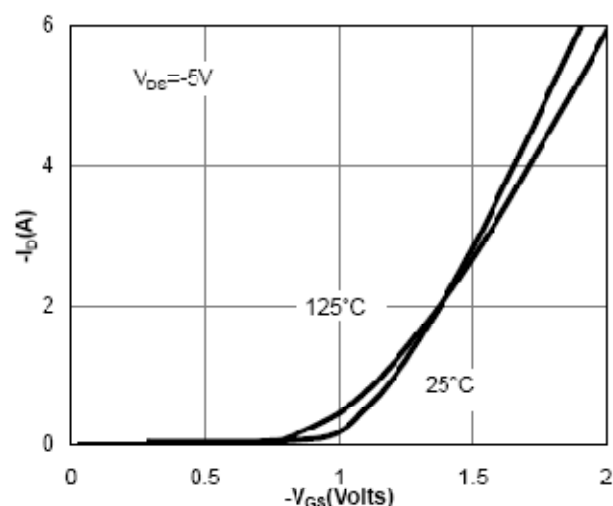


Figure 2: Transfer Characteristics

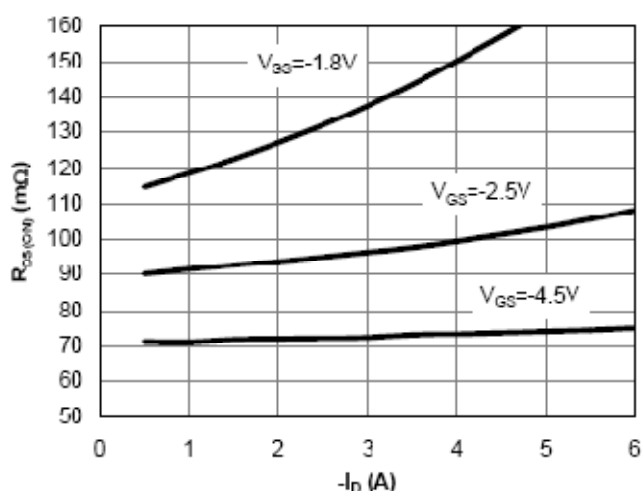


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

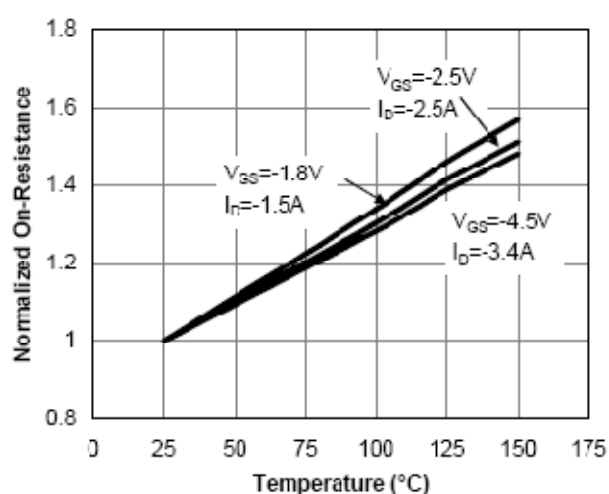


Figure 4: On-Resistance vs. Junction Temperature

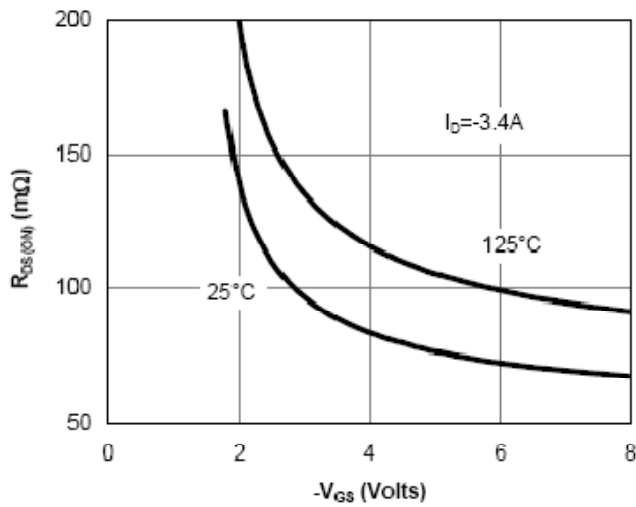


Figure 5: On-Resistance vs. Gate-Source Voltage

