P-Channel Enhancement Mode Field Effect Transistor

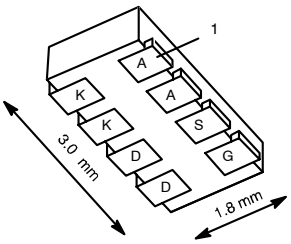
with Schottky Diode

FEATURES

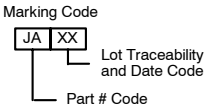
- Super high dense cell design for low $R_{DS(ON)}$
- Rugged and reliable
- **S**imple drive requirement
- DFN3X2-8L package

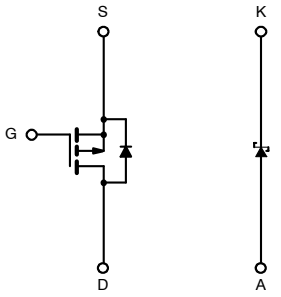
PRODUCT SUMMARY		
V_{DSS}	I_D	$R_{DS(ON)}$ (mΩ) Typ
-20V	-3.6A	75@ V_{GS}=-4.5V
		95 @ V_{GS}=-2.5V
		145 @ V_{GS}=-1.8V
SCHOTTKY		
VKA (V) = 20V, IF = 1A, VF<0.5V@0.5A		

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



Bottom View





P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS（T_A=25℃ 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	℃

THERMAL CHARACTERISTICS MOSFET

Thermal Resistance, Junction-to Ambient[a]	Rth J_A	75	℃/W

THERMAL CHARACTERISTICS SCHOTTKY

Thermal Resistance, Junction-to Ambient[a]	Rth J_A	80	℃/W

ELECTRICAL CHARACTERISTICS (T_A=25℃ 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	tr			12		ns
Turn-Off Delay Time	$t_{D(OFF)}$			44		ns
Fall Time	tf			48		ns
Total Gate Charge	Qg	V_{DS}=-10V,I_D=-3.4A V_{GS}=-4.5V		6.1		nC
Gate-Source Charge	Qgs			0.6		nC
Gate-Drain Charge	Qgd			1.		nC
SCHOTTKY PARAMETERS						
V_F	Forward Voltage Drop	IF=0.5A		0.39	0.5	V
Irm	Maximum reverse leakage current	VR=16V			0.1	mA
		VR=16V, TJ=125°C			20	
C_T	Junction Capacitance	VR=10V		34		pF
trr	SchottkyReverse Recovery Time	IF=1A, dI/dt=100A/μs		5.2	10	ns
Qrr	Schottky Reverse Recovery Charge	IF=1A, dI/dt=100A/μs		0.8		nC

ELECTRICAL CHARACTERICS (TA=25℃ 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

