-140A -60V P-Channel Power MOSFET

DESCRIPTION：

·Low on resistance

·Low gate charge

·Low reverse transfer capacitances

·Fast switching

·100% single pulse avalanche energy test

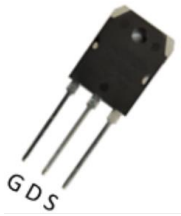
V_{DSS}	-60V
I_D	-140A
$R_{DS(ON)\_Typ.}$	5.8mΩ

TYPICAL APPLICATIONS：

·Power switching applications

·Inverter management system

·Power tools



TO-3PN

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	-140 -99	A
Pulsed Drain Current (1)		I_{DM}	-560	A
Avalanche Energy (2)		E_{AS}	1369	mJ
Power dissipation	Tc=25℃ Tc=100℃	P_{tot}	2.5 208	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} of 75 mJ is based on starting T_J = 25°C, L = 3.0mH, I_{AS} = -7.1A, V_{GS} = -10V, V_{DD} = -30V; 100% test at L = 0.1mH, I_{AS} = -25A, T_{J_Max} = 150°C.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	65 0.6	℃/W

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 = -60V, VGS = 0 V (T_C=25℃/T_C=125℃)	I_{DSS}			-1/-100	uA
Gate-Source Leakage Current VGS = ±20V, VDS = 0V	I_{GSS}			±100	nA
Gate-Source threshold voltage VDS = VGS, ID = -250uA	$V_{GS(th)}$	-1.0		-2.0	V
Drain-Source On-State Resistance VGS = -10V, ID = -60A	$R_{DS(on)}$		5.8	6.6	mΩ
Input capacitance f=1MHz, VDS= -30 V, VGS=0 V	C_{iss}		12668		pF
Output capacitance f=1MHz, VDS= -30 V, VGS=0 V	C_{oss}		736		pF
Reverse transfer capacitance f=1MHz, VDS= -30 V, VGS=0 V	C_{rss}		509		pF
Gate Resistance VDD=0 V, VGS= 0V, f=1MHz	R_g		3.8		Ω
Turn-on delay time VDS= -30 V, VGS= -10V, Id=-60A, R_G=3Ω	td (ON)		5.4		ns
Rise time VDS= -30 V, VGS= -10V, Id=-60A, R_G=3Ω	tr		1.9		ns
Turn-off delay time VDS= -30 V, VGS= -10V, Id=-60A, R_G=3Ω	td (OFF)		23		ns
Fall time VDS= -30 V, VGS= -10V, Id=-60A, R_G=3Ω	tf		4.2		ns
Total Gate Charge VDS= -30V, ID= -60A, VGS= -10V	Q_G		247		nC
Gate to Source Charge VDS= -30V, ID= -60A, VGS= -10V	Q_{GS}		56		nC
Gate to Drain Charge VDS= -30V, ID= -60A, VGS= -10V	Q_{GD}		41		nC

Body Diode

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

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Diode Forward Voltage VGS = 0V, I_S = -60A	V_{SD}			-1.2	V
Diode Continuous Current, Tc=25℃	I_S			-140	A
Revers Recovery Time IF= -60A, dI_F/dt = -100A/us, VGS= 0V	Trr		41		ns
Revers Recovery Charge IF= -60A, dI_F/dt = -100A/us, VGS= 0V	Qrr		51		nC

