

Static Characteristics
T_J = 25°C unless otherwise specified
APT51F50J

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V _{BR(DSS)}	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	500			V
ΔV _{BR(DSS)} /ΔT _J	Breakdown Voltage Temperature Coefficient	Reference to 25°C, I _D = 250μA		0.60		V/°C
R _{DS(on)}	Drain-Source On Resistance ^③	V _{GS} = 10V, I _D = 37A		0.064	0.075	Ω
V _{GS(th)}	Gate-Source Threshold Voltage	V _{GS} = V _{DS} , I _D = 2.5mA	2.5	4	5	V
ΔV _{GS(th)} /ΔT _J	Threshold Voltage Temperature Coefficient			-10		mV/°C
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} = 500V V _{GS} = 0V			250	μA
		T _J = 25°C T _J = 125°C			1000	
I _{GSS}	Gate-Source Leakage Current	V _{GS} = ±30V			±100	nA

Dynamic Characteristics
T_J = 25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
g _{fs}	Forward Transconductance	V _{DS} = 50V, I _D = 37A		55		S
C _{iss}	Input Capacitance	V _{GS} = 0V, V _{DS} = 25V f = 1MHz		11600		pF
C _{rss}	Reverse Transfer Capacitance			160		
C _{oss}	Output Capacitance			1250		
C _{o(cr)} ^④	Effective Output Capacitance, Charge Related	V _{GS} = 0V, V _{DS} = 0V to 333V		725		
C _{o(er)} ^⑤	Effective Output Capacitance, Energy Related			365		
Q _g	Total Gate Charge	V _{GS} = 0 to 10V, I _D = 37A, V _{DS} = 250V		290		nC
Q _{gs}	Gate-Source Charge			65		
Q _{gd}	Gate-Drain Charge			130		
t _{d(on)}	Turn-On Delay Time	Resistive Switching V _{DD} = 333V, I _D = 37A R _G = 2.2Ω ^⑥ , V _{GG} = 15V		45		ns
t _r	Current Rise Time			55		
t _{d(off)}	Turn-Off Delay Time			120		
t _f	Current Fall Time			39		

Source-Drain Diode Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I _S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse p-n junction diode (body diode)			51	A
I _{SM}	Pulsed Source Current (Body Diode) ^①				230	
V _{SD}	Diode Forward Voltage	I _{SD} = 37A, T _J = 25°C, V _{GS} = 0V			1.2	V
t _{rr}	Reverse Recovery Time	I _{SD} = 37A ^③ V _{DD} = 100V di _{SD} /dt = 100A/μs	T _J = 25°C		310	ns
			T _J = 125°C		570	
Q _{rr}	Reverse Recovery Charge		T _J = 25°C	1.48		μC
			T _J = 125°C	3.85		
I _{rrm}	Reverse Recovery Current		T _J = 25°C	11.3		A
			T _J = 125°C	16.6		
dv/dt	Peak Recovery dv/dt	I _{SD} ≤ 37A, di/dt ≤ 1000A/μs, V _{DD} = 333V, T _J = 125°C			20	V/ns

① Repetitive Rating: Pulse width and case temperature limited by maximum junction temperature.

② Starting at T_J = 25°C, L = 2.31mH, R_G = 25Ω, I_{AS} = 37A.

③ Pulse test: Pulse Width < 380μs, duty cycle < 2%.

④ C_{o(cr)} is defined as a fixed capacitance with the same stored charge as C_{OSS} with V_{DS} = 67% of V_{(BR)DSS}.

⑤ C_{o(er)} is defined as a fixed capacitance with the same stored energy as C_{OSS} with V_{DS} = 67% of V_{(BR)DSS}. To calculate C_{o(er)} for any value of V_{DS} less than V_{(BR)DSS}, use this equation: C_{o(er)} = -1.65E-7/V_{DS}² + 5.51E-8/V_{DS} + 2.03E-10.

⑥ R_G is external gate resistance, not including internal gate resistance or gate driver impedance. (MIC4452)

Microsemi reserves the right to change, without notice, the specifications and information contained herein.

