



P-Channel Enhancement Mode Field Effect Transistor

with Schottky Diode

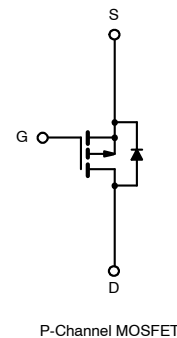
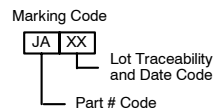
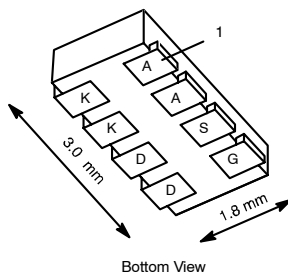
FEATURES

- 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	$R_{DS(ON)}$ (m Ω) Typ
-20V	-3.6A	105 @ $V_{GS}=-4.5V$
		120 @ $V_{GS}=-2.5V$
		145 @ $V_{GS}=-1.8V$
SCHOTTKY		
V_{KA} (V) = 20V, I_F = 1A, $V_F < 0.5V @ 0.5A$		



NOTE: The MT5853B is available in a lead-free package ""



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 ^q	$R_{th JA}$	75	$^\circ C/W$
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THERMAL CHARACTERISTICS SCHOTTKY

Thermal Resistance, Junction-to-Ambient ^q	$R_{th JA}$	80	$^\circ C/W$
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ELECTRICAL CHARACTERISTICS (TA=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 CHARACTERISTICS						
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		105	110	mΩ
		V _{GS} =-2.5V, I _D =-1.5A		120	135	
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		560		pF
Output Capacitance	C _{OSS}			75		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		13		ns
Rise Time	t _r			14		ns
Turn-Off Delay Time	t _{D(OFF)}			47		ns
Fall Time	t _f			49		ns
Total Gate Charge	Q _g	V _{DS} =-10V, I _D =-3.4A V _{GS} =-4.5V		6.3		nC
Gate-Source Charge	Q _{gs}			0.7		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	V _R =16V			0.1	mA
		V _R =16V, T _J =125°C			20	
C _T	Junction Capacitance	V _R =10V		34		pF
t _{rr}	Schottky Reverse 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 ≤ 10sec
- Pulse Test: Pulse Width ≤ 300Us, Duty Cycle ≤ 2%
- Guaranteed by design, not subject to production testing.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

