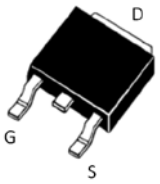
40V P-Channel Power MOSFET

DESCRIPTION：
- Low on resistance
- Low reverse transfer capacitances
- 100% single pulse avalanche energy test
- 100%ΔVds Tested
- RoHS compliant
- Halogen Free

V_{DS}	-40V
I_D (Tc=25℃)	-85A
$R_{DS(ON)\_Typ.}$ @V_{GS}=-10V	6.5mΩ

TYPICAL APPLICATIONS：
- Power switching applications
- DC-DC converters
- Full bridge control



TO-252

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

Characteristic	Condition	Symbol	Value	Unit
Drain-Source Voltage		V_{DS}	-40	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	Tc=25℃ Tc=100℃	I_D	-85 -53	A
Pulsed Drain Current (1)	Tc=25°C, tp limited by Tjmax	$I_{D\ pulse}$	-338	A
Single Pulsed Avalanche Energy	L=0.5mH, Rg=25Ω	E_{AS}	441	mJ
Power dissipation	T_C=25℃ T_A=25℃	P_{tot}	89 1.7	W
Junction & Storage temperature Range		T_J, T_{STG}	-55~+150	℃

Notes： 1. EAS was tested at Tj = 25℃, L = 0.5mH, Id=-29A..
.

THERMAL CHARACTERISTICS

Characteristic	Condition	Symbol	Value	Unit
Thermal resistance,	Junction to Ambient Junction to Case	$R_{\theta JA}$ $R_{\theta JC}$	75 1.4	℃/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	$V_{(BR)DSS}$	-40			V
Zero Gate Voltage Drain Current VDS = -40 V, VGS = 0 V	I_{DSS}			-1	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 = -40A VGS = -4.5V, ID = -40A	$R_{DS(on)}$		6.5 8.5	7.8 11	mΩ
Transconductance VDS = -5V, ID = -40A	G_{fs}		80		S
Input capacitance f=1MHz, VDS= -20 V, VGS=0 V	C_{iss}		3401		pF
Output capacitance f=1MHz, VDS= -20 V, VGS=0 V	C_{oss}		982		pF
Reverse transfer capacitance f=1MHz, VDS= -20 V, VGS=0 V	C_{rss}		47		pF
Total Gate Charge VDS= -20V, ID= -40A,VGS= -10V	Q_G		50		nC
Gate to Source Charge VDS= -20V, ID= -40A,VGS= -10V	Q_{GS}		7		nC
Gate to Drain Charge VDS= -20V, ID= -40A,VGS= -10V	Q_{GD}		7		nC
Turn-on delay time VDD= -20 V, VGS= -10V, ID= -40A, R_{G_ext}=3Ω	td $_{(ON)}$		13		ns
Rise time VDD= -20 V, VGS= -10V, ID= -40A, R_{G_ext}=3Ω	tr		94		ns
Turn-off delay time VDD= -20 V, VGS= -10V, ID= -40A, R_{G_ext}=3Ω	td $_{(OFF)}$		66		ns
Fall time VDD= -20 V, VGS= -10V, ID= -40A, R_{G_ext}=3Ω	tf		99		ns

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 = -20A	V_{SD}			-1.2	V
Maximum Continuous Body Diode Forward Current	I_S			-85	A
Revers Recovery Time IF= -20A, di/dt = -100A/us□	Trr		49		ns
Revers Recovery Charge IF= -20A, di/dt = -100A/us□	Qrr		52		nC

