

650V Super-Junction Power MOSFET

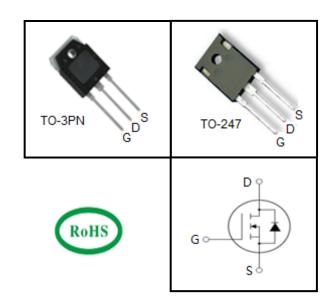
FEATURES

- $\bullet \quad \text{Very low FOM R}_{\text{DS(on)}} \times \text{Q}_{\text{g}} \\$
- 100% avalanche tested
- RoHS compliant

APPLICATIONS

- Switch Mode Power Supply (SMPS)
- Uninterruptible Power Supply (UPS)
- Power Factor Correction (PFC)

Device Marking and Package Information			
Device	Package	Marking	
TPV65R080C	TO-3PN	65R080C	
TPW65R080C	TO-247	65R080C	



Absolute Maximum Ratings $T_C = 25^{\circ}C$, unless otherwise noted				
Parameter		Symbol	Value	Unit
Drain-Source Voltage (V _{GS} = 0V)		V _{DSS}	650	V
Continuous Drain Current		I _D	47	Α
Pulsed Drain Current	(note1)	I _{DM}	141	Α
Gate-Source Voltage		V_{GSS}	±30	V
Single Pulse Avalanche Energy	(note2)	E _{AS}	1120	mJ
Avalanche Current	(note1)	I _{AR}	8.7	Α
Repetitive Avalanche Energy	(note1)	E _{AR}	1.76	mJ
Power Dissipation (T _C = 25°C)		P _D	390	W
Operating Junction and Storage Temperature Range		T _J , T _{stg}	-55~+150	°C

Thermal Resistance			
Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Case	R _{thJC}	0.32	12.001
Thermal Resistance, Junction-to-Ambient	R _{thJA}	62	K/W

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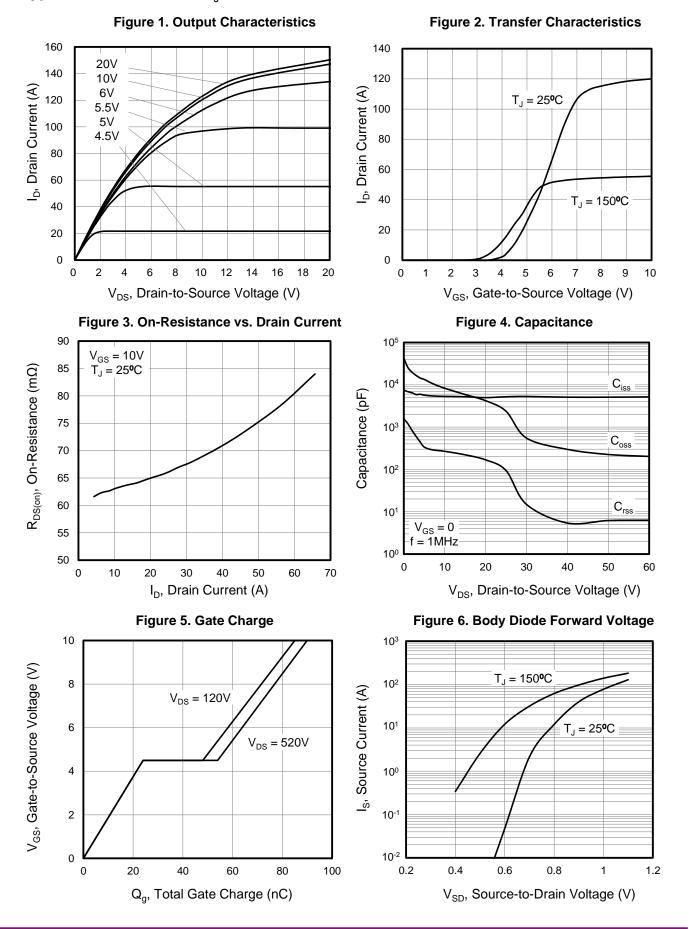
Parameter	0	To at O and distington	Value			
	Symbol Test Conditions	Min.	Тур.	Max.	Unit	
Static		•				
Drain-Source Breakdown Voltage	V _{(BR)DSS}	$V_{GS} = 0V, I_D = 250\mu A$	650			V
7 0 1 1/1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		$V_{DS} = 650V, V_{GS} = 0V, T_{J} = 25^{\circ}C$			1	μА
Zero Gate Voltage Drain Current	I _{DSS}	$V_{DS} = 650V, V_{GS} = 0V, T_{J} = 150^{\circ}C$			100	
Gate-Source Leakage	I _{GSS}	$V_{GS} = \pm 30V$			±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	2.5		4.5	V
Drain-Source On-Resistance (Note3)	R _{DS(on)}	V _{GS} = 10V, I _D = 20A		65	80	mΩ
Forward Transconductance (Note3)	g _{fs}	V _{DS} = 10V, I _D = 20A		40		S
Dynamic		•				
Input Capacitance	C _{iss}	V - 0V		5098		
Output Capacitance	C _{oss}	$V_{GS} = 0V$, $V_{DS} = 50V$, f = 1.0MHz		225		pF
Reverse Transfer Capacitance	C _{rss}			6.2		
Total Gate Charge	Q_g			90		
Gate-Source Charge	Q_{gs}	$V_{DD} = 520V, I_{D} = 47A,$ $V_{GS} = 10V$		24		nC
Gate-Drain Charge	Q_{gd}			30		
Turn-on Delay Time	t _{d(on)}			16		
Turn-on Rise Time	t _r	$V_{DD} = 400V, I_{D} = 26A,$		12		
Turn-off Delay Time	t _{d(off)}	$R_G = 1.7\Omega$		83		ns
Turn-off Fall Time	t _f			5		
Drain-Source Body Diode Characteri	stics					
Continuous Body Diode Current	I _S	T 0500			47	۸
Pulsed Diode Forward Current	I _{SM}	$T_C = 25^{\circ}C$			141	Α
Body Diode Voltage	V _{SD}	$T_J = 25^{\circ}\text{C}, I_{SD} = 47\text{A}, V_{GS} = 0\text{V}$		0.9	1.2	V
Reverse Recovery Time	t _{rr}			720		ns
Reverse Recovery Charge	Q _{rr}	$V_R = 400V, I_F = 26A,$ $di_F/dt = 100A/\mu s$		19		μC
Peak Reverse Recovery Current	I _{rrm}	1,111		52		А

