-60V P-Channel Power MOSFET

DESCRIPTION：

·P-Channel Enhancement Mode - Logic Level
·Excellent FoM (figure of merit)
·100% UIS and Rg Tested

V_{DSS}	-60V
I_D	-25A
$R_{DS(ON)_Typ.}$ @V_{GS}=-10V	36mΩ

TYPICAL APPLICATIONS：

·Motor drives
·Load Switch
·Reverse Polarity Protection



TO-220

MAXIMUM RATINGS (at T_C = 25 °C, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-60	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current (1) T_C = 25℃ T_C = 100℃	I_D	 -25 -15.6	A
Pulsed Drain Current, tp<10us(2)	I_{DM}	-98	A
Single Pulsed Avalanche Energy(3)	E_{AS}	68	mJ
Single Pulse Avalanche Current (L= 0.1mH)	I_{AS}	-21	A
Power dissipation T_C = 25℃ T_C = 100℃	P_D	 50 20	mW
Junction & Storage temperature Range	T_J, T_{STG}	-55~+150	℃
Thermal Resistance, Junction to Ambient Thermal Resistance, Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	65 2.5	℃/W

Notes： 1. This current is chip limited, which is calculated based on Rthjc.
2. This current is calculated on single pulse with 10μs Pulse.
3. Defined by design, not subject to production test, E_{AS} condition: T_J=25°C, V_{DD}= -30V, V_{GS}= -10V, L=1.0mH.

ELECTRICAL CHARATERISTICS (at T_J = 25 °C, unless otherwise specified)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage VGS = 0V, ID = 250uA	$V_{(BR)DSS}$	-60			V
Zero Gate Voltage Drain Current VDS = -60 V, VGS = 0 V, T_J = 25 °C VDS = -60 V, VGS = 0 V, T_J = 125 °C	I_{DSS}			-1 -100	uA
Gate-Source Leakage Current VGS = ±12V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = -250uA	$V_{GS(th)}$	-1.2	-1.8	-2.5	V
Drain-Source On-State Resistance VGS = -10V, ID = -7.0A VGS = -4.5V, ID = -5.0A	$R_{DS(on)}$		36 48	50 65	mΩ
Forward Transconductance VDS = -5.0V, ID = -7.0A	g_{fs}		17		S
Diodes Forward Voltage IS = -2.0A, VGS = 0V	V_{SD}		-0.7	-1.2	V
Input capacitance f=1MHz, VDS=-30 V, VGS=0 V	C_{iss}		668		pF
Output capacitance f=1MHz, VDS=-30 V, VGS=0 V	C_{oss}		222		pF
Reverse transfer capacitance f=1MHz, VDS=-30 V, VGS=0 V	C_{rss}		12		pF
Gate Resistance VGS = 0V, VDS = 0V, f = 1MHz	Rg		8.6		Ω
Turn-on delay time VDD= -30V, VGS= -10V, ID=-7.0A, R_{GEN}=3.0Ω	$t_{d\,(ON)}$		5.5		ns
Rise time VDD= -30V, VGS= -10V, ID=-7.0A, R_{GEN}=3.0Ω	tr		3.6		ns
Turn-off delay time VDD= -30V, VGS= -10V, ID=-7.0A, R_{GEN}=3.0Ω	$t_{d\,(OFF)}$		21		ns
Fall time VDD= -30V, VGS= -10V, ID=-7.0A, R_{GEN}=3.0Ω	tf		9.1		ns
Total Gate Charge VDS =-30V, ID =-7A, VGS =-10V VDS =-30V, ID =-7A, VGS =-4.5V	Qg		11.8 5.3		nC
Gate-Source Charge VDS =-30V, ID =-7A, VGS =-10V	Q_{gs}		1.8		nC
Gate-Drain("Miller") Charge VDS =-30V, ID =-7A, VGS =-10V	Q_{gd}		1.6		nC
Gate Plateau Voltage VDS =-30V, ID =-7A, VGS =-10V	$V_{plateau}$		-2.9		V
Reverse Recovery Time I_S=-7A,di/dt=100A/μs, T_J=25℃	Trr		25		nS
Reverse Recovery Charge I_S=-7A,di/dt=100A/μs, T_J=25℃	Qrr		18		nC
Maximum Continuous Drain to Source Diode Forward Current	I_S			-25	A