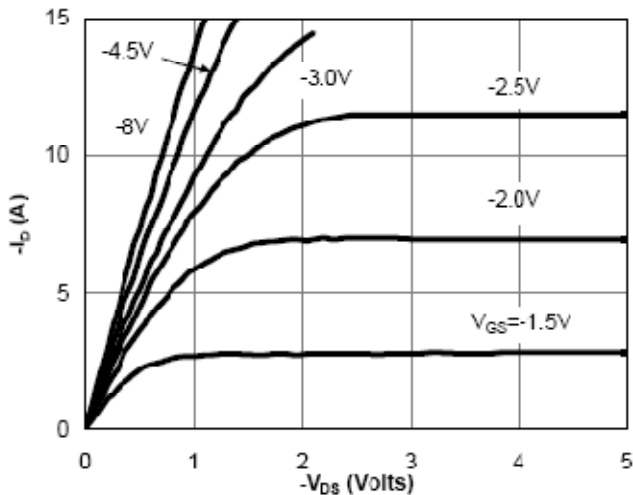


Fig 1: On-Region Characteristics

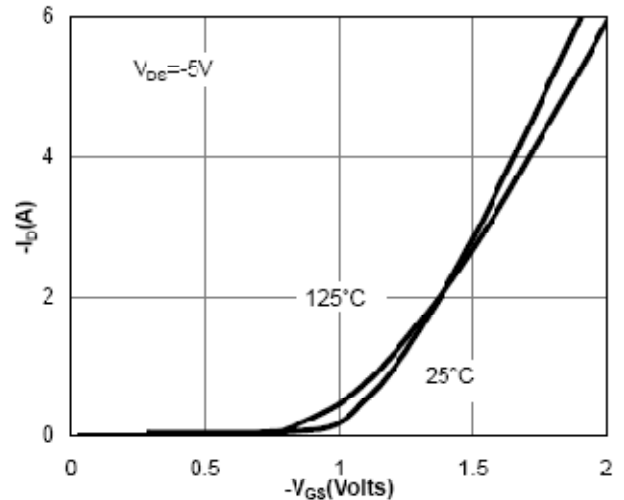


Figure 2: Transfer Characteristics

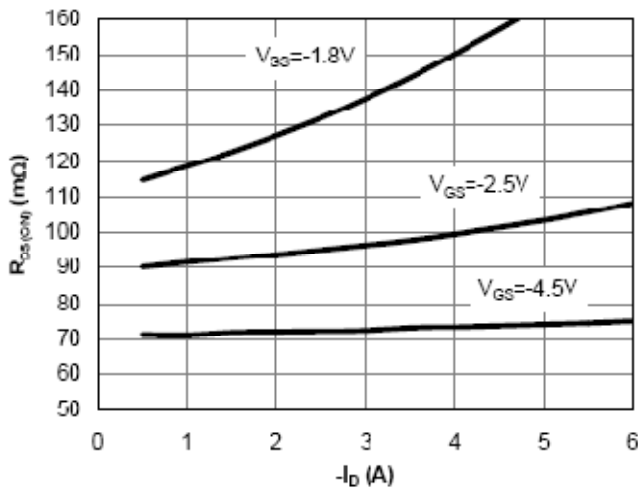


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

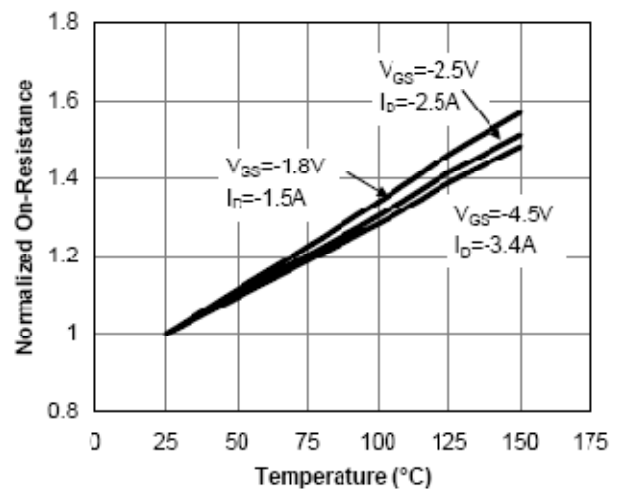


Figure 4: On-Resistance vs. Junction Temperature

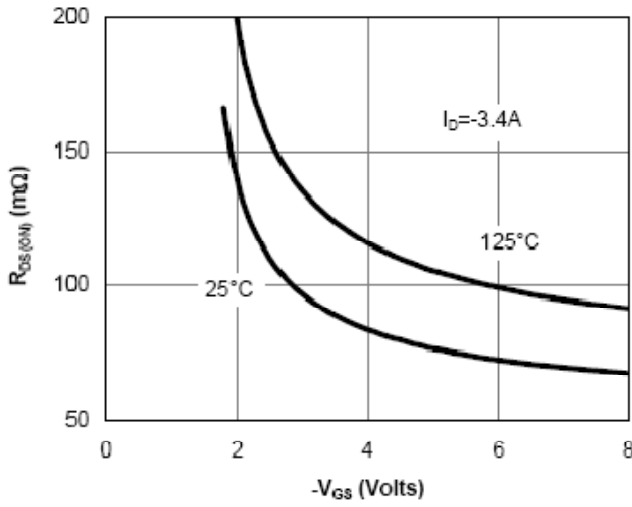