a. Surface Mounted on FR4 Board, t≦10sec

b. Pulse Test: Pulse Width≦300Us, Duty Cycle≦2%

c. Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

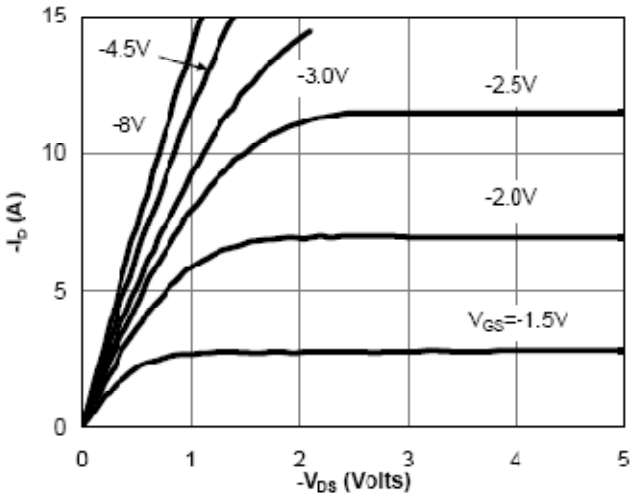


Fig 1: On-Region Characteristics

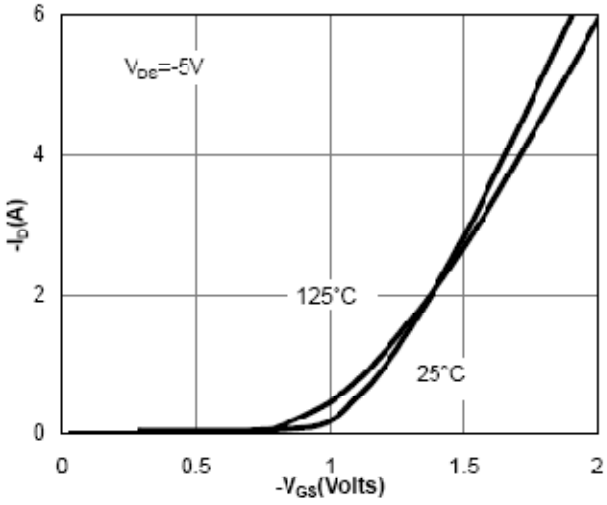


Figure 2: Transfer Characteristics

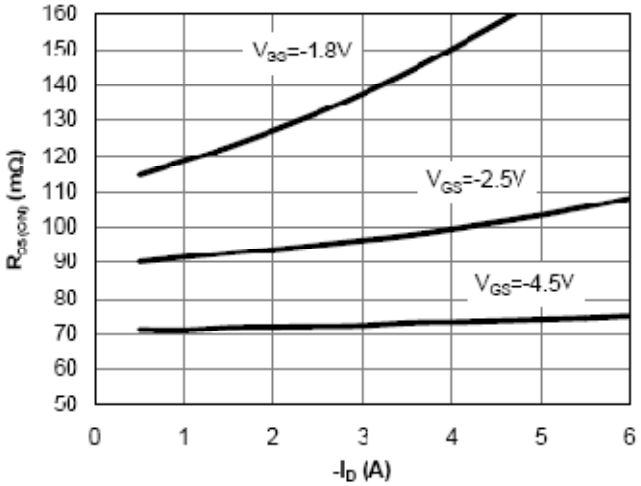


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