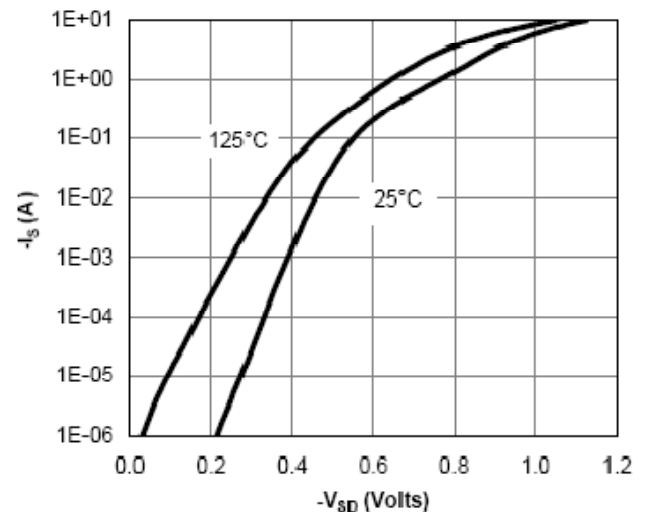


Figure 6: Body-Diode Characteristics

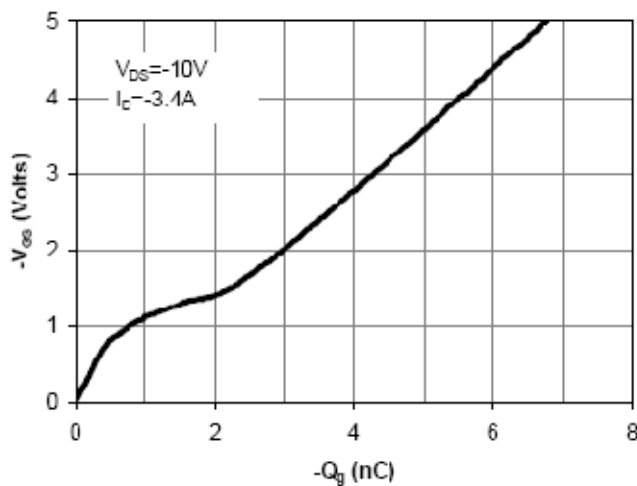


Figure 7: Gate-Charge Characteristics

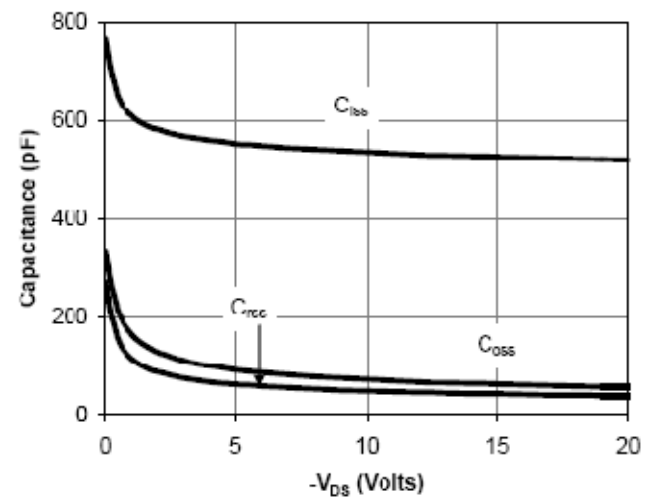


Figure 8: Capacitance Characteristics

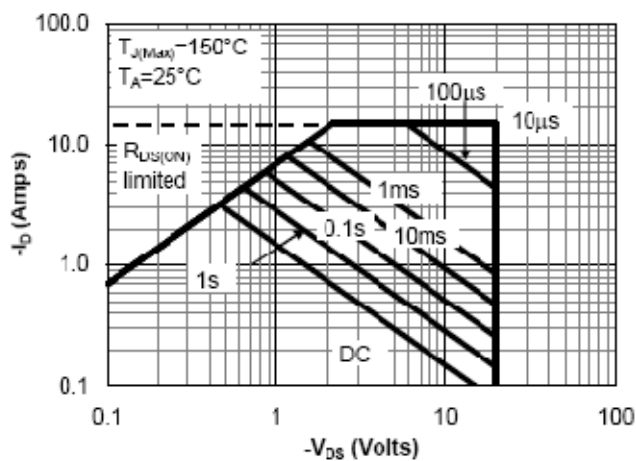


Figure 9: Maximum Forward Biased Safe Operating Area (Note C)