Typical Performance Characteristics

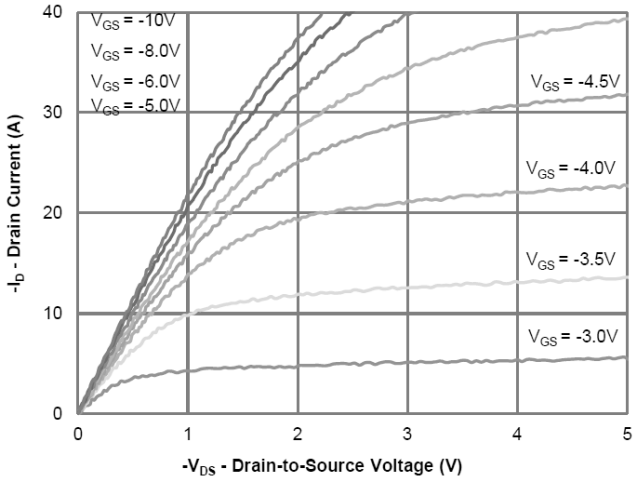


Figure 1. Output Characteristics

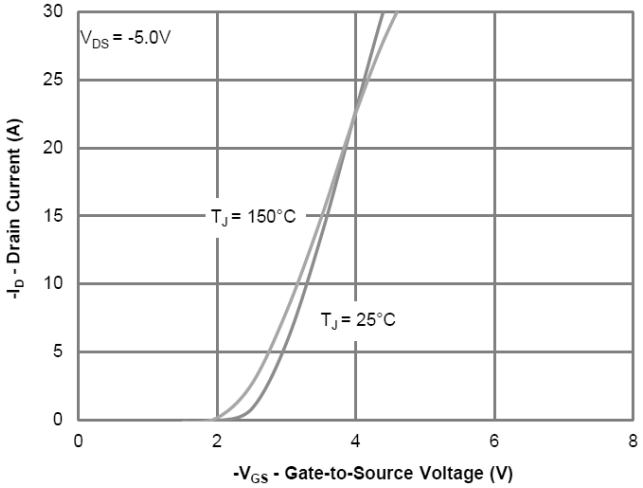


Figure 2. Transfer Characteristics

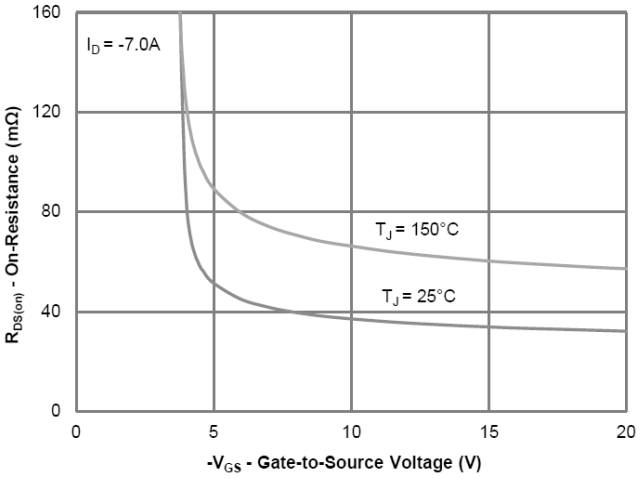


Figure 3. On-Resistance vs. Gate-Source Voltage

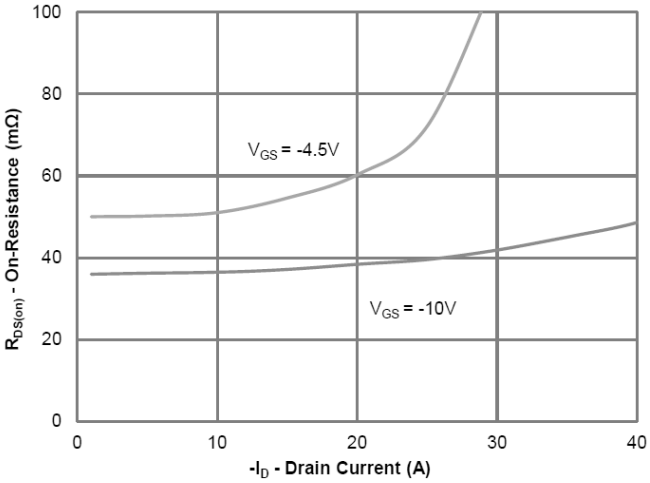


Figure 4. On-Resistance vs. Drain Current and Gate Voltage

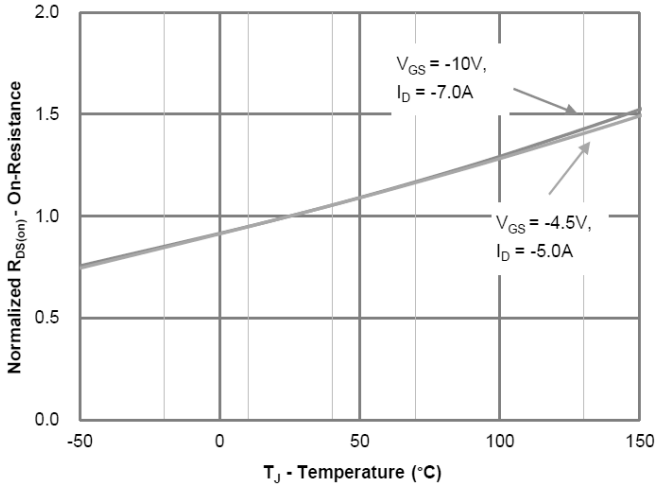


Figure 5. On-Resistance vs. Junction Temperature

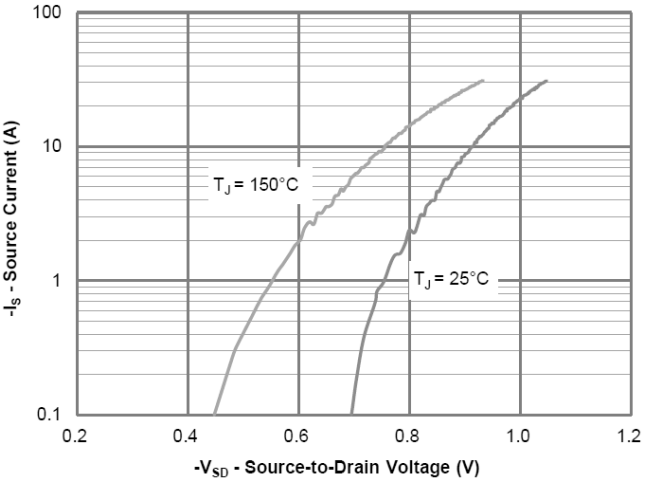


Figure 6. Source-Drain Diode Forward Voltage

Typical Performance Characteristics

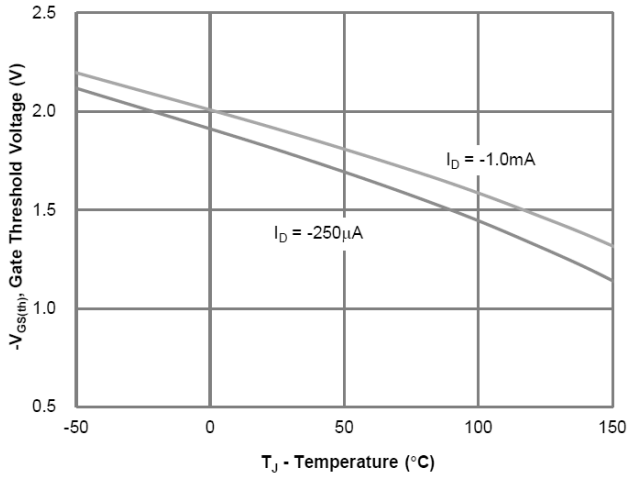


Figure 7. Gate Threshold Variation vs. Junction Temperature

