



N-Channel Enhancement Mode Power MOSFET 500V / 50A

Features

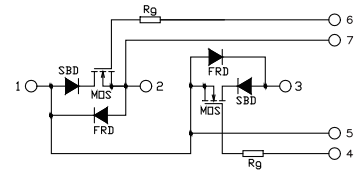
- ◆ $V_{DSS} = 500V$
- ◆ $R_{DS(ON)}$ Typ.110mΩ@ $V_{GS} = 10V$
- ◆ Fully Avalanche Rated
- ◆ Pb Free & RoHS Compliant
- ◆ Isolation Type Package
- ◆ Electrically Isolation base plate

Preliminary



Applications

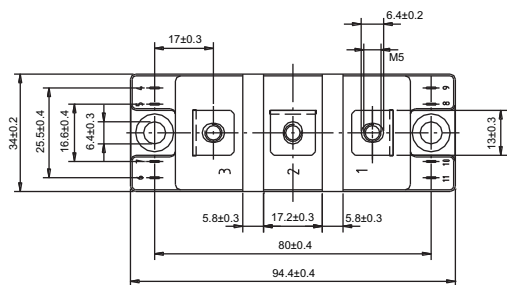
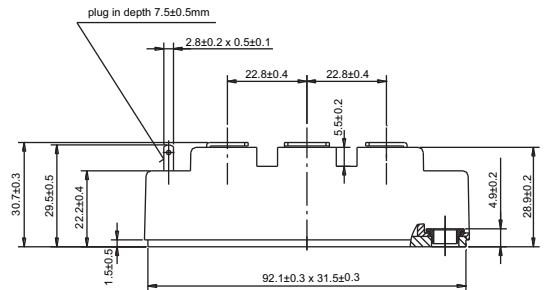
- ◆ Backlighting
- ◆ Power Converters
- ◆ Synchronous Rectifiers



Absolute Maximum Ratings (Tc=25°C unless otherwise noted)

Parameter	Symbol	Ratings	Unit	
Drain-Source Voltage	V_{DS}	500	V	
Gate-Source Voltage	V_{GS}	±20	V	
Drain Current-Continuous	I_D	Duty=50%	50	A
		D.C.	35	
Drain Current-Pulsed @ $T_c = 25^\circ C$ <small>Note1</small>	I_{DM}	100	A	
Maximum Power Dissipation	P_D	350	W	
Storage Temperature Range	T_{STG}	-50 to +125	°C	
Operating Junction Temperature Range	T_J	-50 to +150	°C	
Thermal Resistance, Junction-to-Case	MOSEET	$R_{\theta JC}$	°C/W	
	Diode			0.36
Isolation Voltage (A.C. 1 minute)	V_{iso}	2500	V	
Mounting torque (M5 Screw)	M_d	3-5	Nm	
Weight		142	g	

Package Outlines



Dimensions in mm (1 mm = 0.0394")



■ **Electrical Characteristics** @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
OFF Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_{DS}=3mA$	500	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{GS}=0V, V_{DS}=500V$	-	-	1	mA
Gate-Body Leakage	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	0.3	μA
ON Characteristics						
Gate Threshold Voltage	V_{TH}	$V_{DS}=V_{GS}, I_{DS}=3mA$	2	3.1	4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_{DS}=25A$	-	110	120	m Ω
Forward Transconductance	g_{fs}	$V_{DS}=15V, I_{DS}=25A$	-	30	-	S
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=25V$	-	8.4	-	nF
Output Capacitance	C_{oss}	$V_{GS}=0V$	-	0.6	-	
Reverse Transfer Capacitance	C_{rss}	Freq.=1MHz	-	0.24	-	
Switching Characteristics						
Turn-On Delay Time	$t_{d(on)}$	$V_{Dd}=1/2V_{DSS}$ $V_{GS}=-5V,+10V$ $I_{DS}=25A$ $R_G=2\Omega$	-	80	-	ns
Rise Time	t_r		-	110	-	
Turn-Off Delay Time	$t_{d(off)}$		-	250	-	
Fall Time	t_f		-	35	-	
Diode Forward Voltage	$E_{(on)}$	$R_G=2\Omega$	-	0.1	-	mJ
Diode Continuous Forward Current	$E_{(off)}$		-	1.6	-	

■ **Reverse Diode Characteristics** ($T_J = 25^\circ\text{C}$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Peak Forward Voltage	V_F	$I_F=50A, T_J=25^\circ\text{C}$	-	1.8	-	V
Diode Pulsed Current ^{Note1}	$I_{F,pulse}$		-	-	100	A
Peak Reverse Recovery Current	I_{RM}	$I_F=50A$ $-dis/dt=100A/\mu s$	-	16	-	A
Recovered Charge	Q_{rr}	$I_F=50A$ $-dis/dt=100A/\mu s$	-	0.5	-	μc
Reverse Recovery Energy	E_{rec}	$I_F=50A$ $-dis/dt=100A/\mu s$	-	0.2	-	mJ
Reverse Recovery Time	T_{rr}	$I_F=50A$ $-dis/dt=100A/\mu s$	-	50	-	ns

Notes:

1. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $> 2\%$.