Typical Performance Characteristics

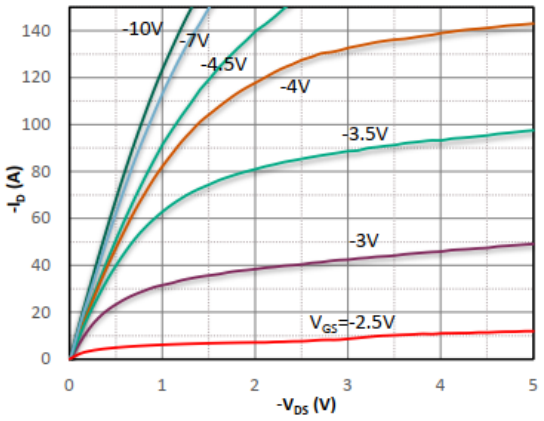


Figure 1 Output Characteristics

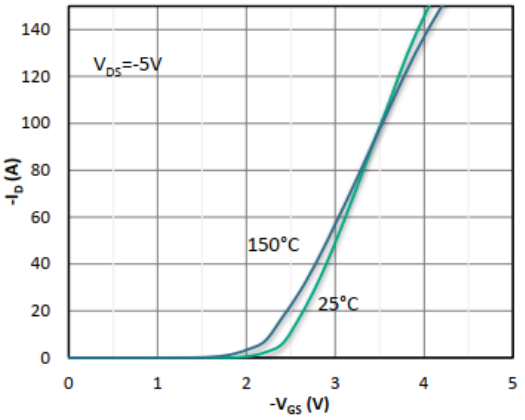


Figure 2. Transfer Characteristics

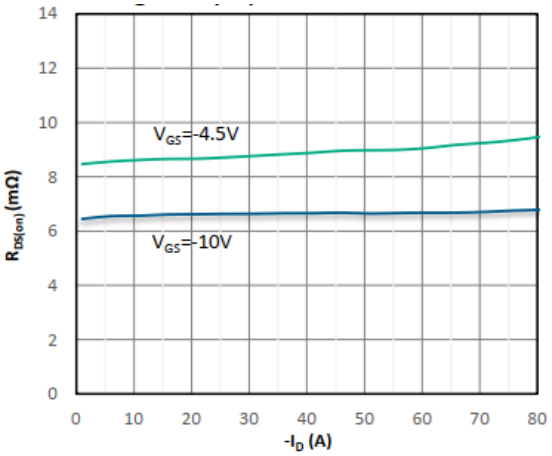


Figure 3. Rds(on) vs Drain Current

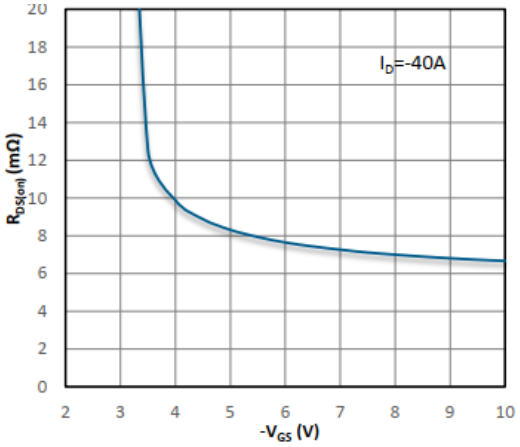


Figure 4. Rds(on) vs Gate Voltage

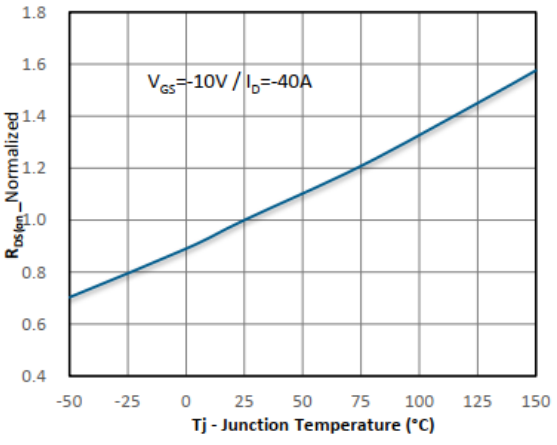


Figure 5. Rds(on) vs. Temperature

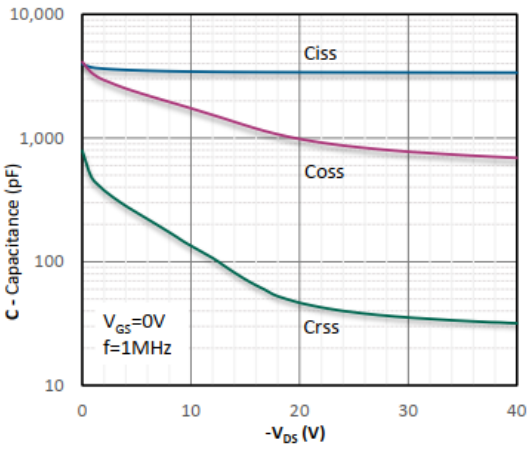


Figure 6. Capacitance Characteristics

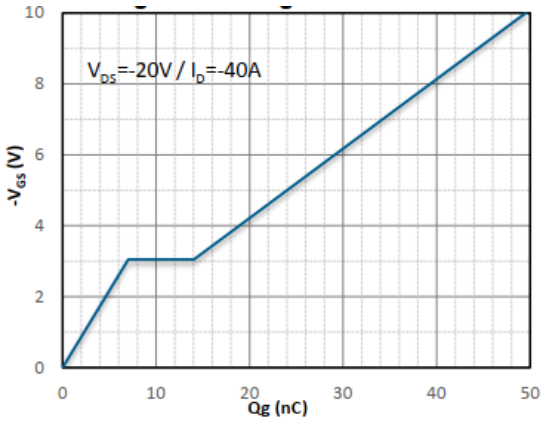


Figure 7. Gate Charge Characteristics

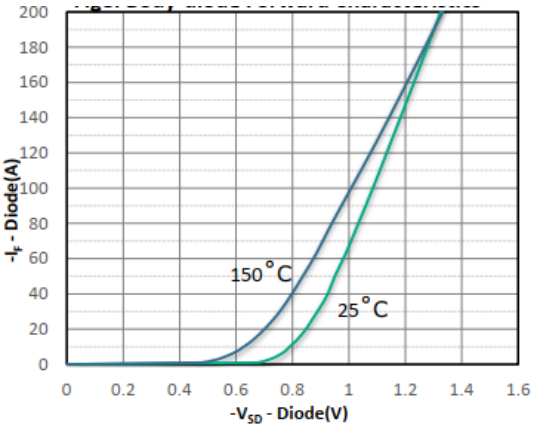


Figure 8. Body-diode Forward Characteristics