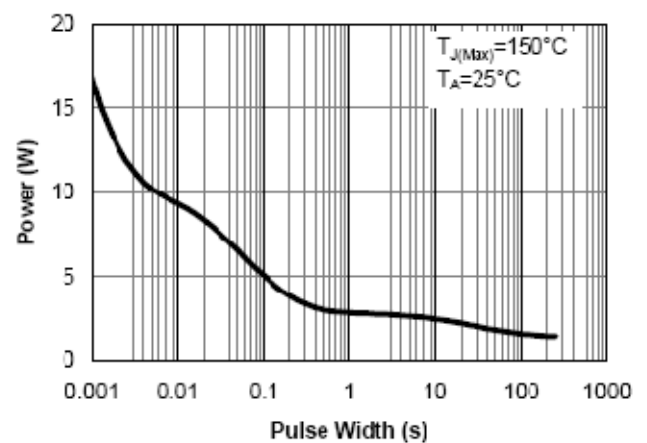


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

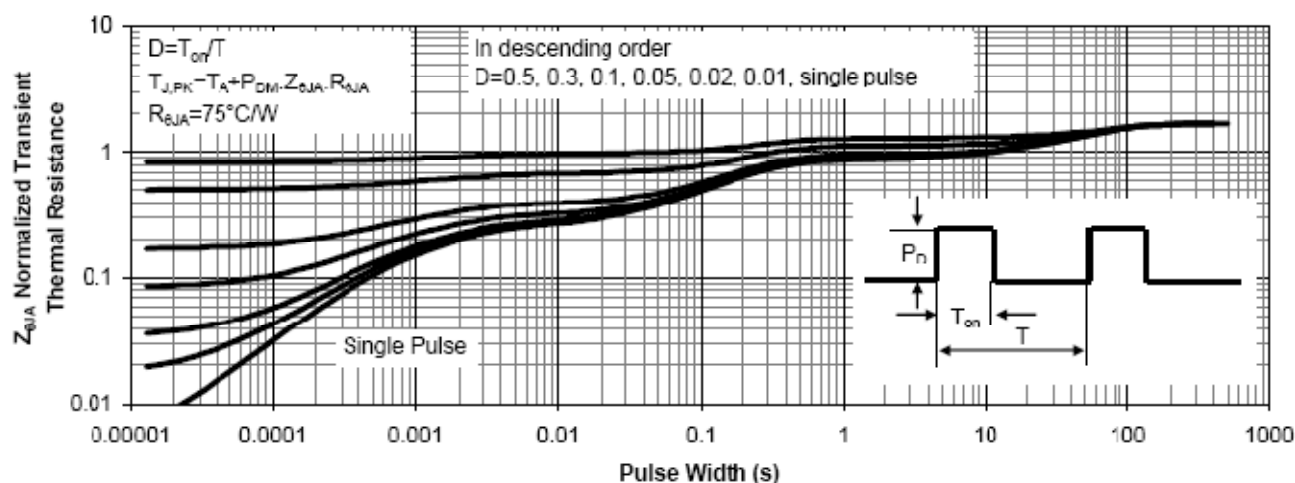


Figure 11: Normalized Maximum Transient Thermal Impedance

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: SCHOTTKY

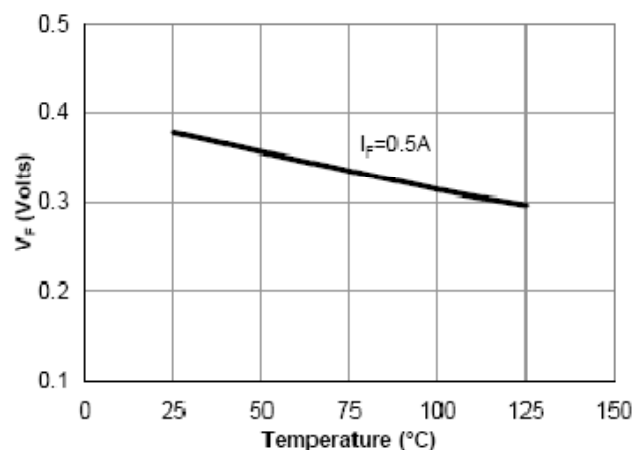