Notes

- 1. Repetitive Rating: Pulse Width limited by maximum junction temperature
- 2. I_{AS} = 15A, V_{DD} = 50V, R_{G} = 25 Ω , Starting T_{J} = 25 $^{\circ}$ C
- 3. Pulse Test: Pulse Width ≤ 300µs, Duty Cycle ≤ 1%



Typical Characteristics $T_J = 25^{\circ}\text{C}$, unless otherwise noted



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Figure 7. On-Resistance vs. Temperature

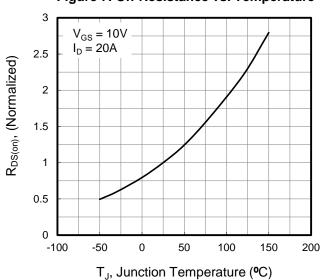


Figure 8. Threshold Voltage vs. Temperature

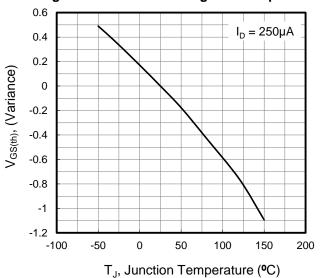
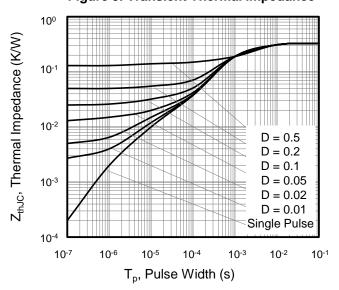


Figure 9. Transient Thermal Impedance



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Figure A: Gate Charge Test Circuit and Waveform