Typical Characteristics

Fig. 1 Typical Output Characteristics

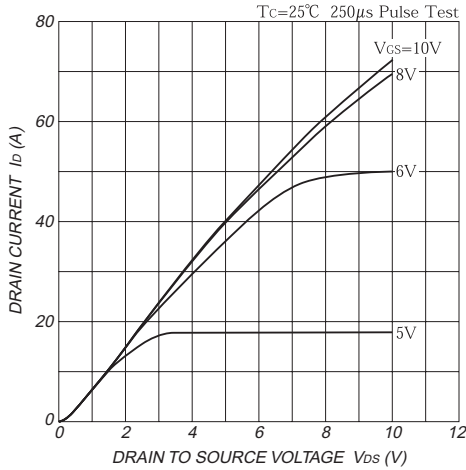


Fig. 2 Typical Drain-Source On-Voltage Vs. Gate-Source Voltage

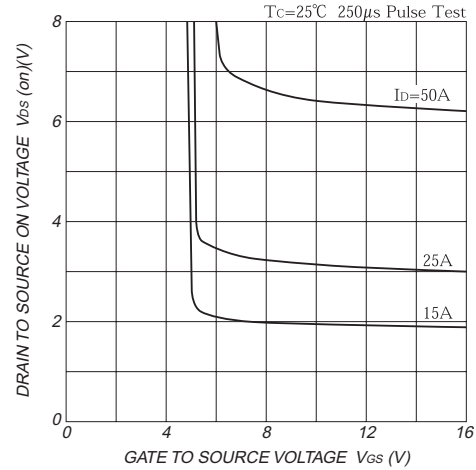


Fig. 3 Typical Drain-Source On Voltage Vs. Junction Temperature

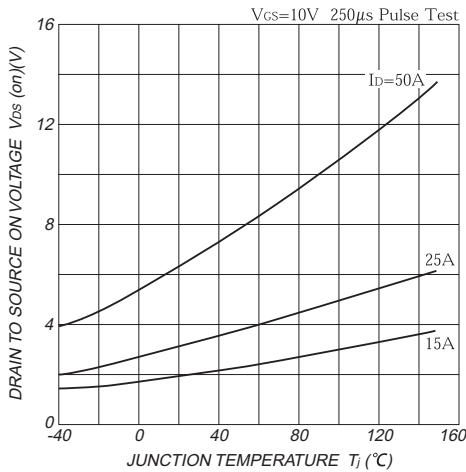


Fig. 4 Typical Capacitance Vs. Drain-Source Voltage

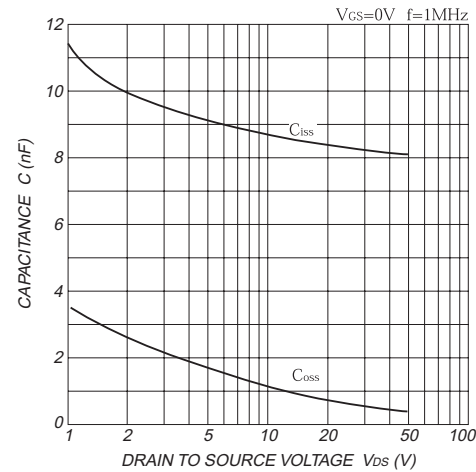


Fig. 5 Typical Gate Charge Vs. Gate-Source Voltage

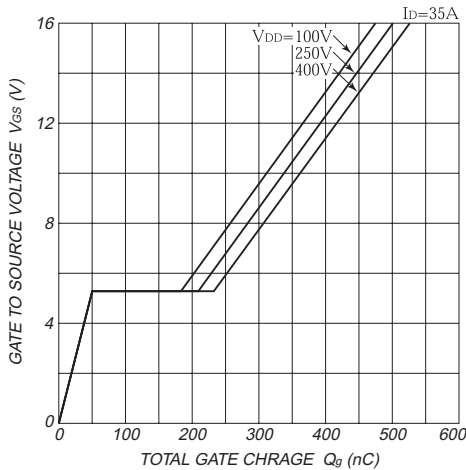
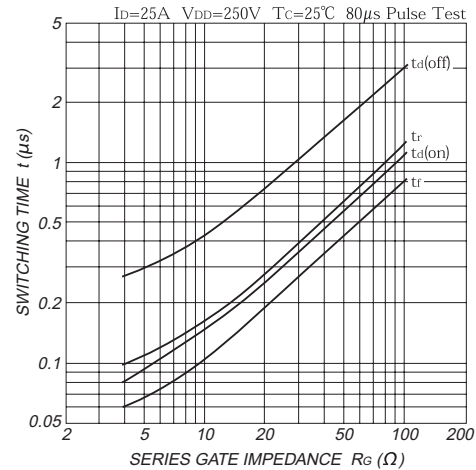