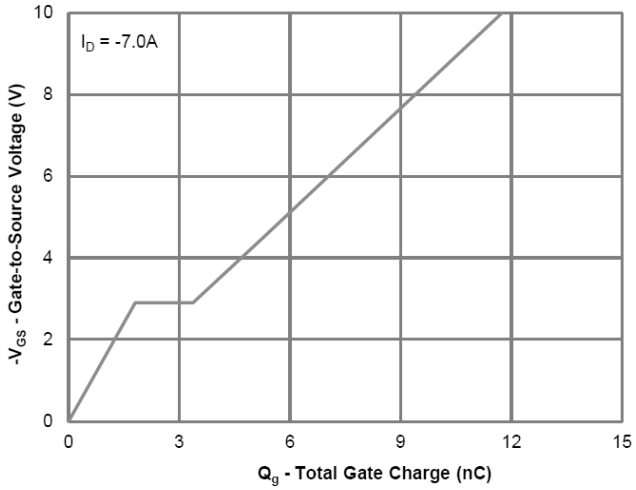


Figure 8. Gate Charge Characteristics

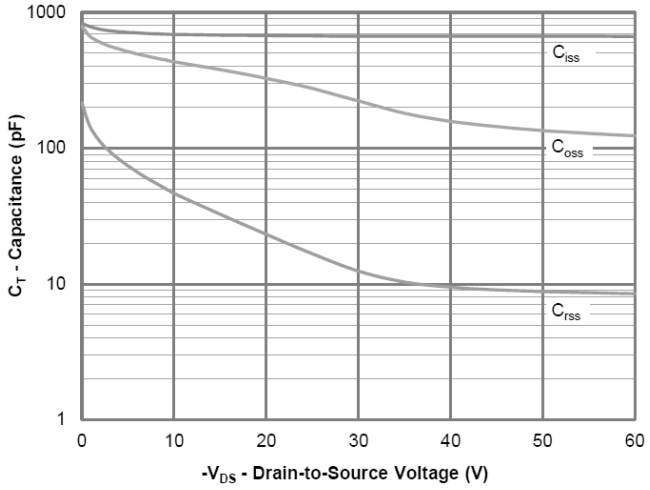


Figure 9. Capacitance Characteristics

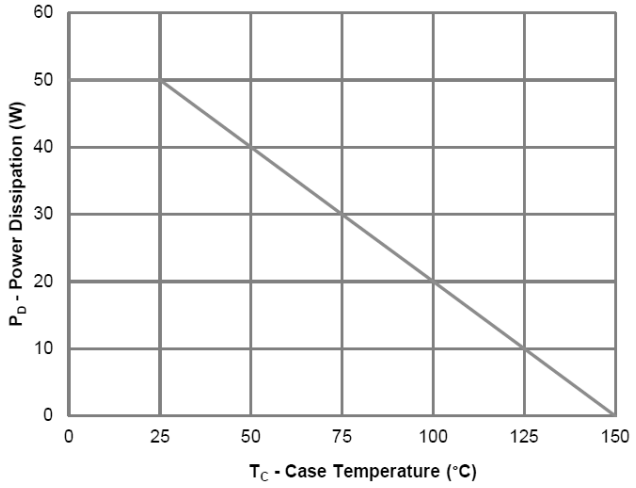


Figure 10. Power Derating

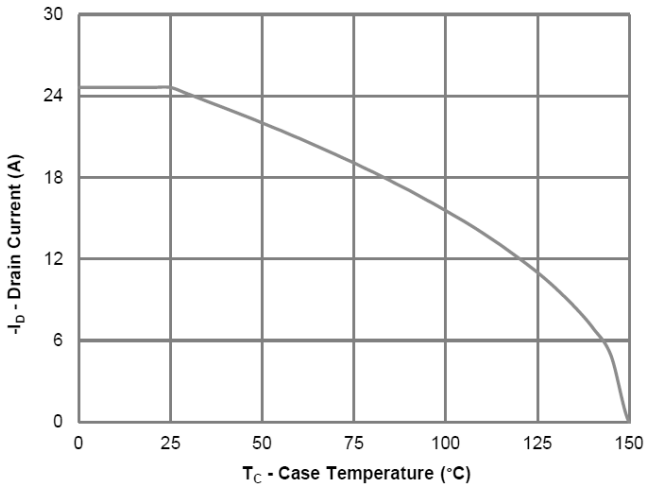


Figure 11. Current Derating

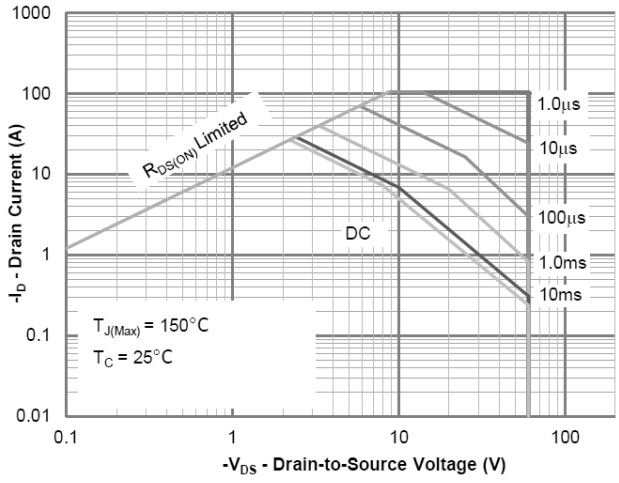


Figure 12: Safe Operating Area

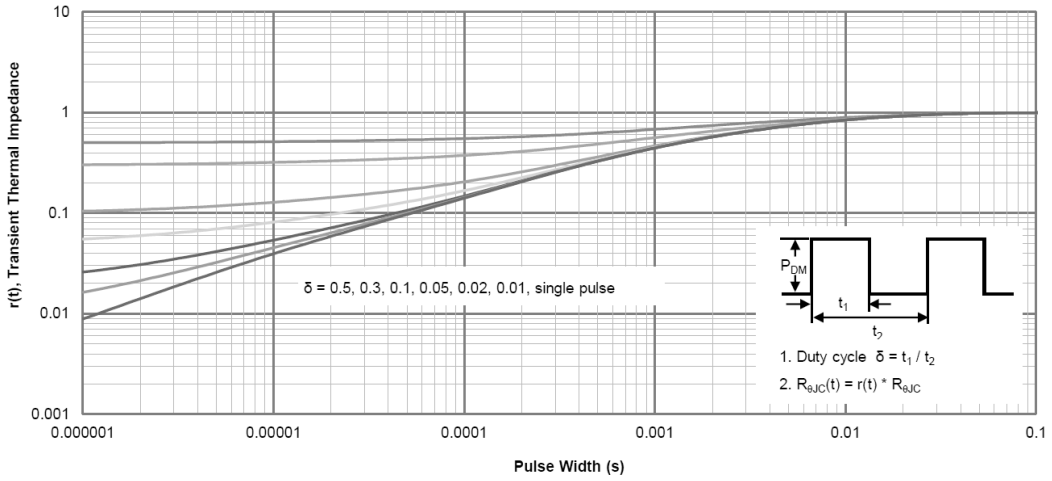
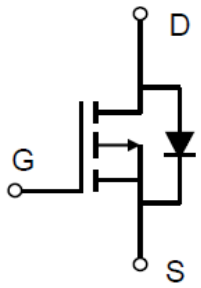
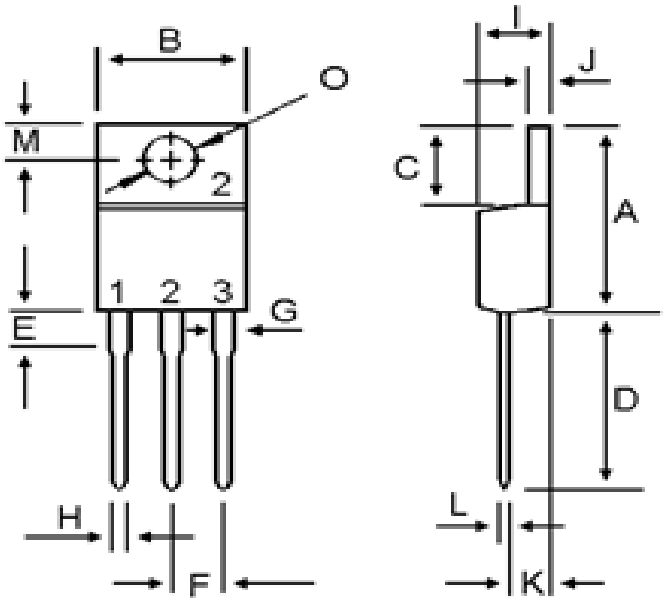


Figure 13: Normalized Maximum Transient Thermal Impedance

·Circuit diagram



·Package outlines : Dimensions in (mm)



DIM	MILLIMETERS	
	MIN	MAX
A	14.68	16.80
B	9.70	10.50
C	5.02	6.90
D	12.95	14.62
E	3.10	4.19
F	2.41	2.67
G	1.10	1.70
H	0.69	1.01
I	4.22	4.98
J	1.14	1.40
K	2.20	3.30
L	0.28	0.61
M	2.40	3.00
O	3.40	4.00

Notice

MOSPEC reserves the rights to make changes of the content herein the document anytime without notification. MOSPEC or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies. Please refer to MOSPEC website for the last document.

MOSPEC disclaims any and all liability arising out of the application or use of any product including damages incidentally and consequentially incurred.

Application shown on the herein document are examples of standard use and operation. Customers are responsible for comprehending suitable use in particular applications. MOSPEC makes no representation or warranty that such application will be suitable for the specified use without further testing or modification.

The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by MOSPEC for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of MOSPEC or others.

These MOSPEC products are intended for usage in general electronic equipment. Please make sure to consult with MOSPEC before you use these MOSPEC products in equipment which require specialized quality and/or reliability, and in equipment which could have major impact to the welfare of human life (atomic energy control, aeronautics , traffic control, combustion control, safety devices etc.)