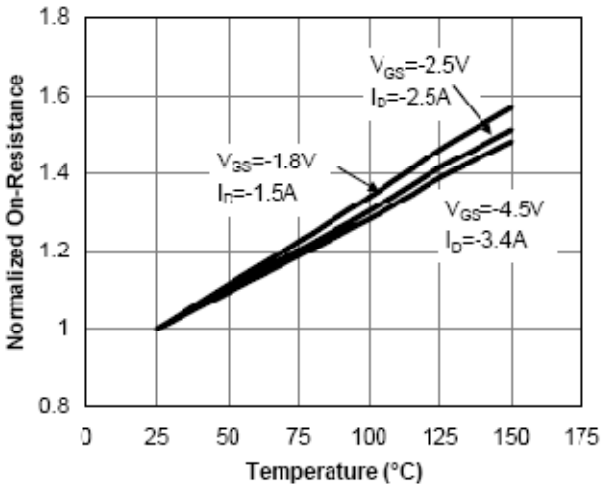


Figure 4: On-Resistance vs. Junction Temperature

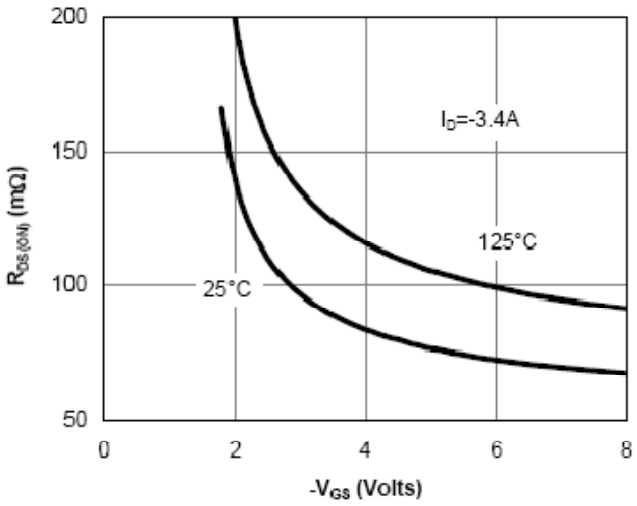


Figure 5: On-Resistance vs. Gate-Source Voltage

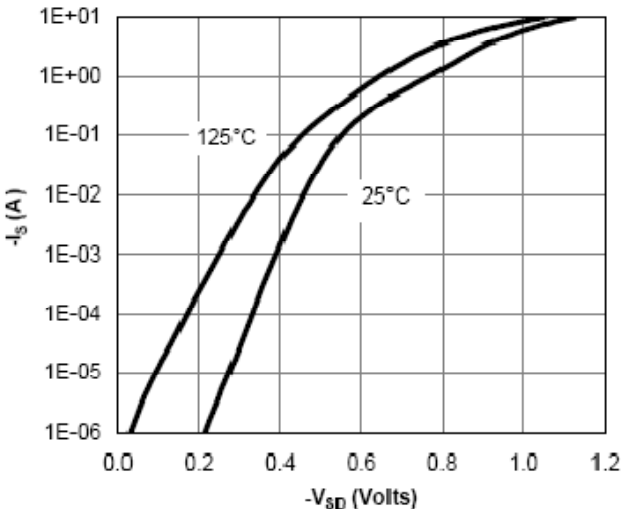


Figure 6: Body-Diode Characteristics

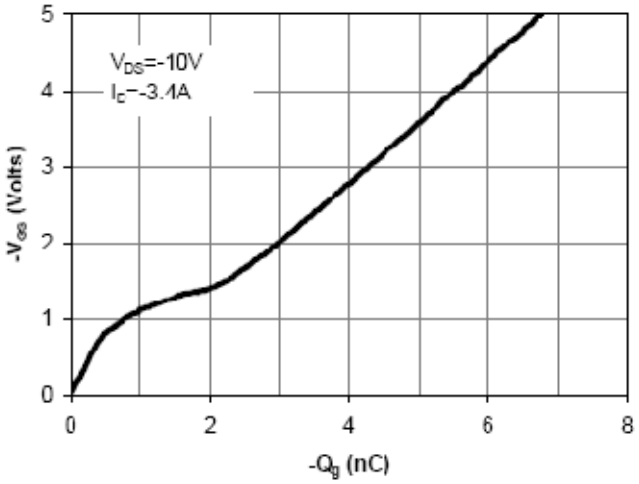


Figure 7: Gate-Charge Characteristics

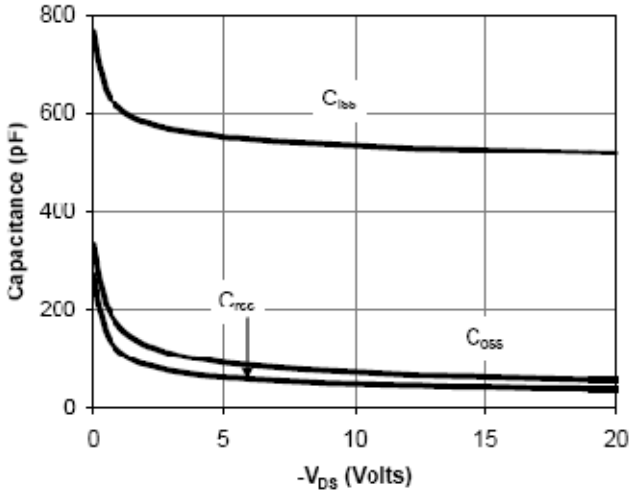