Figure 5: On-Resistance vs. Gate-Source Voltage

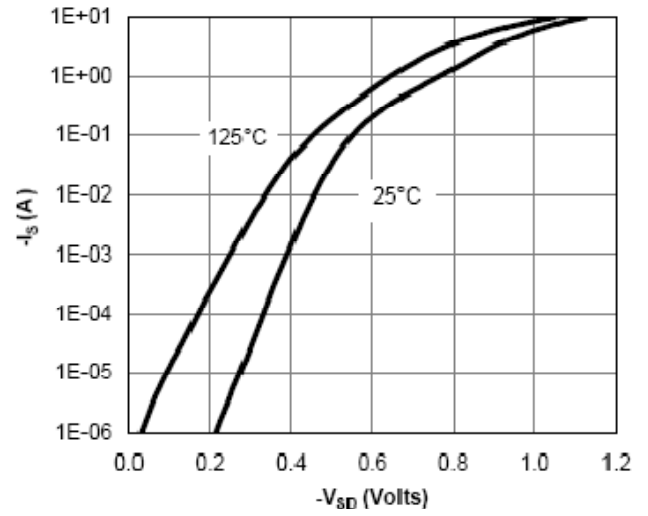


Figure 6: Body-Diode Characteristics

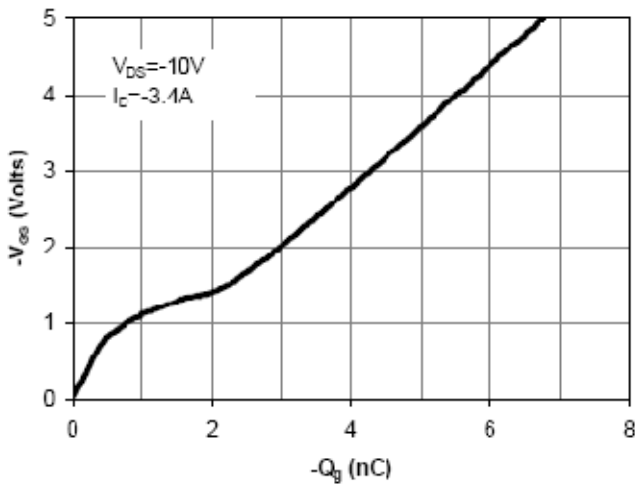


Figure 7: Gate-Charge Characteristics

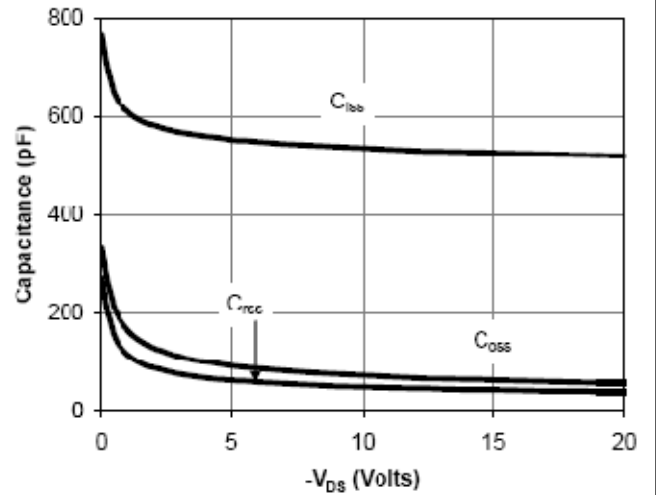


Figure 8: Capacitance Characteristics

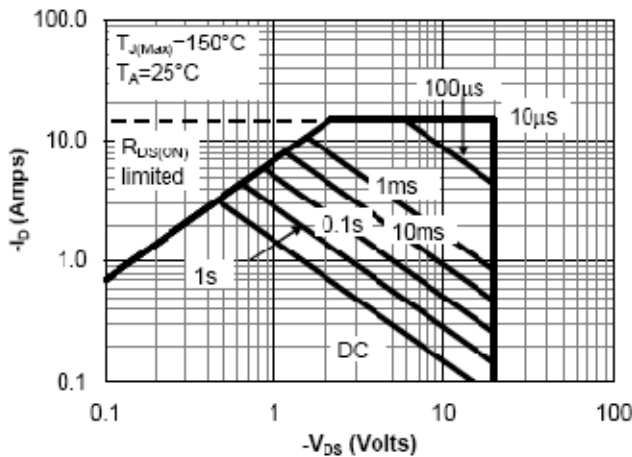


Figure 9: Maximum Forward Biased Safe Operating Area (Note C)