Figure 14: Schottky Forward Drop vs. Junction Temperature

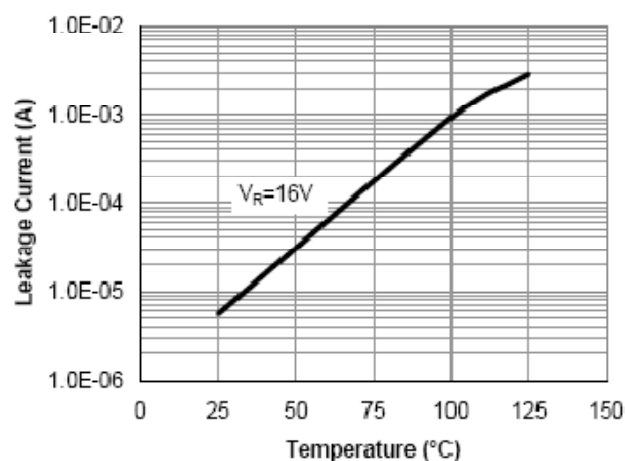


Figure 15: Schottky Leakage current vs. Junction Temperature

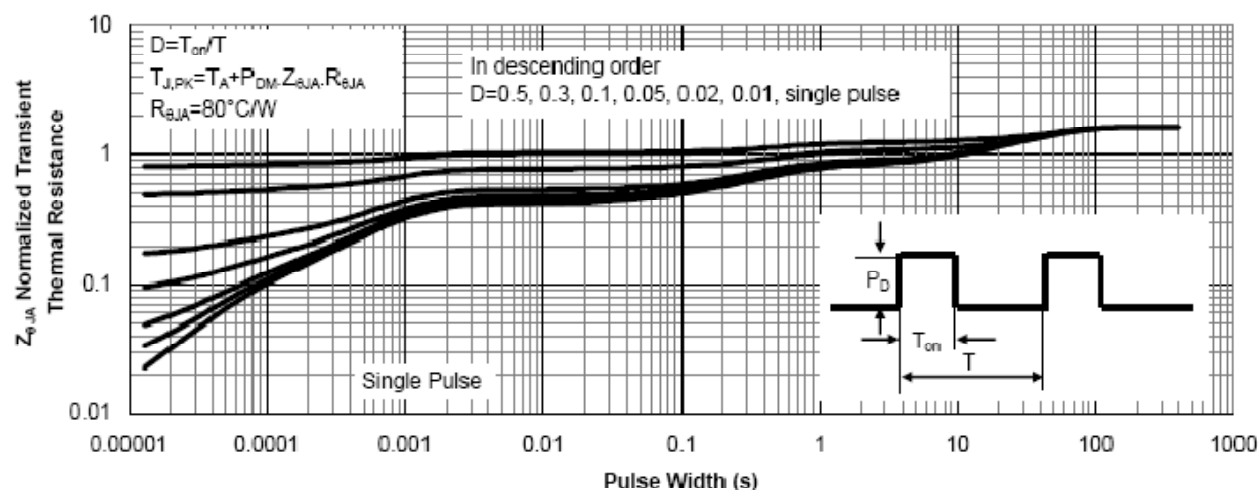


Figure 16: Schottky Normalized Maximum Transient Thermal Impedance