Figure 8: Capacitance Characteristics

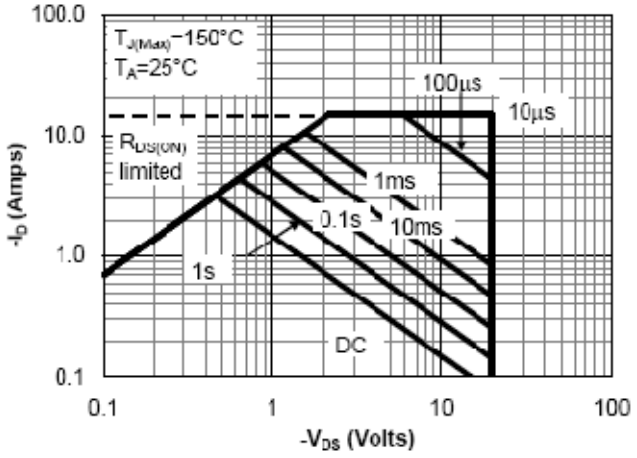


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

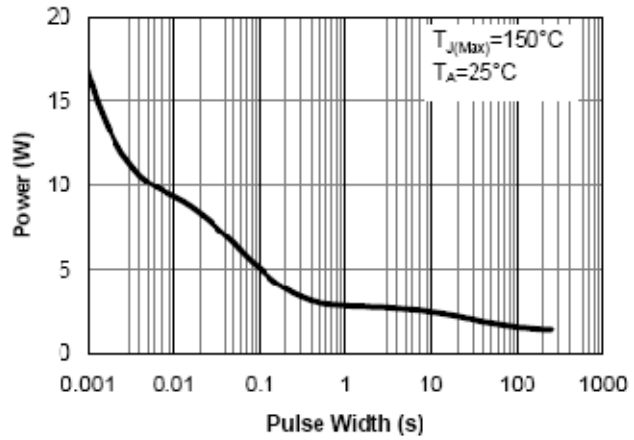


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

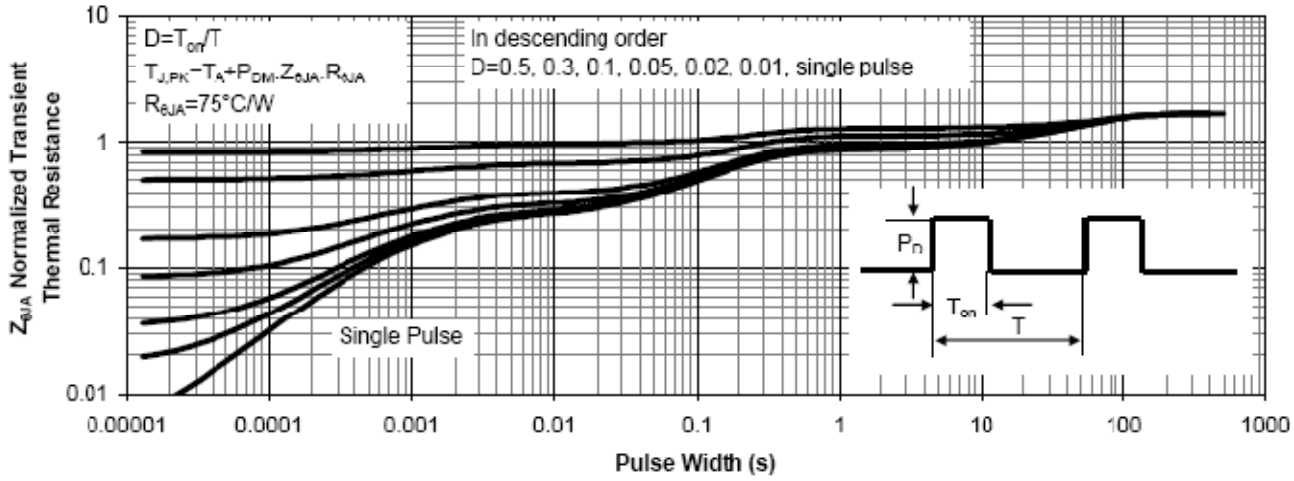


Figure 11: Normalized Maximum Transient Thermal Impedance

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: SCHOTTKY