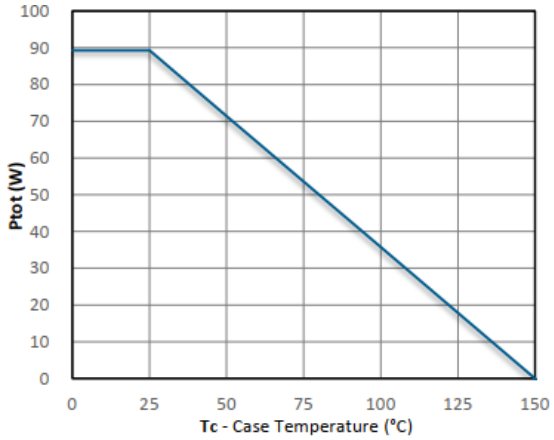


Figure 9. Power De-rating

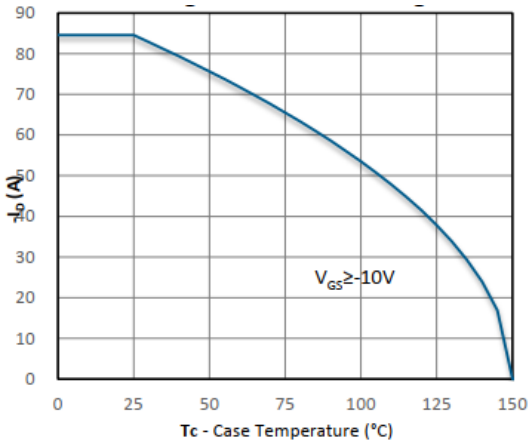


Figure 10. Current De-rating

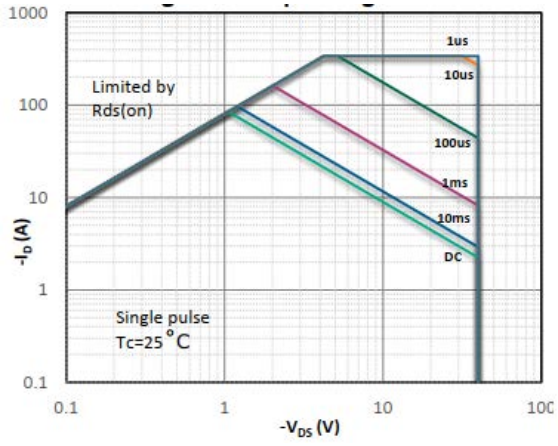


Figure 11. Safe Operating Area

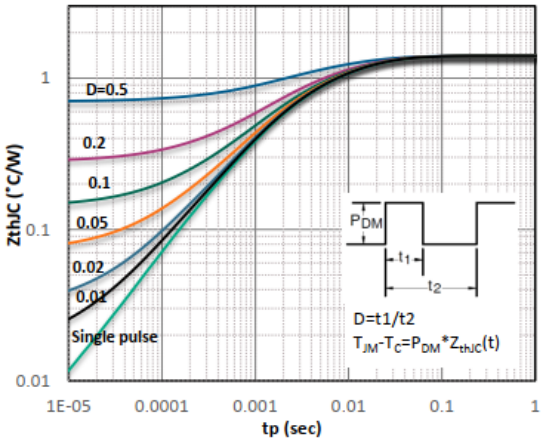
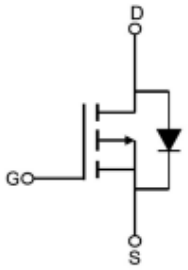
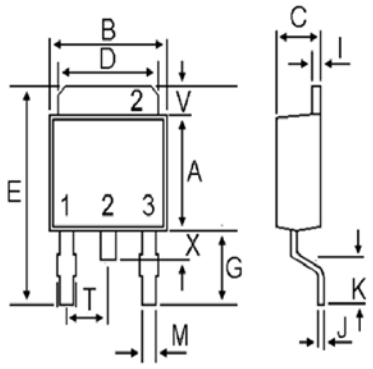


Figure 12. Max. Transient Thermal Impedance

・Circuit diagram



・Package outlines : Dimensions in (mm)



DIM	MILLIMETERS	
	MIN	MAX
A	5.97	6.22
B	6.30	6.75
C	2.18	2.40
D	4.95	5.50
E	9.40	10.41
G	2.75	3.20
I	0.46	0.89
J	0.46	0.61
K	1.40	1.78
M	0.64	0.89
T	2.18	2.38
V	0.89	1.27
X	---	1.05

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