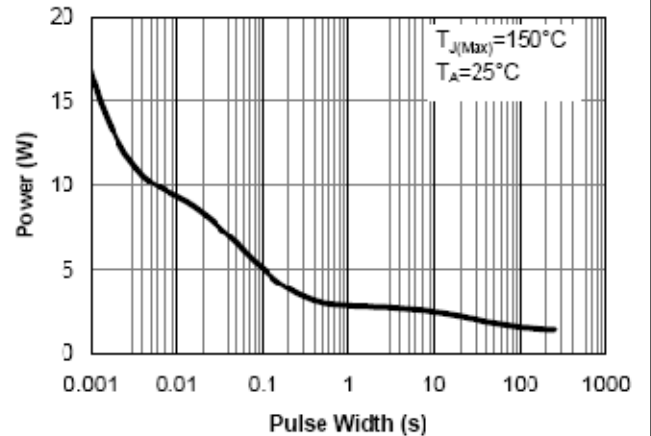


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

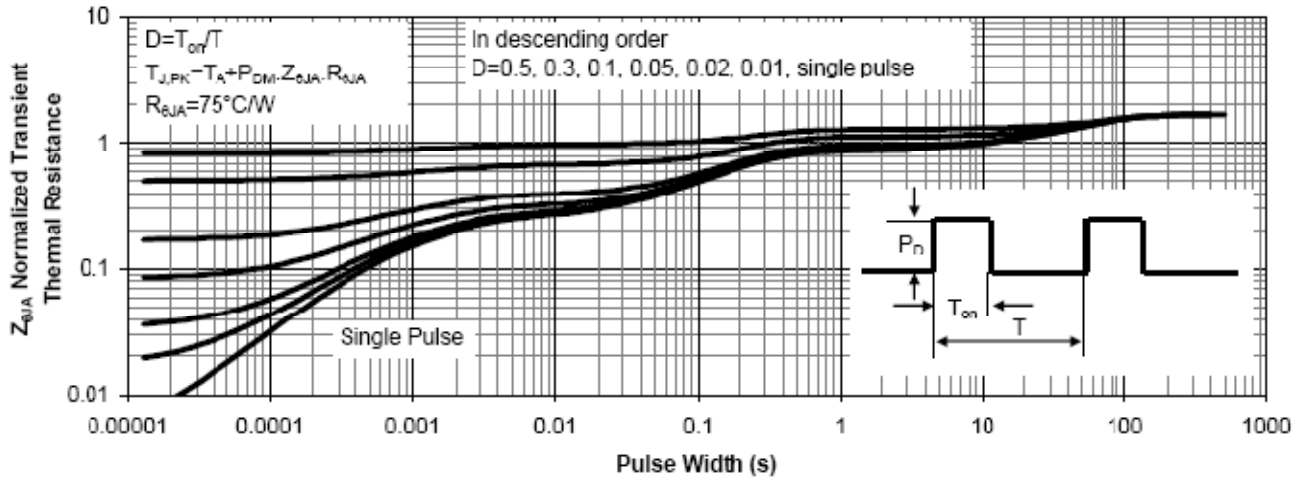


Figure 11: Normalized Maximum Transient Thermal Impedance

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS: SCHOTTKY

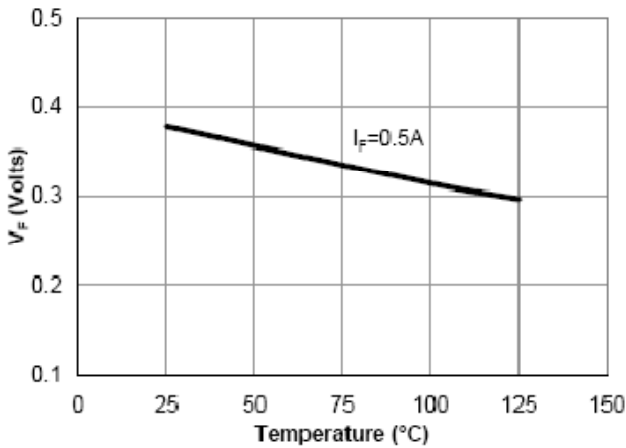