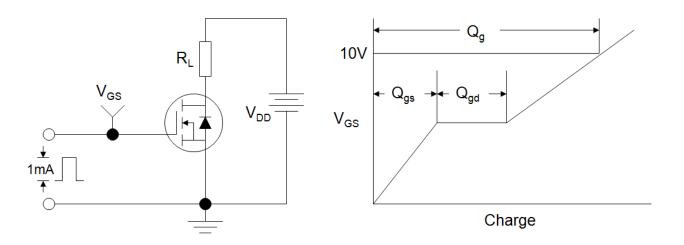


Figure B: Resistive Switching Test Circuit and Waveform

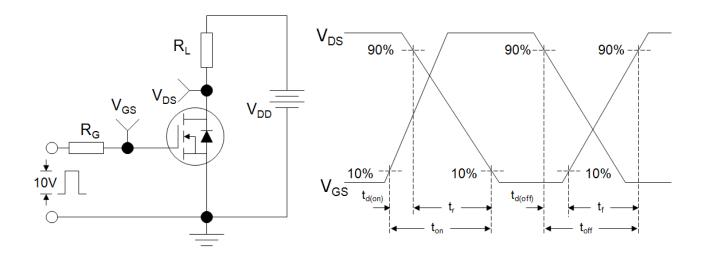
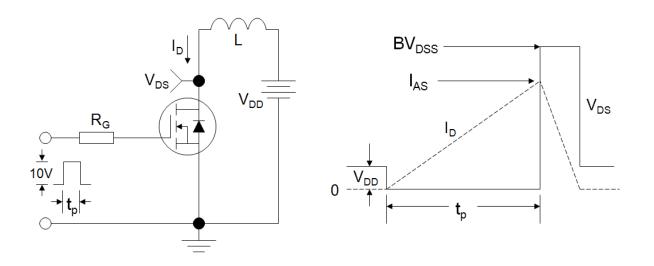


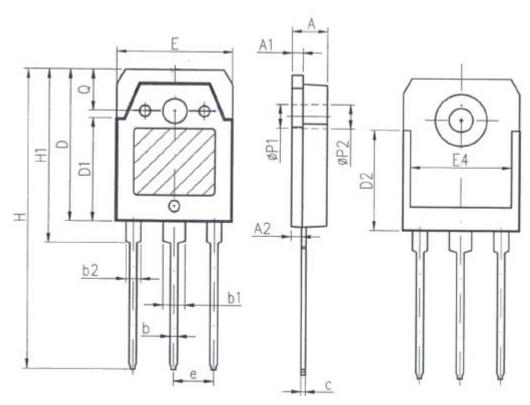
Figure C: Unclamped Inductive Switching Test Circuit and Waveform



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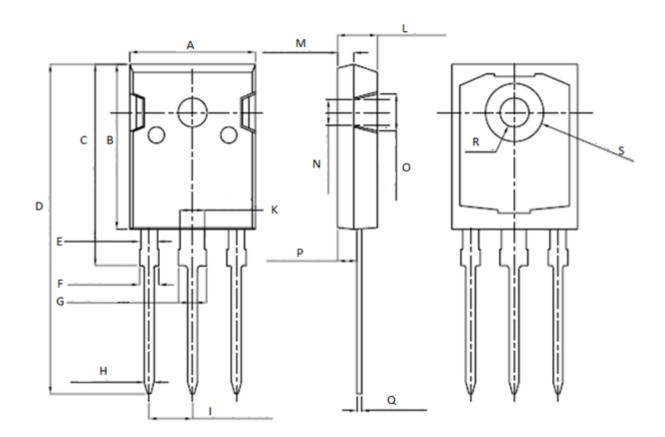






Unit:mm				
Symbol	Min.	Max.		
Α	4. 6	5		
A1	1. 4	1. 65		
A2	1. 18	1. 58		
b	0.8	1. 2		
b1	2. 8	3. 2		
b2	1. 8	2. 2		
С	0. 5	0. 75		
D	19. 6	20. 2		
D1	13. 55	14. 25		
D2	12. 9REF			
E	15. 35	15. 85		
E4	12. 6	_		
е	5. 45TYP			
Н	40. 1	40. 9		
H1	23. 15	23. 65		
P1	3. 2REF			
P2	3. 5REF			

TO-247



Unit: mm			
Symbol	Min.	Max.	
Α	15. 95	16. 25	
В	20. 85	21. 25	
С	20. 95	21. 35	
D	40. 5	40. 9	
E	1. 9	2. 1	
F	2. 1	2. 25	
G	3. 1	3. 25	
Н	1.1	1. 3	
I	5. 40	5. 50	

Unit: mm			
Symbol	Min.	Max.	
K	2. 90	3. 10	
L	4. 90	5. 30	
M	1. 90	2. 10	
N	4. 50	4. 70	
0	5. 40	5. 60	
Р	2. 29	2. 49	
Q	0. 51	0. 71	
R	ф 3. 5	ф 3. 7	
S	ф 7. 1	ф 7. 3	



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