Typical Performance Characteristics

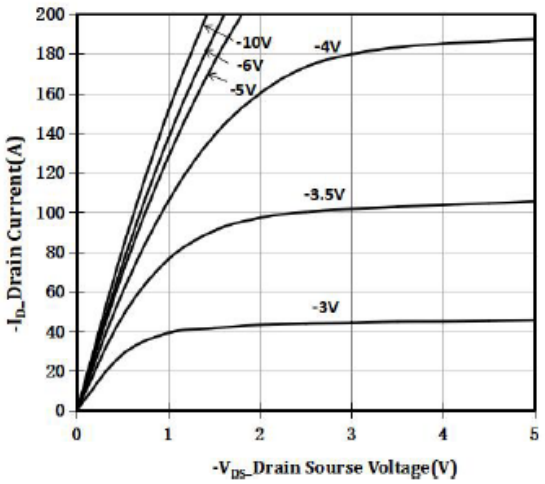


Figure 1. Saturation Characteristics

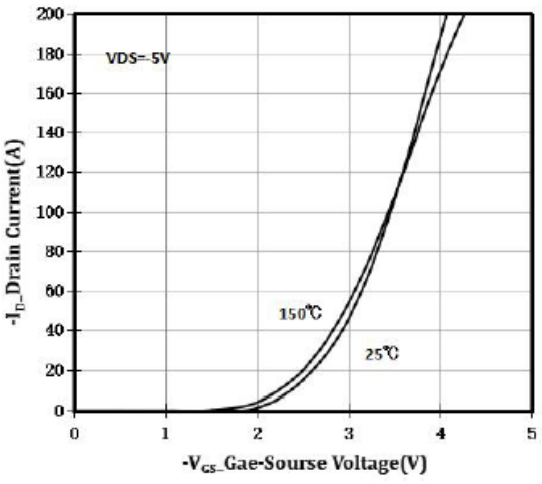


Figure 2. Transfer Characteristics

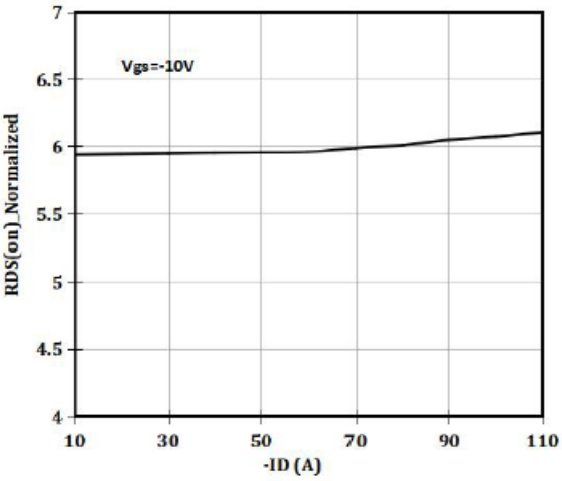


Figure 3. Rdson- Drain Current

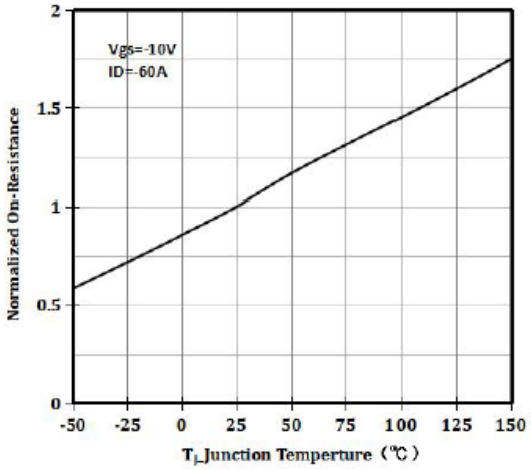


Figure 4. Rdson-JunctionTemperature

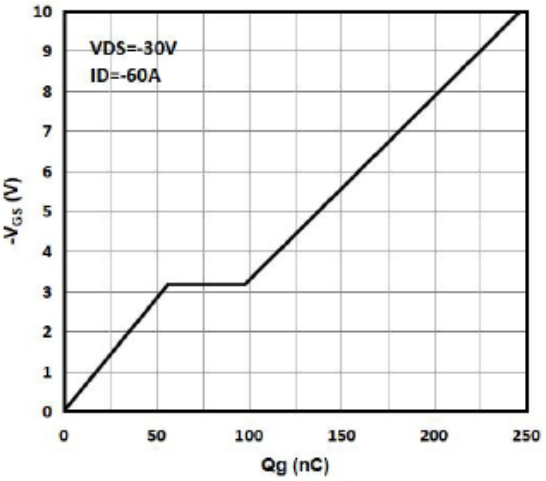


Figure 5. Gate Charge

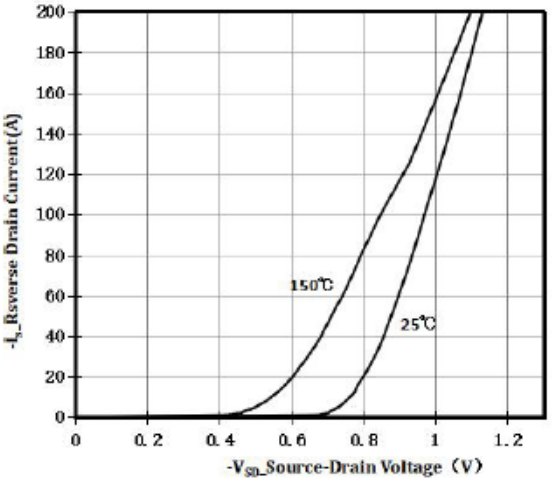


Figure 6. Source- Drain Diode Forward

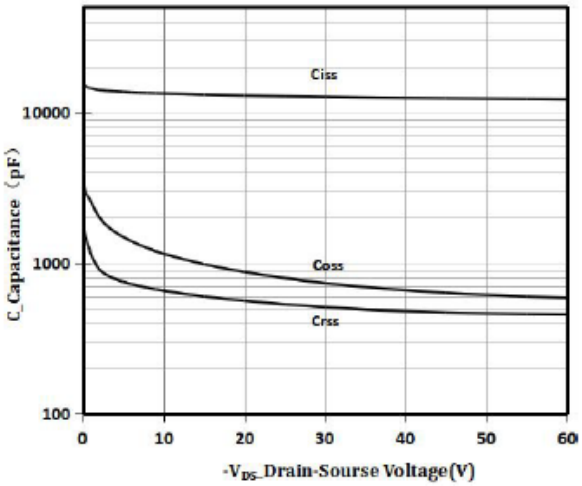