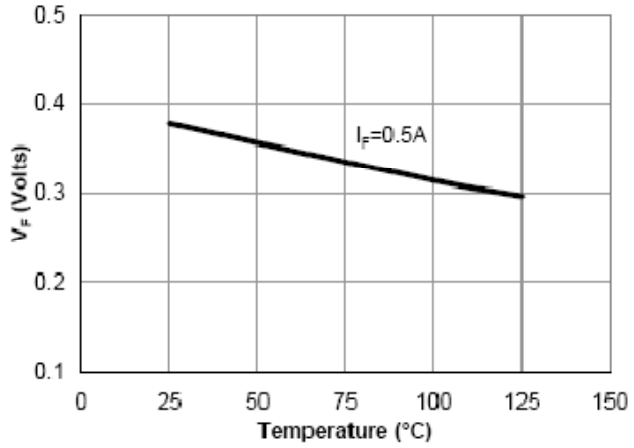


Figure 14: Schottky Forward Drop vs. Junction Temperature

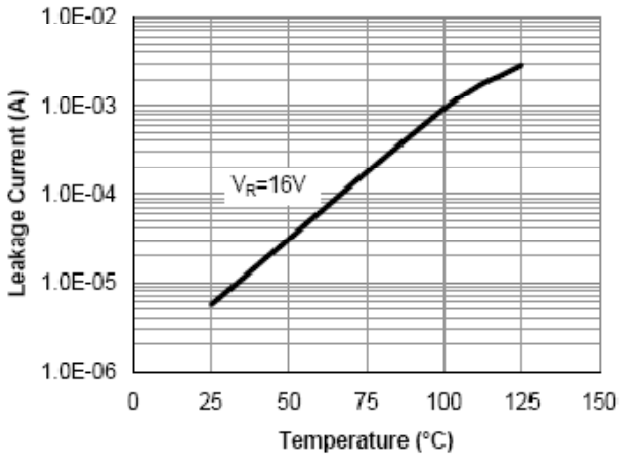


Figure 15: Schottky Leakage current vs. Junction Temperature

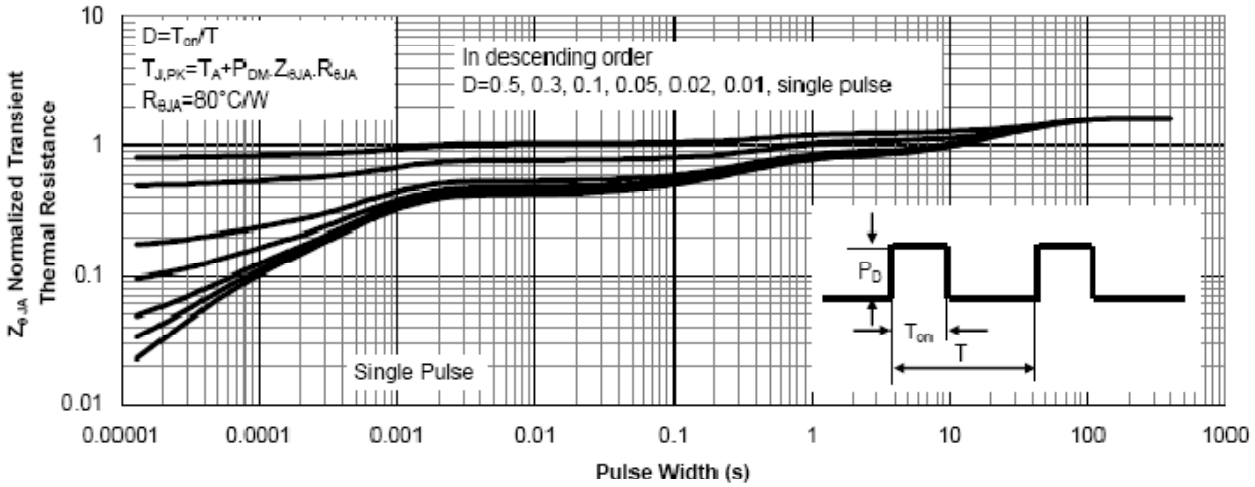


Figure 16: Schottky Normalized Maximum Transient Thermal Impedance

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