Fig. 6 Typical Switching Time Vs. Series Gate Impedance





Typical Characteristics

Fig. 7 Typical Switching Time Vs. Drain Current

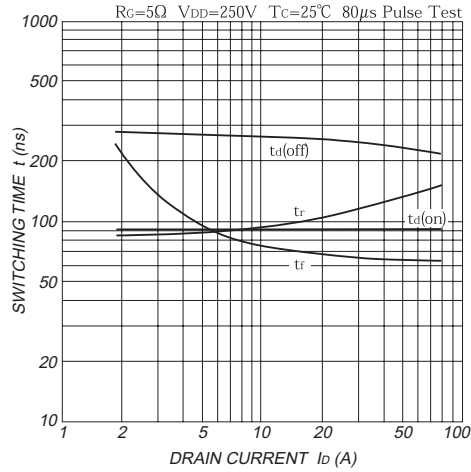


Fig. 8 Typical Source-Drain Diode Forward Characteristics

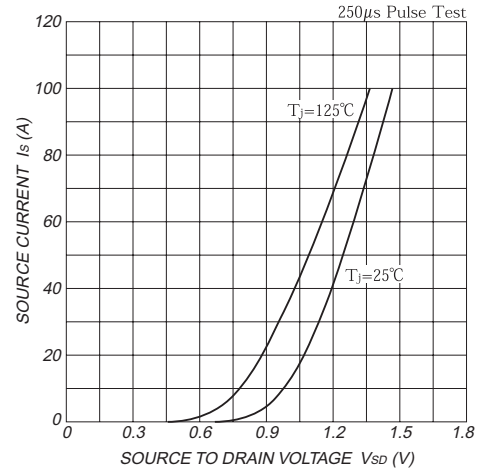


Fig. 9 Typical Reverse Recovery Characteristics

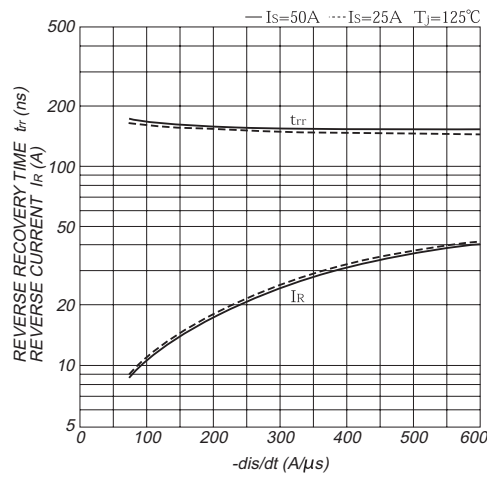


Fig. 10 Maximum Safe Operating Area

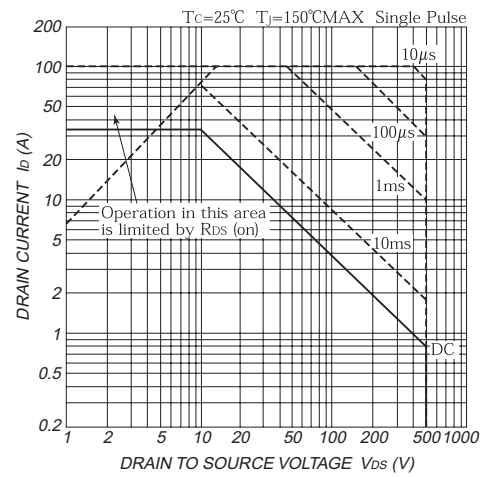


Fig. 11-1 Normalized Transient Thermal impedance(MOSFET)

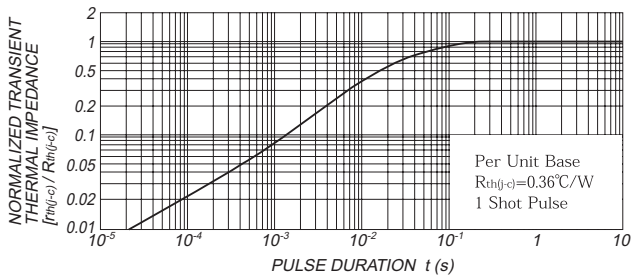
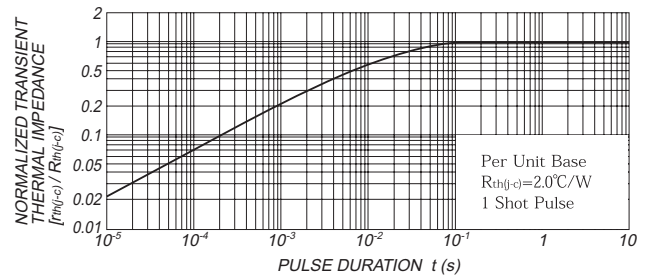


Fig. 11-2 Normalized Transient Thermal impedance(DIODE)





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