Figure 14: Schottky Forward Drop vs. Junction Temperature

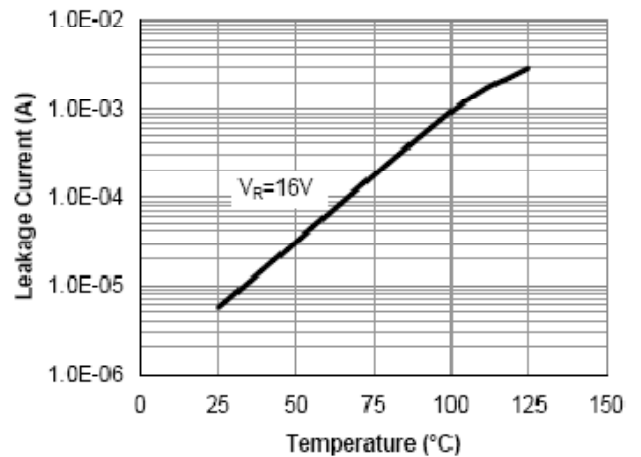


Figure 15: Schottky Leakage current vs. Junction Temperature

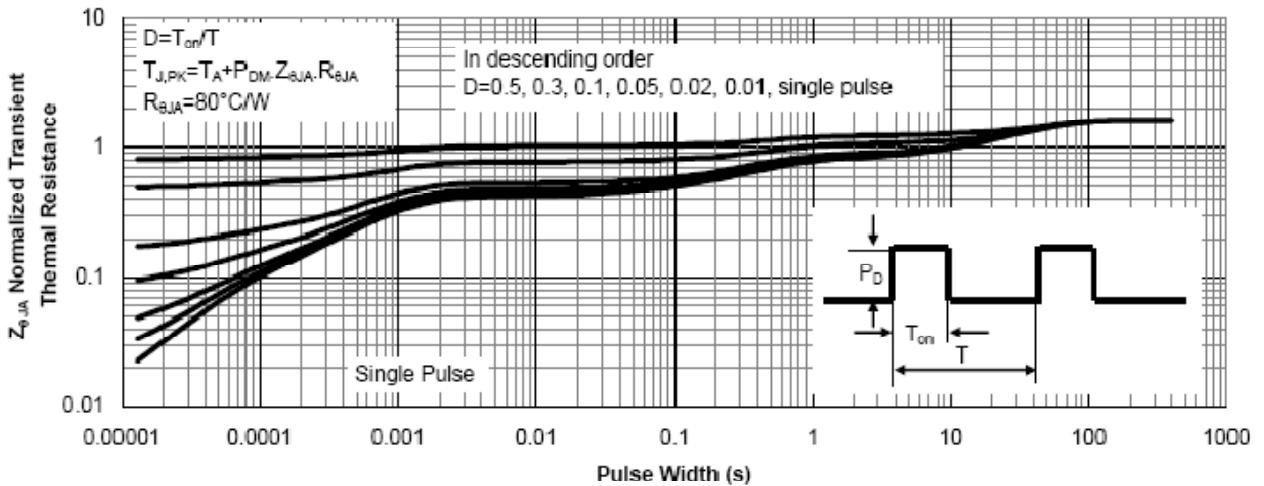


Figure 16: Schottky Normalized Maximum Transient Thermal Impedance



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