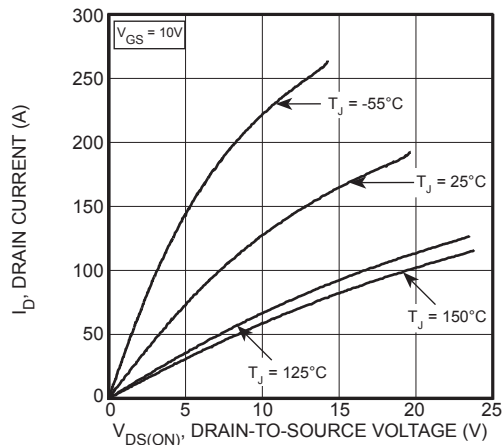


Figure 1, Output Characteristics

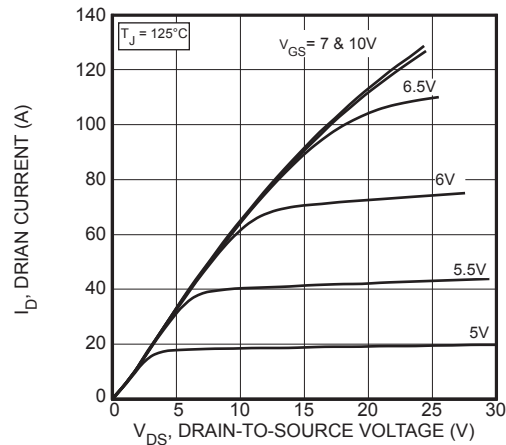


Figure 2, Output Characteristics

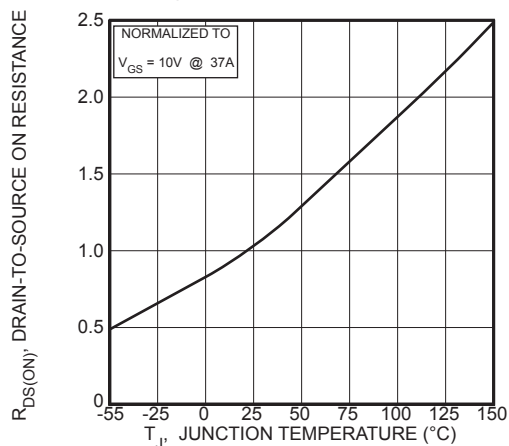
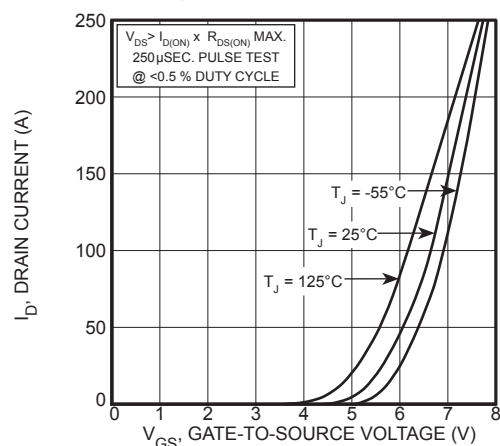
Figure 3, $R_{DS(ON)}$ vs Junction Temperature

Figure 4, Transfer Characteristics

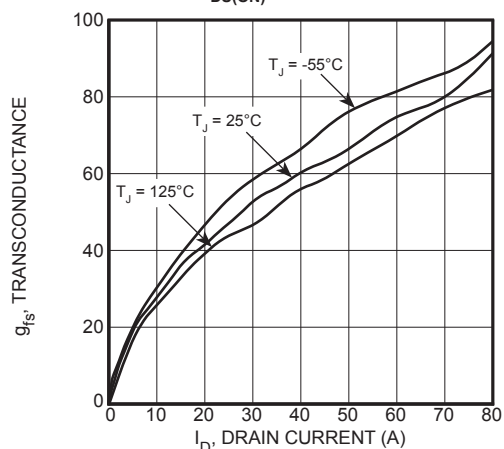


Figure 5, Gain vs Drain Current

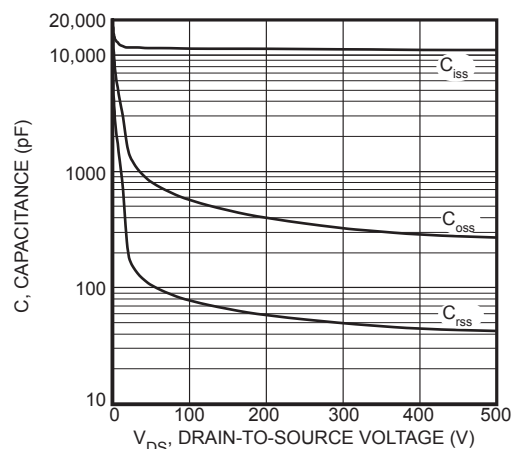


Figure 6, Capacitance vs Drain-to-Source Voltage

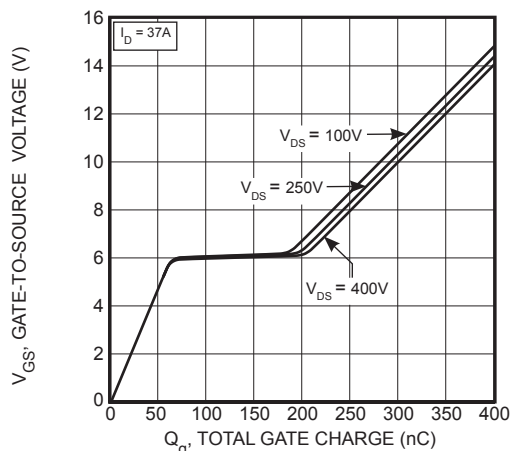


Figure 7, Gate Charge vs Gate-to-Source Voltage

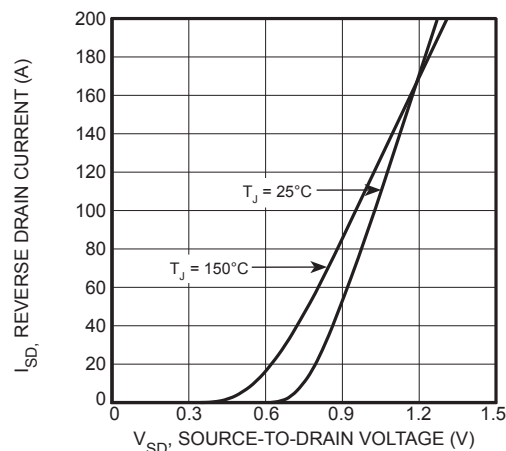


Figure 8, Reverse Drain Current vs Source-to-Drain Voltage