Figure 7. Capacitance vs Vds

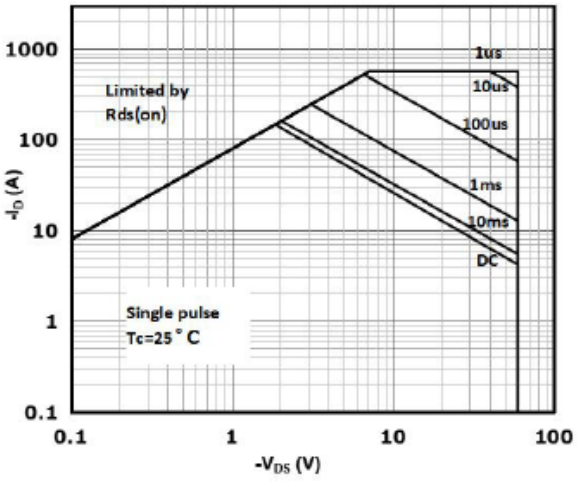


Figure 8. Safe Operation Area

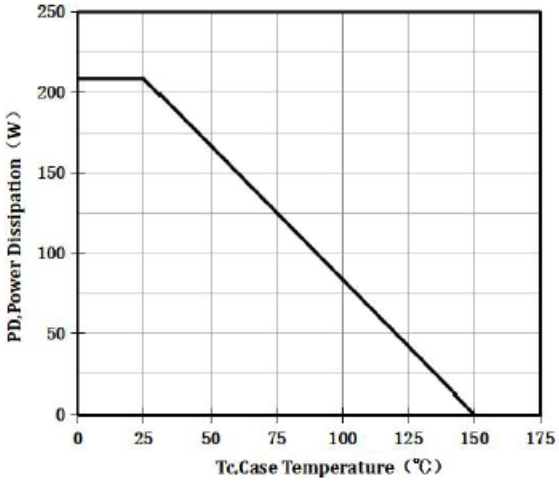


Figure 9. ID Current De-rating

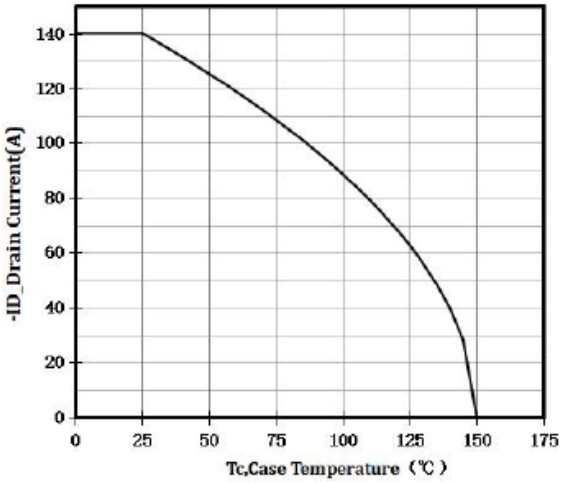


Figure 10. Power De-rating

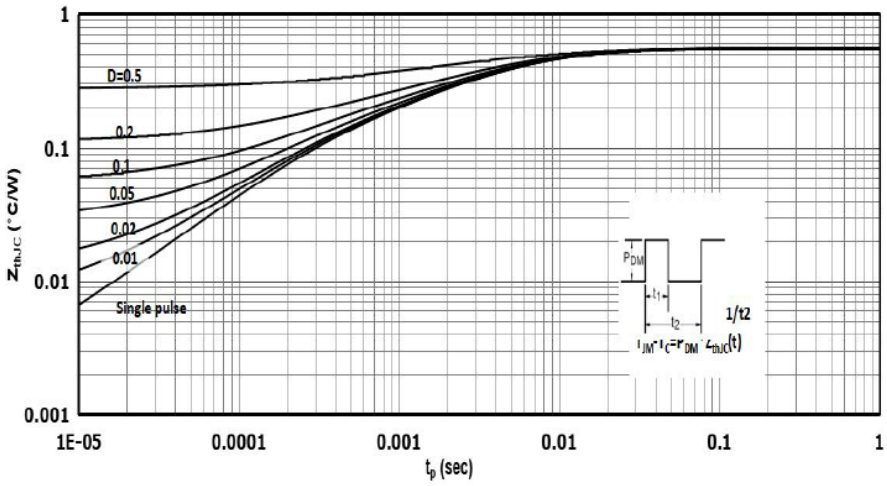
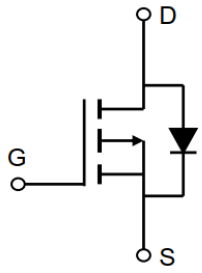
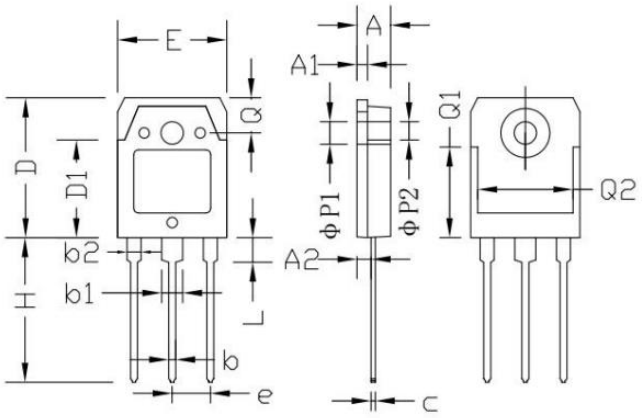


Figure 11. Normalized Maximum Transient Thermal Impedance

·Circuit diagram



·Package outlines : Dimensions in (mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	min.	max.	min.	max.
A	4.60	5.00	0.181	0.197
A1	1.45	1.65	0.057	0.065
A2	2.20	2.60	0.087	0.102
b	0.80	1.20	0.032	0.047
b1	2.80	3.20	0.110	0.126
b2	1.80	2.20	0.071	0.087
C	0.55	0.75	0.022	0.030
D	19.20	19.70	0.756	0.776
D1	13.10	14.70	0.516	0.578
E	15.40	15.80	0.607	0.623
e	5.45 TYP		0.215 TYP	
H	19.80	20.20	0.780	0.826
L	3.30	3.70	0.130	0.146
ΦP1	3.20 TYP		0.126 TYP	
ΦP2	3.50 TYP		0.138 TYP	
Q	5.00 TYP		0.197 TYP	
Q1	12.40 TYP		0.488 TYP	
Q2	12.6	-	0.496	-

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